Divine exchanges: Applying social exchange theory to religious behavior

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Abstract
All social exchanges involve some degree of uncertainty, although the amount depends on the conditions of the exchange. Uncertainty may arise due to the unverifiable quality of the good exchanged or the indeterminable quality of the exchange partner (i.e., whether she is trustworthy). Social exchange theory offers several mechanisms by which uncertainty may be reduced or mitigated such as through trust, repeated exchanges, reputation, information regarding the exchanges of others, and institutions. This paper applies principles from social exchange theory to religious behavior and argues that the same mechanisms that reduce uncertainty in social exchanges also reduce uncertainty in 'religious' exchanges, resulting in higher levels of religious commitment. In particular, this paper proposes that having experiences believed to be supernatural, having close ties to others within one's religious congregation, and being affiliated with a higher tension church should increase religious commitment through decreasing uncertainty. Analysis of the 1988 General Social Survey and the 2007 Baylor Religion Survey supports these hypotheses.

Introduction

All social exchanges—interactions between two or more individuals where valued goods are exchanged—involve some degree of uncertainty, although

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the amount depends on the conditions of the exchange (Molm et al., 2000, 2009). Uncertainty—the inability to predict the probability of certain outcomes—may arise due to the unverifiable quality of the good exchanged or the indeterminable 'quality' of the exchange partner, that is, not knowing her future behavior—whether or not she will reciprocate once an actor contributes to the exchange (Anthony et al., 2010; Kollock, 1994; Lawler et al., 2000; Molm, 1994; Molm et al., 2000; Pavlou et al., 2007). Uncertainty reduces an individual's likelihood of participating in an exchange because he is unable to predict the quality of the good promised or even whether he will receive the good at all. There are several mechanisms by which uncertainty may be reduced or mitigated, such as through trust, repeated exchanges, reputation, information regarding the exchanges of others, and institutions (Kollock, 1994; Lawler et al., 2000; Molm, 1994; Molm et al., 2000, 2009).

Although uncertainty is a key concept within social exchange theory, most experimental studies do not measure a participant's actual level of uncertainty, but instead compare exchange behavior in conditions of low uncertainty to exchange behavior in conditions of high uncertainty. The results of these studies are therefore based on the level of uncertainty associated with the *type* of exchange, which may or may not reflect the actual level of uncertainty the individual is experiencing (see Molm et al., 2009, for a notable study of varying levels of certainty and risk within types of exchanges). Individuals participating in the same type of exchange who have varying levels of uncertainty should behave differently in accordance with their level of uncertainty. In this paper, I use a direct measure of uncertainty to test what factors affect uncertainty and how uncertainty in turn affects exchange behavior. In addition, while there have been numerous laboratory experiments developing, testing, and supporting social exchange theoretic predictions, few studies have attempted to test these findings outside of experimental or economic settings. This study shows the applicability of social exchange theory to one type of social behavior—religious behavior.

Drawing on social exchange theory, the 'religious economies theory' conceives of religion as comprised of *perceived* exchanges between individuals and a god or god(s), where individuals exchange their *religious commitment*—abiding by the behavioral dictates of a religion—in hopes of receiving religious goods, especially other-worldly goods (i.e., unverifiable goods believed to be received in an afterlife context, such as Heaven) (Stark and Finke, 2000). Consequently, a fundamental and universal problem for religious individuals is one of uncertainty (Iannaccone, 1995, 2005; Stark and Finke, 2000). Not only are religious individuals unable to ascertain the

quality of the good, they cannot be certain it even exists. They also cannot determine whether they will ever receive the good or whether their exchange partner (i.e., God) is real. Thus, 'religious exchanges' are perhaps the epitome of exchanges under conditions of uncertainty. Why then does anyone ever become committed to a religion? I argue that the same mechanisms that reduce uncertainty in social exchanges, thereby facilitating exchange, also reduce uncertainty in religious exchanges, thereby facilitating religious commitment. I propose that having experiences believed to be supernatural, having close ties to others within one's religious congregation, and being affiliated with a high-tension religious organization (i.e., a religious organization in tension with society due to its beliefs or behaviors) should increase religious commitment through decreasing uncertainty.

Although religious commitment can be measured in different ways, this paper operationalizes it as religious giving—an important and often-studied measure of religious commitment. Voluntary giving to religious organizations consistently represents the largest share of America's philanthropy, which has resulted in a large body of research investigating the correlates of religious giving (Lincoln et al., 2008). However, there has been little work in this area explicitly identifying causal mechanisms. Lincoln et al. (2008) and others have called for more research specifying and testing 'causal mechanisms so that we may better understand how giving is causally generated in the social world' (p.39). This paper contributes to this literature by theorizing and testing religious certainty as one such causal mechanism. In this way, this paper provides a general causal mechanism predicted to explain not only religious giving but other measures of religious commitment as well. I test these hypotheses using the 1988 General Social Survey (GSS) and the 2007 Baylor Religion Survey (BRS) and find support for them.

Social exchange theory

Social exchange theory begins by assuming that individuals are rational—when making decisions they choose the option that is perceived to result in the highest net benefit given their preferences and constraints (Blau, 1964) or at the very least they seek 'to obtain more of the outcomes that they value' (Molm et al., 2000: 1398). However, individuals are not assumed to have perfect knowledge (Kollock, 1994); instead, they are assumed to make rational decisions based on the knowledge they have, whatever that may be. Sometimes individuals make decisions under conditions of uncertainty or risk. In the former condition, the actor does not know the likelihood of certain outcomes, whereas in the latter condition the actor believes

she knows the likelihood of failure and is able to assign probabilities to particular outcomes. Rational actors under risk will choose the option with the highest anticipated value; however, rational actors under uncertainty have no indication of what option will have the best consequence (Hechter, 1997; Pfeffer and Salancik, 1978). Because all social exchanges involve some level of uncertainty or risk (Molm et al., 2000), a great deal of social exchange research has focused on the implications of exchanges under these conditions and how uncertainty and risk can be reduced or mitigated.

A social exchange is an exchange between two or more actors where each actor offers some good or outcome the other values (Lawler et al., 2000; Molm, 1994; Molm et al., 2000). All exchanges involve some degree of mutual dependence, where each actor depends on her partner in order to receive some desired good or outcome (Molm, 1994). Mutual dependence, and thus exchanges, create a risk of reneging since one actor may provide a desired good for his partner and receive a less than desired good or nothing in return (Molm et al., 2000). Thus, there are generally two main types of uncertainty: good quality and 'seller' quality (Pavlou et al., 2007). Good quality uncertainty, as its name suggests, refers to when an actor is uncertain about the quality of the desired good. Examples of goods of uncertain quality include rubber (the quality is unable to be determined at the time of sale) (Kollock, 1994), used cars (Akerlof, 1970), and goods sold online, whose quality cannot be determined until they are received after being purchased (Anthony et al., 2010; Pavlou et al., 2007). Seller quality uncertainty refers to not knowing the seller's true characteristics and her future behavior, whether she will renege on the exchange either by not providing the good at all or by providing a lower quality good than promised (Kollock, 1994; Lawler et al., 2000; Molm, 1994; Pavlou et al., 2007).

Not all types of exchanges involve the same degree of uncertainty (Molm et al., 2000, 2009). Negotiated exchanges tend to entail less uncertainty than reciprocated exchanges. Negotiated exchanges involve both parties agreeing to the terms of exchange—who provides what to whom and for what in return—and consist of the bilateral giving of the benefits agreed upon (Molm et al., 2000). While there may be uncertainty present regarding the negotiation process (e.g., how to negotiate, what offers to make, and what strategies to use), this uncertainty is reduced, if not eliminated, once the terms of an exchange are agreed upon—'actors know what they are getting for what they are giving, and they can choose to engage in the exchange or not' (Molm et al., 2000: 1401). In addition, if there are conditions or institutions in place that make the terms of the exchange binding, then there is little risk to the actors because those binding

conditions provide assurance that the exchange will go as planned (Molm et al., 2000, 2009). However, there may still be good quality uncertainty, as the quality of the good may not be verifiable at the time of the exchange (Kollock, 1994).

Reciprocated exchanges are asynchronous and non-negotiated, where one actor contributes to an exchange by giving some type of valued good to another person 'without knowing whether, when, or to what extent the other will reciprocate in the future' (Molm et al., 2000: 1340); for example, giving someone advice or pet sitting for a neighbor while she is out of town. These types of interactions occur with one person offering the good (e.g., advice or pet sitting) without an explicit exchange agreement specifying how or whether the receiver will reciprocate. Thus, reciprocal exchanges involve more uncertainty or risk than negotiated exchanges, because the actor contributes to an exchange without any assurance of reciprocation (Molm et al., 2000, 2009).

The level of uncertainty or risk associated with an exchange affects the likelihood of the exchange transpiring. Rational actors seeking valued goods will be less likely to participate in an exchange if the probability that they will not receive the good or will receive a good of lower quality is high (i.e., risk condition) or if they are entirely unable to determine the probability of a net-cost outcome (i.e., uncertainty condition). Consequently, actors will tend to pursue exchanges that are less risky and more certain. Yet, we know empirically that markets for rubber, used cars, internet goods, and other highly uncertain or risky goods do exist and individuals do participate in reciprocal exchanges. Given this, it is important to investigate what mechanisms are in place to reduce uncertainty and risk such that individuals can participate in exchanges that would otherwise be uncertain or risky. Social exchange theoretic research has identified several such mechanisms allowing for predictions regarding when actors will engage in exchanges that are otherwise (net of those mechanisms) uncertain or risky.

Reducing uncertainty and risk in exchange

There are several interrelated ways to reduce uncertainty in exchanges: (1) trust, (2) repeated exchanges, (3) reputation, (4) knowledge of the exchanges of others, and (5) institutions. *Trust* is defined as 'expectations that an exchange partner will behave benignly, based on the attribution of positive dispositions and intention to the partner in a situation of uncertainty and risk' (Molm et al., 2000: 1402). Trust emerges as a reaction to uncertainty and risk (Blau, 1964; Cook, 2005; Heimer, 2001; Molm et al., 2000, 2009), where individuals are willing to make themselves vulnerable to their

exchange partner's behavior because they expect that their partner will reciprocate accordingly (Anthony et al., 2010; Coleman, 1990; Hardin, 2002). Trust has been suggested to be a key facilitator of exchanges, since it can mitigate the risk and uncertainty involved (Anthony et al., 2009; Buchan et al., 2002; Kollock, 1994; Molm, 1994; Molm et al., 2000, 2009).

Blau (1964) argued that trust generally evolves slowly over time through *repeated exchanges* with the same partner. The exchange relationship begins with minor exchanges with little associated risk and once the exchange partner has proven herself to be trustworthy, the exchanges may begin to involve more valuable or costly goods exchanged at greater frequencies. Thus, repeated exchanges are typically necessary for the emergence of trust (Blau, 1964; Lawler and Yoon, 1996, 1998; Molm, 1994). Repeated successful exchanges not only signal the trustworthiness of the partner, but also provide information about her likely future behavior (Cook and Emerson, 1978; Kollock, 1994; Molm et al., 2000). They allow an actor to predict his exchange partner's future behavior on the basis of past behavior, thereby lowering the risk and uncertainty involved in the exchange (Cook and Emerson, 1978; Kollock, 1994).

Repeated exchanges also allow individuals to develop *reputations*. Individuals who behave benignly in past exchanges develop a reputation of being trustworthy, whereas those who renege on exchanges develop a reputation of being untrustworthy (Granovetter, 1985; Kollock, 1994). Granovetter (1985) suggests that under conditions of uncertainty, individuals will use information regarding reputations, either from their own experiences or from those of trusted informants, to determine whether or not to participate in an exchange. While information regarding reputations may come from past experiences or testimonials from trusted associates, it may also come from having *knowledge of the exchange behavior of others*. In one of Kollock's (1994) experimental exchange settings, subjects participated in a series of exchanges where the quality of the good exchanged was unknown to the buyer until after the exchange transpired. Although subjects were not allowed to communicate with each other, they used the exchange behavior of other subjects to identify those who were selling high-quality goods:

> Indeed, the prices buyers were willing to pay for goods from a particular seller and the rush by some buyers to complete a trade with particular sellers seemed to be sources of information for other buyers—if other buyers were eager to trade with seller X, then maybe they should be too. (Kollock, 1994: 337)

In this way reputations were communicated non-verbally through the behavior of other buyers.

Uncertainty and risk may also be reduced through third-party institutions, which provide incentives that encourage benign behavior (Yamagishi and Yamagishi, 1994). Examples of these types of institutions include 'legal or normative authorities that impose sanctions for violations of agreements or failure to fulfill one's obligations, guarantees such as collateral that protect against loss, warranties that assure certain stands of quality, and so forth' (Molm et al., 2000: 1403). When institutions provide assurances like these, exchanges depend less on trust and reputation than when these assurances do not exist.

Religion as exchange

Sociologists of religion have drawn on the language of exchange theory to better understand religious behavior. The religious economies approach also assumes that individuals are rational and they will make religious choices based on which provide the most benefits (Stark and Finke, 2000; see also Lavric and Flere, 2011). This approach defines religion as including the terms of exchange between individuals and a god or gods with religious organizations[1] mediating these exchange relationships (Stark and Finke, 2000: 91; see also Stark and Bainbridge, 1996).[2] Of course, these exchange relationships exist in the minds of religious individuals who believe in them. However, because religious individuals do believe in these exchange relationships, they can have real consequences for their behavior. As WI Thomas states: 'If men define situations as real, they are real in their consequences.' These perceived religious exchanges combine elements of negotiated and reciprocal exchange types. While these perceived religious exchanges are negotiated in the sense that there are explicit terms of exchange that must be followed, they are more so reciprocal in that humans are required to contribute to the exchange without knowing whether, if, and to what extent they will receive the goods promised to them.

Individuals participate in religion in order to receive religious goods—goods 'believed to be received in the distant future or in some other nonverifiable context'—and are willing to exchange their commitment to a religious organization for them (Stark and Bainbridge, 1996: 284; see also Lavric and Flere, 2010, 2011; Wollschleger and Beach, 2011). I define religious commitment as all behavior in accordance with the terms of exchange provided by the religious organization (Stark and Finke, 2000: 103). The terms of exchange refer to explanations provided by the religious organization regarding what the individual needs to do in order to receive the religious goods she desires. Tithing, attending church services, and abiding by the specified rules of a religious organization are examples of religious

commitment. While religions offer a wide variety of goods, Stark and Finke (2000) propose that the most valuable religious goods are other-worldly (i.e., goods believed to be received in some afterlife context). Since other-worldly benefits are not empirical, religious individuals may doubt they will ever actually receive them, thereby creating uncertainty for individuals who prepay the costs (through their commitment) without assurance of receiving the benefits (Brodin, 2003; Finke et al., 1996; Finke and Stark, 1992; Iannaccone, 1995, 1997; Stark and Finke, 2000). In addition, religious individuals may also question whether their perceived exchange partner (i.e., God) even exists. Consequently, making cost–benefit/rational calculations of religious choices is problematic because they necessarily involve uncertainty (Brodin, 2003; Durkin and Greeley, 1991; Finke et al., 1996; Iannaccone, 1995; Montgomery, 1996; Sherkat and Wilson, 1995; Stark and Finke, 2000). Thus, religious exchanges are exchanges under conditions of both seller and good quality uncertainty. Those considering religious commitments will seek assurances that they will in fact receive the benefits promised to them, that is, they will attempt to reduce their uncertainty (Iannaccone, 1995; Stark and Finke, 2000). Just as individuals are more likely to participate in low-uncertainty social exchanges, religious individuals should be more likely to participate in religious exchanges when their uncertainty is low. Religious individuals who trust/believe that God will not renege on his/her side of the exchange should be more likely to uphold their end of it by giving their commitment.

> **Hypothesis 1:** Individuals with lower levels of religious uncertainty will be more likely to have higher levels of religious commitment.

Reducing uncertainty in religious exchanges

As previously mentioned, repeated exchanges can mitigate or reduce uncertainty through the development of trust and/or the ability to predict future behavior based on past behavior. In religious exchanges, experiences believed to be supernatural are *believed* to be interactions, and sometimes exchanges, between an individual and a god or gods. Adapted from Stark and Finke (2000: 110), supernatural experiences will be defined as experiences where an individual *believes* she has had 'some sense of contact, however fleeting, with a god or gods' or the supernatural. Consequently, the 'supernatural' in supernatural experiences does not refer to the quality of the experiences (that the experiences are supernatural), but refers to a belief that imbues certain experiences as supernatural. Supernatural experiences are generally considered undeniable proof of the existence of the supernatural

and the validity of religious beliefs (Smith et al., 1998; Stark and Finke, 2000; Young, 1997) and should therefore reduce uncertainty.

> **Hypothesis 2:** Individuals who have experienced or witnessed others experiencing supernatural experiences should have higher levels of religious commitment, partially due to having higher levels of certainty.

Granovetter's (1985) argument that individuals use reputational information provided by trusted informants to determine whether or not to participate in an exchange may also be applied to religious exchanges. Stark and Finke (2000) propose that an individual's certainty in religious exchanges is largely dependent on the extent to which trusted others are certain in them as well. This assertion is based on the notion that religious communities help individuals evaluate the claims that religions make (Sherkat, 1997: 68). Individuals rely on their communities to determine if religious explanations (e.g., the existence of God, other-worldly goods, and so on) are plausible (Brodin, 2003; Iannaccone, 1995; Pfaff and Corcoran, 2012; Sherkat, 1997; Smith et al., 1998; Stark and Finke, 2000). Thus, positive evaluations of religious explanations from an actor's friends and family should increase her certainty. However, not all social ties are alike. Ties to non-believing (uncertain) individuals should decrease, not increase, certainty. Since, on average, members of a religious organization should be expected to affirm the religious explanations of their religious organization more than outsiders, the more intra-religion ties an individual has the higher her level of certainty should be.

> **Hypothesis 3:** Individuals with more ties to others in their religion should have higher levels of religious commitment, partially due to having higher levels of certainty.

There are also certain religious institutional structures that can reduce uncertainty in religious exchanges. Religious organizations in higher tension with society (e.g., evangelical or theologically conservative religious organizations) offer an institutional structure that may be especially able to facilitate high levels of religious certainty. Research typically finds that religious organizations in higher tension with society, whether due to behavioral proscriptions or theological tenets, tend to have higher levels of religious commitment (Iannaccone, 1994; Kelley, 1986 [1972]; Smith et al., 1998; Stark and Finke, 2000; see also Finke et al., 2006; Hoge et al., 1996; Olson and Perl, 2001, 2005). Iannaccone (1995: 287) theorizes that these religious organizations increase certainty by offering numerous

collective activities where highly committed members participate, thereby providing 'continuous assurance [of religious explanations] through the enthusiasm, devotion, conviction, and testimony of fellow members.' By increasing the number of active and committed members, these religious organizations may thereby create a social environment that is conducive to the generation and reinforcement of religious certainty. This is equivalent to Kollock's (1994) exchange experiment, where individuals made inferences about a seller's reputation and the likelihood of a successful exchange based on the exchange behavior of others. In these churches, individuals constantly observe other members paying the costs of commitment, that is, they are perceived to be meeting their end of the terms of exchange set forth by the religious organization. Individuals may then infer, from the highly committed behavior of others, that the terms of exchange are valid, thereby increasing their certainty.

> **Hypothesis 4:** Individuals affiliated with higher tension religious organizations should have higher levels of religious commitment, partially due to having higher levels of certainty.

Religious giving

Although behavioral religious commitment can be operationalized in numerous ways, this study focuses on one important expression of religious commitment: religious giving. Religious organizations depend on the monetary contributions of their members to survive and be successful (Iannaccone, 1992; Stark and Finke, 2000). Yet, as Smith et al. (2008) note:

> … a sizeable number of Christians give no money, literally nothing. Most of the rest of American Christians give little sums of money. Only a small percent of American Christians give generously, in proportion to what their churches call them to give. (p.4)

Given the importance of financial donations for religious organizations, there has been a considerable amount of research attempting to identify the correlates of religious giving. Several demographic variables have consistently been found to have a relationship with religious giving, including income, age, marriage, and education (see Hoge and Griffin, 1992 and Lincoln et al., 2008 for reviews of this literature). Religious participation, typically operationalized as religious service attendance, is one of the most important religion variables for explaining religious giving (e.g., Chaves and Miller, 1999; Hoge et al., 1996; Smith et al.,

2008). Religious beliefs also tend to be related to religious giving, although several studies find that their effect is not as strong as attendance (Iannaccone, 1997; Luidens and Nemeth, 1994). The weaker relationship between religious beliefs and giving may be partly due to how beliefs are measured. Questions designed to capture religious beliefs generally focus on their content; respondents are either given a list of belief statements they can choose from or they are given one statement of faith and asked whether they agree or disagree with it. This method of measuring beliefs is not exclusive to religious giving studies, but is present in much of religion research. Addressing the broader literature, Hilty (1988) argues that this conceptualization of belief is too simplistic because it fails to take into account the complexities of belief. Religious belief is not merely a matter of agreement or disagreement with a particular statement of faith but also involves degrees of certainty or doubt in those statements. In this way, subjects may have 'difficulties with religious affirmations' (i.e., doubt), but this is 'rarely tested directly' (Hilty, 1988: 243) and it is to this day an understudied topic (Iannaccone, 2005). Individuals may espouse the same belief (e.g., belief in God), but have varying levels of certainty in it. Based on social exchange theory, this study hypothesizes that this variation may contribute to explaining differences in religious giving and is the first to test this prediction. While religious service attendance and beliefs are emphasized in religious giving literature, there have been considerably fewer studies examining the effect of religious social ties. Notably, Finke et al.'s (2006) study on congregational giving uses congregational social involvement as a proxy for social embeddedness and finds a positive relationship between it and giving. However, using social involvement to measure social ties may confound the effects of religious participation and social relationships. This study contributes to this literature by using a direct measure of religious social ties.

On the congregational level, religious tradition, operationalized using denominational classification schemes, has also been linked to religious giving (for reviews see Hoge and Griffin, 1992; Lincoln et al., 2008). Generally, this research finds that individuals within more theologically conservative, strict, and/or higher tension religious organizations tend to have higher levels of religious giving, although Peifer's (2010) recent study finds mixed support for these relationships. In their extensive review of the literature, Lincoln et al. (2008: 38) assert that a major shortcoming in religious giving research is its failure to identify causal mechanisms. Drawing on social exchange theory, this paper proposes religious certainty as one such mechanism.

Methodology

To test the previous hypotheses, I use two different datasets. The first is the National Opinion Research Center's (NORC's) 1988 GSS, a large nationally representative survey of American adults that includes a religion module.[3] This module is particularly useful because it asks a series of questions regarding religious doubt and religious socialization. The second dataset is the 2007 BRS (Baylor University, 2007),[4] which was modeled after the GSS. It is a nationwide, random sample of American adults,[5] but, unlike the GSS, its primary objective is to ask religion questions. These two surveys ask questions on religious doubt, religious socialization, perceived supernatural experiences, *and* religious giving, making them optimal datasets for testing the predictions of this study.

Dependent variable

Religious commitment is measured as religious giving. In the GSS, respondents were asked how much they contribute to their religion every year (excluding school tuition). Religious giving is measured as the proportion of a respondent's family income that is contributed to her religion every year (excluding school tuition). Following Peifer (2010), religious giving was logarithmically transformed to normalize the distribution. Because the log of zero is not defined, .001 was added prior to logarithmic transformation to retain those who did not contribute. In the BRS, respondents were asked: 'During the last year, approximately how much money did you and other family members in your household contribute to your current place of worship?' Respondents were provided with 12 categorical contribution ranges. The mid-point of each category was used and a value of 10,000 was used for the maximum category (i.e., US$10,000 or more). Because the lowest contribution category was 'under US$500', there are no zero values, as the mid-point for this category is 250. Religious giving is measured as the proportion of a respondent's family income that was contributed to his/her current place of worship during the last year. To normalize the distribution, religious giving was logarithmically transformed. Since this question asks specifically about giving to one's 'current place of worship' those unaffiliated with a place of worship were necessarily dropped from the sample.

Mechanism

For the GSS, I used three variables to measure religious certainty: (1) level of doubt one has regarding the existence of God; (2) level of doubt one has

regarding one's faith; and (3) how close one feels to God. GSS respondents were asked: 'Which statement comes closest to expressing what you believe about God: don't believe in God; don't know and no way to find out; believe in higher power; believe in God sometimes; some doubts, but believe in God; no doubts about God's existence.' These responses were collapsed into five categories: (0) Don't believe in God or don't know;[6] (1) believe in a higher power; (2) believe in God sometimes; (3) believe in God with some doubts; and (4) believe in God without doubts. GSS respondents were also asked to place themselves from '(1) My faith is completely free of doubts; to (7) My faith is mixed with doubts' (i.e., response ranges from 1 to 7). These responses were collapsed and reverse coded into five categories: (0) for values of 5, 6, and 7 (my faith is mixed with doubts); (1) for values of 4; (2) for values of 3; (3) for values of 2; and (4) for values of 1, that is, 'free of doubt.' GSS respondents were also asked how close they feel to God most of the time and were provided with the following five categories: does not believe in God; not close at all; not very close; somewhat close; and extremely close. These were left as is and were given values from 0 (does not believe in God) up to 4 (extremely close). These three variables were summed to create an additive religious certainty index.[7] This index reflects an individual's religious certainty with low levels of doubt regarding the existence of God and their faith and high levels of closeness with God reflecting high levels of certainty. Low values of the index indicate low certainty (high uncertainty) and high levels indicate high certainty (or low uncertainty).

For the BRS, to measure religious certainty I used two variables: (1) level of doubt one has regarding the existence of God and (2) level of doubt one has regarding whether he/she is going to Heaven. BRS respondents were asked 'Which one statement comes closest to your personal beliefs about God?' and were provided with the following responses: I have no doubts that God exists; I believe in God, but with some doubts; I sometimes believe in God; I believe in a higher power or cosmic force; I don't know and there is no way to find out; and I am an atheist. These categories were collapsed into five categories: (0) I am an atheist or I don't know; (1) believe in a higher power; (2) believe in God sometimes; (3) believe in God with some doubts; and (4) believe in God without doubts. BRS respondents were also asked 'How certain are you that you will get into Heaven?' and were given the following response categories: not at all certain; not very certain; somewhat certain; quite certain; very certain; I don't believe in Heaven;[8] and I don't know. These categories were collapsed into five categories: (0) I don't believe in Heaven, I don't know, or not at all certain; (1) not very certain; (2) somewhat certain; (3) quite certain; and (4) very certain. These

two variables were summed to create an additive religious certainty index.[9] This index reflects an individual's religious certainty with low levels of doubt regarding the existence of God and whether he/she is getting into Heaven reflecting high levels of certainty. Thus, as with the GSS certainty index, low values of the index indicate low certainty (high uncertainty) and high levels indicate high certainty (or low uncertainty).

Independent variables

Higher tension religious organizations are often identified based on denominational affiliation. In this study, evangelical Protestant denominations are used to operationalize higher tension religious groups. Higher tension religious groups are deviant subcultures that entail beliefs, norms, and behaviors that differ from and conflict with those of mainstream society, which makes interacting with outsiders more difficult or costly (Bainbridge and Stark, 1980; Smith et al., 1998; Stark and Finke, 2000). Evangelical religious groups fall under this category: they are more likely to hold conservative sex and gender norms, to be intolerant of certain types of outsiders, to express negative views toward science, and to have homophilous social ties (Ellison and Musick, 1995; Scheitle and Adamczyk, 2009; Smith et al., 1998; Stark and Finke, 2000; Steensland et al., 2000; Wellman, 2008; Woodberry and Smith, 1998). Religious tradition categorizations are based on Steensland et al.'s (2000) categorization scheme, which identifies six religious categories: Catholic, Jewish, black Protestant, mainline Protestant, evangelical Protestant, and other affiliation. Because of their small sample size, Jews were included with 'other affiliation.' Catholic, black Protestant, mainline Protestant, and other affiliation were each coded as separate binary variables (0 = not affiliated, 1 = affiliated). For the GSS, an additional binary variable was created for those unaffiliated with a religion. This was unnecessary for the BRS, because the unaffiliated were dropped from the sample due to the nature of the dependent variable (i.e., proportion of one's family income given to one's *current* place of worship). Evangelical Protestant serves as the referent category.

In the GSS, respondents were asked to think of their three closest friends and were then asked if each of these friends attends their congregation. I coded these variables as 0 for close friends who do not attend the respondent's congregation and 1 for close friends who do attend the respondent's congregation. These three binary variables were then summed to create an additive intra-congregational friendships index. In the BRS, respondents were asked 'How many of your friends attend your place of worship?' with the following response categories: (1) none; (2) a few; (3) about half; (4)

most; and (5) all. These categories were kept and are used to measure intra-congregational friendships.

To measure perceived supernatural experiences, in the GSS I used a question asking respondents whether they had felt very close to a powerful, spiritual force that seemed to lift them out of themselves. Respondents who reported having experienced this were coded as 1 and those who reported never having experienced this as 0. In a series of questions, the BRS asked respondents whether they have had any of the following eight experiences: 'I witnessed a miraculous, physical healing'; 'I received a miraculous physical healing'; 'I spoke or prayed in tongues'; 'I felt called by God to do something'; 'I heard the voice of God speaking to me'; 'I had a dream of religious significance'; 'I was protected from harm by a guardian angel'; and 'I had a religious conversion experience.' Each of these eight questions was coded as a binary variable with respondents who reported having had the experience receiving a value of 1 and otherwise 0. These eight variables were summed to create an additive perceived supernatural experience index.[10]

Control variables

I include the following control variables in all models: sex (0 = male, 1 = female); education; income (logged family income in thousands of dollars); age (in years); marital status (0 = not married, 1 = married); and religious service attendance. Religious service attendance is coded as a binary variable with 1 representing regular attenders (i.e., those who attend a religious service at least once a week) and 0 indicating non-regular attenders (i.e., those who attend a religious service less than once a week). Education is measured in years for the GSS data and as two binary variables for the BRS with 'has a college degree' as the referent category: (1) less than a high school degree (1 = has less than a high school degree, 0 = otherwise) and (2) has a high school degree (1 = has a high school degree, 0 = otherwise). Respondents were provided with categorical responses for family income and the mid-point of each category was used. The maximum category for the GSS was US$60,000 and above and for the BRS was US$150,001 and above. For these categories, the mean income for families in the United States who earned more than US$60,000 in 1988 and more than US$150,000 in 2007 were used for the GSS and BRS family income variables, respectively. These values were based on the Current Population Report from the U.S. Bureau of the Census. The natural logarithm of income was taken to normalize the distribution. Tables 1 and 2 provide descriptive statistics for all the variables.

Table 1. Descriptive statistics, General Social Survey, 1988.

Variable	Definition	N	Mean	SD	Min	Max
Sex	1 = female; 0 = male	906	0.576	0.494	0	1
Age	Age in years	906	43.958	17.378	18	89
Married	1 = married; 0 = otherwise	906	0.518	0.500	0	1
Education	Years of education	906	12.910	2.979	2	20
Log family income	Log yearly family income	906	9.743	0.986	6.215	11.171
Evangelical Protestant	1 = affiliated with an evangelical Protestant denomination; 0 = otherwise	906	0.270	0.444	0	1
Mainline Protestant	1 = affiliated with a mainline Protestant denomination; 0 =otherwise	906	0.216	0.412	0	1
Black Protestant	1 = affiliated with an historically black Protestant denomination; 0 = otherwise	906	0.068	0.253	0	1
Catholic	1 = affiliated with Catholicism; 0 = otherwise	906	0.283	0.450	0	1
Other faiths	1 = other religious affiliations; 0 = otherwise	906	0.088	0.284	0	1
Unaffiliated	1 = not affiliated with a religion; 0 = otherwise	906	0.074	0.262	0	1
Service attendance	1 = attend religious services at least once a week or more; 0 = otherwise	906	0.283	0.450	0	1
Congregational friends	How many of respondent's close three friends belong to his/her congregation?	906	0.738	1.060	0	3
Supernatural experience	1 = have felt very close to a powerful, spiritual force; 0 = otherwise	906	0.332	0.471	0	1
Religious certainty	Additive index: level of certainty in God and faith and closeness to God	906	8.418	2.834	0	12
Log religious giving	Log proportion of income plus 0.001 contributed to religion in the past year	906	−4.971	1.705	−6.91	−0.021

Table 2. Descriptive statistics, Baylor Religion Survey, 2007.

Variable	Definition	N	Mean	SD	Min	Max
Sex	1 = female; 0 = male	712	0.594	0.491	0	1
Age	Age in years	712	50.204	15.168	18	96
Married	1 = married; 0 = otherwise	712	0.730	0.444	0	1
Less than high school	1 = has less than a high school degree; 0 = otherwise	712	0.039	0.195	0	1
High school	1 = has a high school degree; 0 = otherwise	712	0.528	0.500	0	1
College	1 = has a college degree; 0 = otherwise	712	0.433	0.496	0	1
Log yearly family income	Log yearly family income	712	10.993	0.736	9.2103	12.032
Evangelical Protestant	1 = affiliated with an evangelical Protestant denomination; 0 = otherwise	712	0.264	0.481	0	1
Mainline Protestant	1 = affiliated with a mainline Protestant denomination; 0 = otherwise	712	0.256	0.436	0	1
Black Protestant	1 = affiliated with an historically black Protestant denomination; 0 = otherwise	712	0.018	0.134	0	1
Catholic	1 = affiliated with Catholicism; 0 = otherwise	712	0.274	0.446	0	1
Other faiths	1 = other religious affiliations; 0 = otherwise	712	0.088	0.284	0	1
Service attendance	1 = attend religious services at least once a week or more; 0 = otherwise	712	0.435	0.496	0	1
Congregational friends	How many of respondent's friends attend his/her congregation? (1 = none to 5 = all)	712	2.337	0.997	1	5
Supernatural experience	Additive index of eight supernatural experiences	712	2.639	2.148	0	8
Religious certainty	Additive index: level of certainty in God and going to Heaven	712	5.949	2.250	0	8
Log religious giving	Log proportion of income contributed to congregation in the past year	712	−4.199	1.289	−6.51	−0.799

Analysis

Since I am testing religious certainty as an intervening variable, I use a causal steps approach, which requires estimating a series of regression models in order to establish mediation (Baron and Kenny, 1986: 1177). If religious certainty mediates the relationship between the independent variables and religious giving, then the following relationships should exist: (1) certainty should positively affect religious giving; (2) the independent variables should positively affect religious giving; (3) the independent variables should positively affect certainty; and (4) controlling for certainty, the estimated effects of the independent variables on religious giving should be attenuated. If the estimated effects of the independent variables remain statistically significant, 'a partial mediation model is indicated, conditional on satisfaction of the criteria for mediation in Steps 1 through 3' (James et al., 2006: 239). However, if they become 'nonsignificant, a complete mediation model is indicated, conditional again on satisfaction of the criteria for mediation in the first three steps' (James et al., 2006: 239). When the estimated effect of the independent variable 'does not differ significantly from zero when the intervening variable is included in the model, then the results are consistent with a model in which the effect is completely transmitted through the intervening variable' (i.e., the null hypothesis that the coefficient is equal to zero cannot be rejected) (MacKinnon et al., 2002: 86). Because socio-demographic and other religion variables may also affect religious giving and certainty, I test the previous relationships using multivariate ordinary least squares (OLS) regression models that control for these variables and estimate robust standard errors to guard against the results being unduly affected by heteroscedasticity and influential cases. To determine statistical significance for partial mediation, I use Sobel's (1982) approximate significance test for mediation,[11] which tests the null hypothesis that X has no indirect effect on Y through Z, that is, that the indirect effect is zero. Two-tailed significance tests are reported.

Results

Table 3 provides OLS regression models predicting religious certainty for the GSS data. Women and those who attend religious services regularly have significantly higher levels of certainty, whereas more highly educated individuals have significantly lower levels of certainty. Intra-congregational friendships and supernatural experience have significant positive effects on certainty. Individuals who believe they have had a supernatural experience and those who have more intra-congregational friendships have higher levels of

Table 3. Ordinary least squares unstandardized regression coefficients certainty predicting religious, General Social Survey, 1988 (robust SE).

	Model	
	(1)	(2)
Sex	0.705***	0.546**
	(0.176)	(0.167)
Age	0.003	0.000
	(0.005)	(0.005)
Married	0.316†	0.165
	(0.173)	(0.167)
Education	−0.151***	−0.116***
	(0.033)	(0.032)
Log family income	−0.187*	−0.130
	(0.094)	(0.092)
Religious service attendance	2.289***	1.840***
	(0.167)	(0.172)
Mainline Protestant		−1.100***
		(0.233)
Black Protestant		−0.498†
		(0.299)
Catholic		−0.882***
		(0.194)
Other faiths		−1.050**
		(0.361)
Unaffiliated		−2.927***
		(0.394)
Congregational friendships		0.206*
		(0.081)
Supernatural experience		0.871***
		(0.166)
Constant	11.52***	11.17***
	(0.969)	(0.960)
R^2	.208	.304
Adjusted R^2	.202	.294

†$p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.
Two-tailed significance tests.
$N = 906$.

certainty. Mainline Protestants, Black Protestants, Catholics, other faiths, and unaffiliated individuals have significantly lower levels of certainty compared to evangelical Protestants. The key independent variables—religious tradition,

intra-congregational friendships, and supernatural experience—explain roughly 9 percent of the variance in certainty (i.e., a change in the adjusted R^2 from .202 in the base model to .294 in the full model). The full model explains 30.4 percent of the variance in certainty.

Table 4 provides the OLS regression model predicting religious certainty for the BRS data. Unlike the findings from the GSS data, sex is not significantly related to certainty and, in the full model, there are no significant differences in certainty between those with a college degree compared to those with a high school degree or less than a high school degree. These differences from the GSS findings are most likely due to the BRS sample excluding the unaffiliated. However, the other significant GSS findings are the same. Religious service attendance, intra-congregational friendships, and supernatural experience all have significant positive effects on certainty. Mainline Protestants, Catholics, and other faiths also have significantly lower levels of certainty than evangelical Protestants. Religious tradition, intra-congregational friendships, and supernatural experience explain roughly 17.8 percent of the variation in certainty (i.e., a change in the adjusted R^2 from .160 in the base model to .346 in the full model).

Table 5 provides the OLS regression results predicting religious giving for the GSS data. Model 1 is the base model with control variables, which shows that individuals who are older, married, more educated, and attend religious services regularly contribute a greater proportion of their family income to their religions, whereas individuals with higher family incomes contribute a smaller proportion. Model 2 adds the key independent variables to the base model. Mainline Protestants, Catholics, other faiths, and the unaffiliated give smaller proportions of their family income to their religions compared to evangelical Protestants. Intra-congregational friendships and supernatural experience have significant positive effects on proportion of family income given to religion. Model 2 explains an additional 5.2 percent of the variance in religious giving (i.e., a change in the adjusted R^2 from .363 in Model 1 to .415 in Model 2). In Model 3, religious certainty was added to the model and it has a significant positive effect on the proportion of family income given to religion, providing support for Hypothesis 1. Consistent with Hypothesis 2, certainty completely mediates the positive estimated effect supernatural experience has on the proportion of family income given to religion (Sobel Z: 3.341, $p < 0.001$). Certainty also partially mediates the positive estimated effect of intra-congregational friendships (Sobel Z: 2.193, $p < .05$; explains 9.88 percent of the effect), supporting Hypothesis 3. Consistent with Hypothesis 4, certainty partially attenuates the differences in religious giving between evangelical Protestants and mainline Protestants (Sobel Z: –3.192, $p < 0.01$; explains 18.01 percent of the difference), Catholics (Sobel Z: –3.137, $p < 0.01$; explains 12.25

Table 4. Ordinary least squares unstandardized regression coefficients predicting religious certainty, Baylor Religion Survey, 2007 (robust SE).

	Model	
	(1)	(2)
Sex	0.343	0.314
	(0.184)	(0.163)
Age	−0.018***	−0.010
	(0.006)	(0.005)
Married	0.435	0.349
	(0.267)	(0.216)
Less than high school	1.038**	0.566
	(0.367)	(0.349)
High school degree	0.647**	0.333
	(0.200)	(0.179)
Log family income	−0.025	0.175
	(0.155)	(0.135)
Religious service attendance	1.536***	0.743***
	(0.183)	(0.200)
Mainline Protestant		−0.839**
		(0.270)
Black Protestant		0.335
		(0.388)
Catholic		−0.711***
		(0.200)
Other faiths		−2.056***
		(0.362)
Congregational friendships		0.237**
		(0.087)
Supernatural experience		0.322***
		(0.043)
Constant	5.546***	2.728
	(1.673)	(1.546)
R^2	.168	.358
Adjusted R^2	.160	.346

†$p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.
Two-tailed significance tests.
$N = 712$.

percent of the difference), other faiths (Sobel Z: –2.415, $p < 0.05$; explains 17.9 percent of the difference), and the unaffiliated (Sobel Z: –3.927, $p < 0.001$;

Table 5. Ordinary least squares unstandardized regression coefficients predicting log religious giving, GSS 1988 (robust SE).

	Model		
	(1)	(2)	(3)
Sex	0.036	−0.056	−0.099
	(0.094)	(0.092)	(0.092)
Age	0.020***	0.018***	0.018***
	(0.003)	(0.003)	(0.003)
Married	0.741***	0.658***	0.645***
	(0.097)	(0.095)	(0.095)
Education	0.071***	0.091***	0.100***
	(0.016)	(0.016)	(0.016)
Log family income	−0.426***	−0.396***	−0.386***
	(0.060)	(0.060)	(0.058)
Religious service attendance	1.654***	1.426***	1.283***
	(0.103)	(0.108)	(0.113)
Mainline Protestant		−0.472**	−0.387**
		(0.144)	(0.144)
Black Protestant		−0.097	−0.058
		(0.181)	(0.179)
Catholic		−0.555***	−0.487***
		(0.118)	(0.119)
Other faiths		−0.458*	−0.376*
		(0.187)	(0.188)
Unaffiliated		−1.368***	−1.140***
		(0.162)	(0.170)
Congregational friendships		0.162***	0.146**
		(0.046)	(0.046)
Supernatural experience		0.201*	0.133
		(0.095)	(0.096)
Religious certainty			0.078***
			(0.018)
Constant	−3.432***	−3.621***	−4.491***
	(0.584)	(0.604)	(0.639)
R^2	.367	.423	.435
Adjusted R^2	.363	.415	.426

†$p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.
Two-tailed significance tests.
$N = 906$.

explains 16.67 percent of the difference). Although religious certainty only explains an additional 1.1 percent of the variance in religious giving (i.e., a change in the adjusted R^2 from .415 in Model 2 to .426 in Model 3), by fully or partially mediating the effects of the independent variables, it also accounts for some of the variance in the dependent variable that was explained by the independent variables in Model 2. The full model explains 42.6 percent of the variation in proportion of family income given to religion.

Table 6 presents the OLS regression results predicting religious giving for the BRS data. In Model 1, the base model, only three control variables have significant effects on religious giving—family income, having less than a high school degree (relative to having a college degree), and religious service attendance, with the former two variables having negative effects and the latter a positive effect. Model 2 adds the key independent variables to the model. Mainline Protestants and Catholics give smaller proportions of their family income to their current place of worship than evangelical Protestants. Intra-congregational friendships and supernatural experience have significant positive effects on religious giving. These independent variables explain an additional 5.1 percent of the variance in religious giving (i.e., a change in the adjusted R^2 from .391 in Model 1 to .442 in Model 2). Model 3 adds religious certainty, which also has a significant positive effect on religious giving, further supporting Hypothesis 1. Certainty partially mediates the positive estimated effect of supernatural experience on religious giving (Sobel Z: 2.747, p < .01; explains 28.17 percent of the effect), supporting Hypothesis 2. Consistent with Hypothesis 3, certainty also partially mediates the positive estimated effect of intra-congregational friendships on religious giving (Sobel Z: 2.002, p < .05; explains 14.56 percent of the effect). Further supporting Hypothesis 4, certainty partially attenuates the differences in religious giving between evangelical Protestants and mainline Protestants (Sobel Z: –2.14, p < 0.05; explains 16.35 percent of the difference) and Catholics (Sobel Z: –2.27, p < 0.05; explains 7.54 percent of the difference). Religious certainty explains an additional 0.6 percent of the variance in religious giving (i.e., a change in the adjusted R^2 from .442 in Model 2 to .448 in Model 3); however, by partially or fully mediating the effects of the independent variables, it also contributes to accounting for some of the explained variance they added to Model 2 (i.e., 5.1 percent). The full model explains 45.9 percent of the variation in proportion of family income given to one's current place of worship.

Discussion and conclusions

Just as social exchange theory has demonstrated that uncertainty in exchanges affects exchange behavior (Kollock, 1994; Lawler et al., 2000;

Table 6. Ordinary least squares unstandardized regression coefficients predicting log religious giving, BRS 2007 (robust SE).

	Model		
	(1)	(2)	(3)
Sex	−0.030	−0.036	−0.055
	(0.090)	(0.087)	(0.086)
Age	0.004	0.007*	0.007*
	(0.003)	(0.003)	(0.003)
Married	0.101	0.051	0.030
	(0.113)	(0.113)	(0.113)
Less than high school	−0.406†	−0.464*	−0.499*
	(0.210)	(0.213)	(0.216)
High school degree	−0.068	−0.119	−0.140
	(0.095)	(0.088)	(0.088)
Log family income	−0.523***	−0.462***	−0.473***
	(0.073)	(0.075)	(0.074)
Religious service attendance	1.341***	1.082***	1.036***
	(0.096)	(0.111)	(0.110)
Mainline protestant		−0.318**	−0.266*
		(0.112)	(0.113)
Black protestant		−0.419	−0.440
		(0.341)	(0.333)
Catholic		−0.570***	−0.527***
		(0.110)	(0.110)
Other faiths		−0.105	0.022
		(0.155)	(0.159)
Congregational friendships		0.103*	0.088†
		(0.051)	(0.050)
Supernatural experience		0.071**	0.051*
		(0.023)	(0.024)
Religious certainty			0.062**
			(0.021)
Constant	0.779	−0.039	−0.207
	(0.802)	(0.881)	(0.863)
R^2	.397	.452	.459
Adjusted R^2	.391	.442	.448

†$p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.
Two-tailed significance tests.
$N = 712$.

Molm, 1994; Molm et al., 2000; Pavlou et al., 2007), the results of this paper suggest that uncertainty in religious exchanges also affects the religious exchange behavior of individuals. Viewing religious commitment as an individual's contribution to a religious exchange, these results show that, congruent with Hypothesis 1, certainty has a strong significant positive effect on an important form of religious commitment—religious giving, both to one's religion and also to one's congregation. Consistent with social exchange theory, individuals who are more certain about the terms of exchange (i.e., their faith in the religious explanations provided to them) and their exchange partner (i.e., God) are more willing to contribute greater proportions of their income to their religion or congregation. Because the data are cross-sectional, the causal direction may in fact work in the opposite direction—religious commitment may increase certainty. It is theoretically reasonable to expect that causality may flow in both directions: an individual's level of religious certainty may affect how often she engages in religious practices, and how often she participates in such practices may in turn affect her level of certainty. This may be especially the case when religious commitment is operationalized as participation in religious rituals or groups in which religious beliefs are reinforced (Stark and Finke, 2000). Since the act of giving does not intrinsically reinforce beliefs regarding God and/or an afterlife, there is less risk of reverse causality when religious commitment is operationalized as religious giving. Still, certainty and religious commitment most likely reinforce each other through time. Thus, while this study highlights the relationship between certainty and religious commitment, longitudinal research is needed to further explore the causal dynamics between these two factors, especially for other operationalizations of religious commitment.

The positive relationship between certainty and religious giving found in this study has important implications for religious organizations. Since religious uncertainty is associated with higher levels of religious giving, religious uncertainty is not only a problem for individuals but also one for religious organizations. A great deal of research on religious giving focuses on denominational or theological variation, typically finding that conservative, evangelical, and/or strict denominations or churches generally receive more financial contributions from their members (Finke et al., 2006; Hoge et al., 1996; Iannaccone, 1994; Olson and Perl, 2001, 2005). The results of this study, consistent with past research, show that evangelical Protestants have higher levels of contribution compared to most other religious affiliations. However, these differences are partially attenuated by religious certainty, which explains between 8 and 28 percent of these differences, depending on which affiliation is compared and the dataset used. This

suggests that evangelical Protestants give more partly due to having higher levels of religious certainty compared to those in other religious affiliations. Drawing on Kollock's (1994) study, I argued that evangelical denominations provide an institutional structure that should decrease uncertainty by providing a setting for individuals to continually observe the behavior of highly committed members, thereby signaling the trustworthiness of the religious organization and their perceived exchange partner (i.e., God). Evangelical Protestants' higher levels of certainty compared to other religious affiliations (i.e., mainline Protestants, Catholics, and other faiths) may be a result of individuals making reputational inferences based on the behavior of other highly committed members in the same way Kollock's (1994) subjects inferred a seller's trustworthiness from the behavior of other buyers. This study examined one type of institutional structure (i.e., higher tension) that may decrease uncertainty; future studies should investigate other types, such as organizational structures that maintain a small congregational size, which may curb free-riders, or congregations in which the laity are actively involved in decision-making, which may provide the opportunity to observe the behavior of highly committed members.

Given that the findings are based on cross-sectional data, one might argue that individuals with higher levels of certainty tend to choose evangelical Protestant denominations. However, this is a less tenable explanation of the results for two reasons. Firstly, the certainty questions are not in regards to any particular doctrines but to God and faith generally. Secondly, past research has found that the majority of Americans remain in the religious tradition in which they grew up (Iannaccone, 1990; Kluegel, 1980). The GSS also asked respondents what their religious affiliation was when they were 16. Additional models were estimated that controlled for religious consistency (i.e., whether the respondent is currently in the same religious tradition she was in at age 16) and the results remained the same net of movement across religious traditions (results not shown). Moreover, additional models were estimated where current religious tradition was replaced with religious tradition at age 16 (models not shown), and these results were also consistent with the models presented. These explanations and additional models provide further support for the theorized causal direction.

Individuals with more close friendship ties to others in their congregation do have lower levels of uncertainty, which partially mediates their effect on religious giving. Granovetter (1985) provides a possible explanation for this finding. Actors within a congregation will most likely support the claims of their religion, including its terms of exchange and the existence of God, thereby associating a trustworthy reputation to the religion. If individuals consider the reputational knowledge provided by trusted others when

deciding on exchange behavior (Granovetter, 1985), then individuals with more friends in their congregation should hear more positive reputational information regarding their religion, have higher levels of certainty, and be more likely to participate in religious exchanges as a result. While certainty partially mediates the effects of intra-congregational friendships on religious giving in both datasets (i.e., certainty explains roughly 10 and 15 percent of these effects in the GSS and BRS, respectively), it still maintains a positive effect on religious giving, net of certainty. Thus, there must be a mechanism other than certainty alone that can explain the rest of the effect. Other research suggests that social ties may affect group commitment through mechanisms such as sanctions and preference formation, or by supporting a particular identity (Corcoran, 2012; Kitts, 2000; Sherkat, 1997). Future research would benefit from directly testing these proposed mechanisms to determine if they are able to account for the residual effect of intra-congregational friendships on religious giving.

Given the cross-sectional nature of the data in this study, the results cannot ascertain whether level of religious certainty might affect congregational friendship choice. Despite this, findings from several previous studies strengthen confidence in the specification of the model. Firstly, the longitudinal results of Krause and Ellison's (2009) study, which show an effect of prior social interaction on changes in religious doubt over time, lend support to the causal direction predicted by this study. Secondly, other theoretical and empirical work suggests that friendships often precede religious belief (Bankston, 2002; Lofland and Stark, 1965; Snow and Phillips, 1980; Stark and Bainbridge, 1980; Stark and Finke, 2000), a finding that is also congruent with the specified causal direction. Congregational friendships and religious certainty may be best thought of in tandem, possibly mutually reinforcing each other and resulting in higher levels of religious commitment.

Individuals who believe they have witnessed or had supernatural experiences contribute higher proportions of their income to their religion or congregation than their counterparts; this relationship is partially mediated by certainty (i.e., certainty fully mediates this relationship in the GSS and explains roughly 28 percent of this relationship in the BRS). 'Supernatural' experiences are *believed* by the partakers to be real interactions or exchanges with a god or gods, and the results of this study suggest that these exchanges result in monetary contributions. These findings are therefore consistent with social exchange theory's predictions that repeated interactions increase the likelihood of future exchanges (Blau, 1964; Cook and Emerson, 1978; Kollock, 1994; Molm et al., 2000), as well as ethnographic research finding that supernatural experiences are transformative and often affect the way an

individual views the world (Griffith, 1997; McGuire, 1982; Neitz, 1987). Neitz (1987) suggests that these experiences are generally characterized by increased religious certainty:

> The word most commonly used in conjunction with these realizations by my informants is 'know.' Such moments transform one's understanding of reality; a most important characteristic of such moments is certainty. […] It can refer to something as general as that God loves one, or it can refer to something much more specific. (p.87)

These ethnographic accounts of increased certainty following the supernatural experiences, bolsters confidence in the causal direction theorized in this paper. Moreover, the results of the present study quantitatively corroborate these rich qualitative accounts and suggest their generalizability. The supernatural experiences examined in this study represent perceived successful exchanges (e.g., miraculous healings). However, social exchange theory also makes predictions regarding *un*successful exchanges, which should decrease confidence in the exchange partner and thereby decrease the likelihood of future exchanges. Future studies could investigate whether perceived unsuccessful exchanges with a god or gods, such as an unanswered prayer or sickness, decrease religious giving and other forms of religious commitment through lower levels of religious certainty.

Although the experimental studies conducted by social exchange theorists have been particularly useful for generating theory and establishing causality, this paper contributes to social exchange theory by demonstrating how its theoretical predictions can explain behavior even in a seemingly unlikely area of social life—religion. While most previous studies examine uncertainty by comparing behavior in low-uncertainty exchanges to high-uncertainty exchanges, this paper uses an actual measure of uncertainty to test what factors affect levels of uncertainty and whether uncertainty in turn affects exchange behavior. At the same time, this paper demonstrates the utility of applying social exchange theory to the study of religion and suggests that this is a fruitful avenue for future empirical religion research.

Funding

Notes

1. A religious organization is a social enterprise 'whose primary purpose is to create, maintain, and supply religion to some set of individuals and to support and supervise their exchanges with a god or gods' (Stark and Finke, 2000: 279).

2. The underlying assumption of rationality and that individuals participate in perceived religious exchanges is not without critics (e.g., Bruce, 1999; Jerolmack and Porpora, 2004). However, there is evidence to support theorizing religion as an exchange relationship. Hoge et al. (1996) provide qualitative evidence regarding how some individuals are motivated to give money in hopes that God will reciprocate with other-worldly benefits. Lavric and Flere (2011) provide quantitative evidence further supporting the expectation of other-worldly benefits as a motive for religious commitment. Moreover, Wright et al.'s (2011) study of Christian deconversion narratives finds that 44 percent of those in the study identified dissatisfaction with God as a primary reason for deconverting. These individuals described feeling 'as if they had done their part – praying, waiting, being faithful – but God had failed them or let them down. They expected certain benefits from God, such as answered prayers and his revealed presence, and they did not receive these benefits, causing them costly feelings of disillusionment, pain, and betrayal. These costs explicitly motivated their decision to leave their faith' (Wright et al., 2011: 9).

3. The data was downloaded from the Association of Religion Data Archives, www.TheARDA.com, and was originally collected by the NORC.

4. The data was downloaded from the Association of Religion Data Archives, www.TheARDA.com. The survey was designed by the department of sociology at Baylor University and the sample was collected by Gallup (see Froese and Bader, 2010, for more information on the survey and data collection).

5. Using a statistical algorithm based on data from the Census Bureau, Gallup weighted the survey for race, gender, region, age, and education. This weight was used in all regression models using the BRS.

6. Those who do not believe in God were left in the sample. While atheism is not equivalent to complete uncertainty and, one may argue, it represents complete certainty in the non-existence of God, using it as a zero value is consistent with the logic of the hypotheses. If someone does not believe in God, then they should be less likely to participate in religious exchanges, even more so than individuals who are completely uncertain about the existence of God.

7. The Cronbach's alpha for the GSS certainty index is .698. According to Devellis' (1991: 85) guidelines for Cronbach's alphas, an alpha between .65 and .70 is minimally acceptable.

8. Those who do not believe in Heaven were left in the sample as a zero value. As with belief in God (see footnote 5), if someone does not believe in Heaven, then they should be less likely to participate in religious exchanges, even more so than individuals who are completely uncertain about whether they are going to Heaven.

9. The Cronbach's alpha for the BRS certainty index is .651, which is a minimally acceptable alpha (Devellis, 1991: 81).

10. A confirmatory factor analysis was conducted and the results indicate that a one-factor solution is a reasonable fit for the data. The goodness of fit indices were all acceptable: the normed fit index (NFI) was .919 (values greater than .9 are considered acceptable), the goodness-of-fit index (GFI) was .968 (values greater than .9 are considered acceptable), and the standardized root mean square residual (SRMR) was .040 (values less than .05 indicate good fit) (Gerbing and Anderson, 1992). The Cronbach's alpha for the supernatural experience index is .767. According to Devellis' (1991: 81) guidelines for Cronbach's alphas, an alpha between .70 and .80 is a respectable coefficient.

11. Sobel's *Z* statistic is computed by the following equation, where α is the unstandardized regression coefficient for the effect of the independent variable on the mediator and β is the unstandardized regression coefficient for the effect of the mediator on the dependent variable net of the independent variable (MacKinnon et al., 2002):

$$Z = \frac{\alpha\beta}{\sqrt{\alpha^2 \sigma_\beta^2 + \beta^2 \sigma_\alpha^2}}$$

The two alternative versions of the Sobel test, the Aroian (1944) and Goodman (1960) tests, produce consistent results for all mediation analyses performed in this study. Although I only report Sobel's *Z* statistic, all mediation tests in this study have statistically significant *Z* scores according to all three mediation tests.

References

Akerlof G (1970) The market for lemons. *Quarterly Journal of Economics* 84: 488–500.

Anthony D, Henderson T and Kitts JA (2009) Trust and privacy in distributed work groups. In: Liu H, Salerno JJ and Young MJ (eds) *Social Computing and Behavioral Modeling*. New York: Springer, pp. 16–23.

Anthony D, Kitts JA, Masone C, et al. (2010) Internet exchange and forms of trust. In: Latusek D and Gerbasi A (eds) *Trust and Technology in a Ubiquitous Modern Environment: Theoretical and Methodological Perspectives*. Hershey, PA: IGI Global, pp. 257–269.

Aroian LA (1944) The probability function of the product of two normally distributed variables. *Annals of Mathematical Statistics* 18: 265–271.

Bainbridge WS and Stark R (1980) Sectarian tension. *Review of Religious Research* 22(2): 105–124.

Bankston CL III (2002) Rationality, choice and the religious economy: the problem of belief. *Review of Religious Research* 43(4): 311–325.

Baron RM and Kenny DA (1986) The moderator-mediator variable distinction in social psychological research: conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology* 51: 1173–1182.

Baylor University (2007) *The Baylor Religion Survey, Wave II*. Waco, TX: Baylor Institute for Studies of Religion.

Blau PM (1964) *Exchange and Power in Social Life*. New York: Wiley.

Brodin JA (2003) A matter of choice: a micro-level study on how Swedish new agers choose their religious beliefs and practices. *Rationality and Society* 15(3): 381–405.

Bruce S (1999) *Choice and Religion: A Critique of Rational Choice*. New York: Oxford University Press.

Buchan R, Croson RTA and Dawes RM (2002) Swift neighbors and persistent strangers: a cross-cultural investigation of trust and reciprocity in social exchange. *American Journal of Sociology* 108(1): 168–207.

Chaves M and Miller SL (1999) *Financing American Religion*. Walnut Creek, CA: AltaMira Press.

Coleman J (1990) *Foundations of Social Theory*. Cambridge, MA: Harvard University Press.

Cook KS (2005) Networks, norms, and trust: the social psychology of social capital 2004 Cooley Mead Award Address. *Social Psychology Quarterly* 68(1): 4–14.

Cook KS and Emerson RM (1978) Power, equity, and commitment in exchange networks. *American Sociological Review* 43: 721–739.

Corcoran KE (2012) Religious human capital revisited: testing the effect of religious human capital on religious participation. *Rationality and Society* 24(30): 343–379.

Devellis RF (1991) *Scale Development: Theory and Applications*. Thousand Oaks, CA: SAGE.

Durkin JT and Greeley AM (1991) A model of religious choice under uncertainty: on responding rationally to the nonrational. *Rationality and Society* 3(2): 178–196.

Ellison CG and Musick MA (1995) Conservative Protestantism and public opinion toward science. *Review of Religious Research* 36(3): 245–262.

Finke R and Stark R (1992) *The Churching of America 1776–1990: Winners and Losers in Our Religious Economy*. New Brunswick, NJ: Rutgers University Press.

Finke R, Bahr M and Scheitle CP (2006) Toward explaining congregational giving. *Social Science Research* 35: 620–641.

Finke R, Guest AM and Stark R (1996) Mobilizing local religious markets: religious pluralism in the empire state, 1855 to 1865. *American Sociological Review* 61: 203–218.

Froese P and Bader C (2010) *America's Four Gods: What We Say about God and What that Says about Us*. New York: Oxford University Press.

Gerbing DW and Anderson JC (1992) Monte Carlo evaluations of goodness of fit for structural equation models. *Sociological Methods & Research* 21: 132–160.

Goodman LA (1960) On the exact variance of products. *Journal of the American Statistical Association* 55: 708–713.

Granovetter M (1985) Economic action and social structure: the problem of embeddedness. *American Journal of Sociology* 91(3): 481–510.

Griffith RM (1997) *God's Daughters: Evangelical Women and the Power of Submission*. Berkeley, CA: University of California Press.

Hardin R (2002) *Trust and Trustworthiness*. New York: Russell Sage Foundation.

Hechter M (1997) Religion and rational choice theory. In: Young LA (ed.) *Rational Choice Theory and Religion: Summary and Assessment*. New York: Routledge, pp. 133–145.

Heimer CA (2001) Solving the problem of trust. In: Cook KS (ed.) *Trust in Society*. New York: Russell Sage Foundation, pp. 40–88.

Hilty DM (1988) Religious belief, participation and consequences: an exploratory and confirmatory analysis. *Journal for the Scientific Study of Religion* 27(2): 243–259.

Hoge D, Zech C, McNamara P, et al. (1996) *Money Matters: Personal Giving in American Churches*. Louisville, KY: Westminster John Knox Press.

Hoge DR and Griffin DL (1992) *Research on Factors Influencing Giving to Religious Bodies*. Indianapolis, IN: Ecumenical Center for Stewardship Studies.

Iannaccone LR (1990) Religious practice: a human capital approach. *Journal for the Scientific Study of Religion* 29(3): 297–314.

Iannaccone LR (1992) Religious markets and the economics of religion. *Social Compass* 39(1): 123–131.

Iannaccone LR (1994) Why strict churches are strong. *American Journal of Sociology* 99: 1180–1211.

Iannaccone LR (1995) Risk, rationality, and religious portfolios. *Economic Inquiry* 33(2): 285–295.

Iannaccone LR (1997) Rational choice: framework for the scientific study of religion. In: Young LA (ed.) *Rational Choice Theory and Religion: Summary and Assessment*. New York: Routledge, pp. 25–45.

Iannaccone LR (2005) Economy. In: Ebaugh HR (ed.) *Handbook of Religion and Social Institutions*. New York: Springer, pp. 21–40.

James LR, Mulaik SA and Brett JM (2006) A tale of two methods. *Organizational Research Methods* 9: 233–244.

Jerolmack C and Porpora D (2004) Religion, rationality, and experience: a response to the new rational choice theory of religion. *Sociological Theory* 22(1): 141–160.

Kelley DM (1986 [1972]) *Why Conservative Churches Are Growing: A Study in Sociology of Religion with a New Preface for the Rose Edition*. Macon, GA: Mercer University Press.

Kitts JA (2000) Mobilizing in black boxes: social networks and social movement organizations. *Mobilization* 5(2): 241–257.

Kluegel JR (1980) Denominational mobility: current patterns and recent trends. *Journal for the Scientific Study of Religion* 19(1): 16–25.

Kollock P (1994) The emergence of exchange structures: an experimental study of uncertainty, commitment, and trust. *American Journal of Sociology* 100(2): 313–345.

Krause N and Ellison CG (2009) The doubting process: a longitudinal study of the precipitants and consequences of religious doubt in older adults. *Journal for the Scientific Study of Religion* 48(2): 293–312.

Lavric M and Flere S (2010) Measuring religious costs and rewards in a cross-cultural perspective. *Rationality and Society* 22(2): 223–236.

Lavric M and Flere S (2011) Intrinsic religious orientation and religious rewards: an empirical evaluation of two approaches to religious motivation. *Rationality and Society* 23(2): 217–233.

Lawler EJ and Yoon J (1996) Commitment in exchange relations: test of a theory of relational cohesion. *American Sociological Review* 61(1): 89–108.

Lawler EJ and Yoon J (1998) Network structure and emotion in exchange relations. *American Sociological Review* 63: 871–894.

Lawler EJ, Thye SR and Yoon J (2000) Emotion and group cohesion in productive exchanges. *American Journal of Sociology* 106(3): 616–657.

Lincoln R, Morrissey C and Mundey P (2008) Religious giving: a comprehensive review of the literature. *Report for the John Templeton Foundation Generosity Planning Project*, May. Available at: http://generosityresearch.nd.edu/assets/20447/religious_giving_final.pdf

Lofland J and Stark R (1965) On becoming a world-saver: a theory of conversion to a deviant perspective. *American Sociological Review* 30(6): 862–875.

Luidens DA and Nemeth RJ (1994) Social sources of family contributions: giving patterns in the reformed church in America. *Review of Religious Research* 36(2): 207–217.

McGuire MB (1982) *Pentecostal Catholics: Power, Charisma, and Order in a Religious Movement*. Philadelphia, PA: Temple University Press.

MacKinnon DP, Lockwood CM, Hoffman JM, et al. (2002) A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods* 7: 83–104.

Molm L (1994) Dependence and risk: transforming the structure of social exchange. *Social Psychology Quarterly* 57(3): 163–176.

Molm L, Schaefer DR and Collett J (2009) Fragile and resilient trust: risk and uncertainty in negotiated and reciprocal exchange. *Sociological Theory* 27: 1–32.

Molm L, Takahashi N and Peterson G (2000) Risk and trust in social exchange: an experimental test of a classical proposition. *American Journal of Sociology* 105(5): 1396–1428.

Montgomery JD (1996) Contemplations on the economic approach to religious behavior. *American Economic Review* 86(2): 443–447.

Neitz MJ (1987) *Charisma and Community: A Study of Religious Commitment within the Charismatic Renewal*. New Brunswick, NJ: Transaction.

Olson DVA and Perl P (2001) Variations in strictness and religious commitment within and among five denominations. *Journal for the Scientific Study of Religion* 40: 757–764.

Olson DVA and Perl P (2005) Free and cheap riding in strict, conservative churches. *Journal for the Scientific Study of Religion* 44(2): 123–142.

Pavlou PA, Liang H and Xue Y (2007) Understanding and mitigating uncertainty in online exchange relationships: a principal-agent perspective. *MIS Quarterly* 31(1): 105–136.

Peifer JL (2010) The economics and sociology of religious giving: instrumental rationality or communal bonding? *Social Forces* 88(4): 1569–1594.

Pfaff S and Corcoran KE (2012) Piety, power, and the purse: religious economies theory and urban reform in the Holy Roman Empire. *Journal for the Scientific Study of Religion* 51(4): 757–776.

Pfeffer J and Salancik GR (1978) *The External Control of Organizations*. New York: Harper & Row.

Scheitle CP and Adamczyk A (2009) It takes two: the interplay of individual and group theology on social embeddedness. *Journal for the Scientific Study of Religion* 48(1): 16–29.

Sherkat DE (1997) Embedding religious choices: integrating preferences and social constraints into rational choice theories of religious behavior. In: Young LA (ed.) *Rational Choice Theory and Religion: Summary and Assessment*. New York: Routledge, pp. 66–86.

Sherkat DE and Wilson J (1995) Preferences, constraints, and choices in religious markets: an examination of religious switching and apostasy. *Social Forces* 73(3): 993–1026.

Smith C, Emerson M, Gallagher S, et al. (1998) *American Evangelicalism: Embattled and Thriving*. Chicago, IL: University of Chicago Press.

Smith C, Emerson MO and Snell P (2008) *Passing the Plate: Why American Christians Don't Give Away More Money*. New York: Oxford University Press.

Snow D and Phillips C (1980) The Lofland-Stark conversion model: a critical reassessment. *Social Problems* 27(4): 430–447.

Sobel ME (1982) Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology* 13: 290–312.

Stark R and Bainbridge WS (1980) Networks of faith: interpersonal bonds and recruitment to cults and sects. *American Journal of Sociology* 85: 1376–1395.

Stark R and Bainbridge WS (1996) *A Theory of Religion*. New Brunswick, NJ: Rutgers University Press.

Stark R and Finke R (2000) *Acts of Faith: Explaining the Human Side of Religion*. Berkeley, CA: University of California Press.

Steensland B, Park JZ, Regnerus MD, et al. (2000) The measure of American religion: toward improving the state of the art. *Social Forces* 79(1): 291–318.

Wellman JK Jr (2008) *Evangelical vs. Liberal: The Clash of Christian Cultures in the Pacific Northwest*. New York: Oxford University Press.

Wollschleger J and Beach L (2011) A cucumber for a cow: a theoretical exploration of the causes and consequences of religious hypocrisy. *Rationality and Society* 23(2): 155–174.

Woodberry RD and Smith CS (1998) Fundamentalism et al: conservative Protestants in America. *Annual Review of Sociology* 24: 25–56.

Wright BRE, Giovanelli D, Dolan EG, et al. (2011) Explaining deconversion from Christianity: a study of online narratives. *Journal of Religion & Society* 13: 1–17.

Yamagishi T and Yamagishi M (1994) Trust and commitment in the United States and Japan. *Motivation and Emotion* 18: 129–166.

Young LA (1997) Phenomenological images of religion and rational theory. In: Young LA (ed.) *Rational Choice Theory and Religion: Summary and Assessment*. New York: Routledge, pp. 133–145.