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Religion as Schedule-Induced Behavior

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In this article, I argue that a class of religious behaviors exists that is induced, for prepared organisms, by specific stimuli that are experienced according to a response-independent schedule. Like other schedule-induced behaviors, the members of this class serve as minimal units out of which functional behavior may arise. In this way, there exist two classes of religious behavior: nonoperant schedule-induced behaviors and operant behaviors. This dichotomy is consistent with the distinction insisted upon by religious scholars and philosophers between ''graceful'' and ''effortful'' religious behaviors. Embracing the distinction allows an explanation of many aspects of religious experience and behavior that have been overlooked or disregarded by other scientific approaches to religion.

Key words: religion, spirituality, evolution, verbal behavior, schedules of reinforcement

Behavior analysis differs from evolutionary theory in that the former attempts to explain the behavior of organisms whereas the latter attempts to explain the structural and behavioral characteristics of species. Overlap occurs when behavior is stable across generations for members of a species, prompting questions about the source of that stability. One might presume compatibility across these disciplines given that they both rely on selectionist principles to explain stasis and change (Donahoe & Palmer, 1994). However, when it comes to explaining behavioral stability, deep disagreements sometimes arise. Differences of opinion usually concern whether complex behavior is best explained in terms of contingencies that operate over the course of ontogeny (the subject matter of behavior analysis) or in terms of natural selection over the course phylogeny (the subject matter of evolutionary theory). Therefore, evolutionary theorists and behavior analysts are in agreement about the basic mechanism: selectionism. But they differ sometimes about whether some behavior is inherited or is in some other way a function of having been structurally encoded (i.e., selected) over the phylogenetic course of the history of the species, or whether the behavior can be explained in terms of learning.

The recent publication of two books about religious behavior, written by highly influential evolutionary theorists, has the potential for reawakening this debate. These books, one written by Daniel Dennett (2006) and the other by Richard Dawkins (2006), set out to explain the origins of religion from the standpoint of evolutionary theory. The arguments they marshal and the conclusions they draw are remarkably similar. Dawkins and Dennett agree that the concept of God, and resulting religious behavior, are stable across generations, although they are not coded in the genes nor do they confer evolutionary advantages. Instead, they are by-products of other functional characteristics of the species, and the fidelity of their transmission across generations is a testament to the power of social learning. Arguing that the intergenerational stability of religious thought and behavior is a cultural phenomenon is a major conclusion for evolutionary theorists whose first-line consideration is that

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stability is a manifestation of evolutionary fitness.

Having dispensed with the idea that religion is encoded in the genes and concluding that it confers no evolutionary advantage, Dawkins (2006) and Dennett (2006) embark on a discussion of its origin and mechanisms of transmission. This takes them to the level of the individual, and the ontogenetic processes responsible for religiosity. Rachlin (2007) summarizes their position as follows: ''At the most fundamental level, the inherited trait most responsible for religious behavior is our tendency to attribute agency to complex moving objects'' (p. 144). Dennett labels this the *intentional stance*, and it serves as the basis for the origins of the concept of God. According to Dennett, we naturally presume that complex phenomena are the products of intentional behavior. For that reason, we attribute phenomena we do not understand to a sentient being. The legitimacy of the intentional stance as an explanatory construct is criticized by Rachlin and by Zeiler (2007) on the grounds that this explanation is as mysterious and poorly understood as the construct it seeks to explain.

Having attributed the ubiquity of a belief in God to the intentional stance and other mental constructions, Dawkins (2006) and Dennett (2006) proceed to explain the stability of beliefs about God and religious behavior. At this point they invoke learning in the form of socially mediated reinforcement. That is, children are said to imitate their parents and other powerful role models and receive reinforcement for adhering to family and societal traditions concerning God and religious behavior. Reinforcement can take the form of verbal praise, social acceptance and prestige, and even money and access to health care. The importance of social mediation is noted by Zeiler (2007): ''Under some circumstances acting religious can be beneficial; in others detrimental [depending] on the beliefs of the potential supplier of benefits'' (p. 440).

GOD AND BEHAVIOR ANALYSIS

General agreement exists, then, between evolutionary theorists and behavior analysts who have written on the topic that religious behavior is no different than other operant behavior; it occurs to the extent that it confers political, economic, and social advantages. The question then becomes, how is it maintained? Once again, the explanations of Dawkins (2006) and Dennett (2006) and behavior analysis converge on a common answer: Behavior that was established through reinforcement eventually becomes resistant to extinction. According to Shoenfeld (1993), religious behavior, like other human behavior, comes to be maintained by increasingly intermittent reinforcement, thereby reducing its susceptibility to extinction. Similarly, religious behavior becomes insensitive to consequences to the extent that it becomes rule governed (Catania, Shimoff, & Matthews, 1989). As a result, religious behavior may persist long after it garners no advantages for the practitioner.

A primary problem with this conceptualization is that it provides a compelling story but does not allow specific predictions. That is, if religious behavior changes, it can be said to reflect changes in the prevailing reinforcement contingencies. If it remains stable despite changing contingencies, its persistence can be attributed to insensitivity arising from its rule-governed status. The problem of gauging the relative strength of these countervailing forces is noted by Zeiler (2007): ''The possibilities are sufficiently varied as to either support existing belief systems or to result in their abandonment'' (p. 440). In this way, the model is consistent with a ''just so'' story; it disarmingly explains any-

thing post hoc, but is unhelpful with respect to prediction and control. Although this is problematic for evolutionary theory, it is particularly so for behavior analysis. That is because it is a philosophical requirement of behavior analysis that explanatory constructs operate forwardly rather than backwardly, by improving prediction or control (Chiesa, 1994; Hayes, Hayes, & Reese, 1988; Moore, 2008).

In addition to being of questionable scientific value, the socially mediated reinforcement hypothesis is a cynical view of religious behavior because it explains "acting" religious rather than "being" religious (Hood, 1995). That is because, although religious behavior includes rituals, methods of interacting with others, hierarchies, and other social accoutrements, these are simply the outward expressions of something more foundational. According to philosophers and religious scholars, this foundation of faith is based on private, personal experiences, not socially mediated ones (Hood; Merton, 1948; Tillich, 1957). These personal experiences are the truest and most genuine expressions of faith, out of which less genuine, acquired expressions arise. Therefore, not all religious behavior is equal. Acquired religious behavior is motivated by and can be understood in terms of social contingencies. Foundational religious behavior, on the other hand, falls outside the control of socially mediated reinforcement.

This definition is a seeming conundrum for scientists. If some aspect of behaving religiously is illustrated to be sensitive to observable consequences, the critic would claim that the behavior in question is not a genuine or foundational expression. Some scientists agree, stating that true religious experience is not susceptible to scientific methods. The prolific paleontologist Stephen Jay Gould (1999) argued that the mystical falls outside of the magisterium of science. Other scientists have dismissed the distinction, claiming that religious behavior is behavior and, therefore, must conform to its laws (Schoenfeld, 1993). Rejected is the notion of a nonsocial personal-experiential foundation of faith. This is a rejection of the dualism that is the basis of much religious thought. This position is primarily pragmatic; it stems from the intractability of operationalizing the distinction insisted upon by religious scholars. The solution to this problem has been to disregard the proposed distinction.

Nevertheless, even scientists who apply selectionist principles to religious behavior hint at the specialness of the foundation of faith. Dawkins (2006) is forceful on the topic, noting that it is those behaviors that involve faith—that disregard reason—that are really pernicious. One gets the sense Dawkins could tolerate all the rest of religious behavior. However, faith—believing the incredible—is what religious scholars identify as a foundational expression (Chesterton, 1986), and it is what believers seek for themselves and their children. Therefore, despite the difficulty of distinguishing between different classes of religious behavior, the distinction cannot be ignored. A complete scientific account of religious behavior must make sense of the dichotomy.

A NEW START FOR A BEHAVIOR ANALYSIS OF RELIGION

Most attempts to explain religious behavior focus on why it is so stable. At first glance, stability in the context of shifting reinforcement contingencies may seem contrary to the socially mediated reinforcement hypothesis; but it is not. That is because, according to this view, malleability occurs primarily in childhood, after which beliefs become fixed as contingency-based behavior gives way to rule-governed behavior. For that reason, people rarely switch their

religious beliefs or affiliations in response to immediate and tangible rewards. Think of the suffering many people would have avoided had they done so. This view maintains the innocence and malleability of childhood and is accurately caricatured as follows: "Environment molds man, brainwashes him from infancy, and instills religious habits of such strength that they can persevere in the face of powerful counter-active pressures" (Schoenfeld, 1993, p. 7). From this perspective, religious behavior is remarkably stable. Among the zealous, life is eagerly sacrificed for afterlife. Not only are religious habits unswayed by worldly advantages, they may grow stronger in the face of persecution and deprivation. Believers remain faithful for better or worse, through thick and thin, for richer or poorer, and oftentimes report increased fidelity arising from trials and tribulations. It is this steadfastness that captures our attention and demands explanation.

This portrait, however, is incomplete. Although rarely considered in the scientific literature on religion, devotion sometimes gives way to doubt, and vice versa. Even spiritual leaders experience profound changes in their conviction, devotion, and practice over time (James, 1902/1958). According to Dennett (2006), this variability has been overlooked: "Creed revision is a process that is upsetting to watch too closely, so it is no wonder that the fog of mystery descends so gracefully over it" (p. 205). Clearing this fog involves focusing on change rather than stability, and may have important ramifications for the scientific analysis of religion. That is because the socially mediated reinforcement hypothesis is clearest with respect to predicting change. It states, if change occurs, it is in response to shifting reinforcement contingencies. No other mechanism of change is proposed.

Contrary to the prediction, however, there appear to be few if any accounts of important shifts in religiosity that are readily traced back to changes in the availability of tangible reinforcers. An exception is forced conversions, such as those of the Holy Inquisition. Religious scholars would agree, however, that a coerced conversion differs from one that is uncoerced, and that the former falls outside the sphere of a genuine religious experience. Once again, the legitimacy of religious behavior is called into question to the extent that it can be identified as having tangible worldly benefits. But if shifts in religious thinking, beliefs, and behavior are not contingent on socially mediated reinforcement, what, if anything, predicts them? If religious behavior varies over the lifespan, it behooves behavior analysts to be able to predict it.

Variability of Religious Behavior

There is little evidence that profound changes in religious beliefs and behaviors occur in response to changing reinforcement contingencies; nevertheless, they do occur. It is necessary to search for predictors of change. It may be the case that changes in religiosity are preceded by monumental life events, which are defined here as events that bring people into contact with mortality and loss. But they are bigger than that too, and include events that prompt verbal behavior involving life's big questions. The religious scholar Haught (2004) describes the big questions this way:

> The ones that never go away. We may momentarily distract ourselves from them, but they loiter on beneath the surface of our lives. In some of us they remain dormant for years, but extreme circumstances, such as bitter personal defeat and needless suffering, the prospect of our own death or the death of another, may force us to face them head on, at least occasionally. (p. 133)

Therefore, monumental events are defined here not in terms of what an outsider would conclude about them,

but rather by their effects on the behavior of the person who experiences them. To qualify as "monumental" an event must prompt behavior that is concerned with death. Examples of such behavior include (a) efforts to alter the probability of death (e.g., managing risk, attempting suicide), (b) preparing for death (e.g., writing a will), and (c) responding to the possibility of an afterlife. As will be discussed in a subsequent section of this paper, only the latter of these three behaviors—responding to the possibility of an afterlife—qualifies as religious behavior. Therefore, monumental life events do not necessitate religious behavior. Nevertheless, given an observable shift toward greater religious behavior, the present paper hypothesizes that a monumental life event will have triggered it.

Empirical support for this hypothesis can be found in the medical literature. Among patients who tested positive for HIV/AIDS, 45% reported a subsequent increase in religiousness or spirituality (Ironson, Stuetzle, & Fletcher, 2006). By comparison, 13% reported a decrease and 42% reported no change. In another study, 75% of HIV/AIDS patients said that as a result of their illness their faith had been strengthened at least a little (Cotton et al., 2006). These data are consistent with the hypothesis stated above. Having experienced an event that signals an increased probability of death in the form of an HIV/AIDS diagnosis, a sizable percentage of people reported an increase in religious behavior.

The idea that religious faith is triggered by monumental life events is replete throughout scripture and religious biographies. St. Paul writes that his ministry was motivated by escape from death in a storm. Jonah was moved to prophesy by a series of monumental events culminating in being swallowed and regurgitated by a whale. Merton (1948) reported that reminiscences of the horrors of World War I, prompted by the inevitability of what became World War II, provided the proximal impetus for his own religious conversion and eventual monastic convocation. Others attribute being "saved," "reborn," or otherwise brought back to spirituality to a host of monumental events, including addiction, social rejection, and dangerous compulsions. These events have in common the possibility of death or loss. Not unless they are recognized as life altering do they prompt religious behavior. Although these events are not subsequently sought after (disqualifying them as reinforcers) people are often thankful for them in hindsight. They are identified as turning points, toward hopefulness and purposefulness and away from despair and aimlessness. In this way, monumental life events sometimes prompt an enduring reorganization of behavior.

Religious Behavior as a Response Class

Religious behavior may be a class of responses induced by exposure to monumental life events (Segal, 1972). The activities subsumed under this class include both verbal and nonverbal behavior, such as questioning the meaning of existence, contemplating our origins and ultimate fate, and organizing behavior to secure a desirable afterlife. According to both Schoenfeld (1993) and Hayes (1984), the organizing principle for this class of behavior is responding in accordance with the self extended beyond a material existence. Hayes labels the class *self-as-infinite*, noting that it emerges as a function of verbal training in perspective taking (Hayes, Barnes-Holmes, Roche, 2001). It is our ability to engage in verbal behavior about a nonmaterial existence that is the basis for religious behavior (Hayes).

It is important to note that the deictic response class, self-as-infinite, cannot be defined in terms of topog-

raphy; membership is unconstrained by form. It is a verbal frame involving if–then relations (Hayes, 1984). The frame may subsume various individual acts, similar to how grammatical frames subsume various words (Palmer, 1998; Skinner, 1957). For example, "if I am good, then I get a cookie" readily extends to "if I worship, then I go to heaven." Religious behavior, then, is the application of verbal frames to a temporal sequence that extends beyond the speaker's material existence. The ubiquity of religious behavior is illustrated by the fact that even declaring oneself an atheist is likely a religious act. This is true to the extent that professed atheism is a response to the possibility of an afterlife.

Schoenfeld (1993) notes that religious and irreligious behaviors represent competing response alternatives. Whereas religious behavior is characterized by organizing one's activities with regard to self-as-infinite, irreligious behavior involves organizing behavior in response to self-as-finite. The latter involves all activities that are unaffected by a putative nonmaterial existence. This interpretation of religious and irreligious behavior parallels laboratory-based research on concurrent schedules that pits delayed and probabilistic reinforcers against immediate and definite reinforcers (e.g., Chaudhuri, Sopher, & Strand, 2002; Silverstein, Cross, Brown, & Rachlin, 1998). To the extent that a concurrent schedules interpretation is valid, a goal of a behavioral analysis of religion should be to describe how organisms distribute activities across these competing response alternatives. Such a description would contribute to an explanation of the variability of religious behavior.

SCHEDULE-BASED VARIABILITY

Dennett (2006) identified one other behavior-analytic formulation as a possible explanation for religious behavior, namely Skinner's (1948) superstition theory. The theory is based on observations of the behavior of pigeons exposed to a response-independent reinforcement schedule. Observing that behavior, Skinner reported the following:

> In six out of eight cases the resulting responses were so clearly defined that two observers could agree perfectly on counting instances. One bird was conditioned to turn counterclockwise about the cage, making two or three turns between reinforcements. Another repeatedly thrust its head into one of the upper corners of the cage. A third developed a "tossing" response, as if placing its head beneath an invisible bar and lifting it repeatedly. (p. 168)

Skinner suggested that the pigeons were responding as if their behavior controlled delivery of food when in fact the delivery was independent of behavior. That is, he attributed the cause of the "superstitious" responding to the response-independent reinforcement schedule.[1]

Like Dennett (2006), Rachlin (2007) and Zeiler (2007) reject Skinner's (1948) theory as an explanation for religious behavior. The dismissal stems from subsequent experimental analyses illustrating that the behavior of pigeons exposed to response-independent reinforcement schedules is not, in actuality, superstitious. That is, in a replication of the superstition experiment, Staddon and Simmelhag (1971) found that the odd behavior arising in the context of response-independent reinforcement was not a function of a false association between behavior and the reinforcer. Rather, the odd behaviors of the

[1] Skinner's demonstration involved a fixed-time (FT) rather than a variable-time (VT) response-independent schedule. This is important because the present proposal maintains that the occurrence of monumental life events involves the latter. Skinner's work is relevant, however, because subsequent experiments (reviewed by Staddon & Simmelhag, 1971) reveal that both FT and VT response-independent schedules induce the complex behavior patterns relevant to the model of religious behavior presented here.

pigeons were random, or under the control of other reinforcers. This conclusion was supported by subsequent work illustrating that animals do not readily mistake contiguity for contingency (Killeen, 1981). Therefore, superstitious behavior is a less robust phenomenon than Skinner suggested, making it a less than adequate candidate for explaining religious behavior.

Despite the fact that Skinner's (1948) explanation may have been faulty, the observation was not. Research by Staddon and Simmelhag (1971) and others has confirmed that the behavior of nonhuman animals (Anderson & Shettleworth, 1977; Flagel, Watson, Akil, & Robinson, 2008; Flagel, Watson, Robinson, & Akil, 2007; Innis, Simmelhag-Grant, & Staddon, 1983; Kupfer, Allen, & Malagodi, 2008) and humans (Muller, Crow, & Cheney, 1979; Porter, Brown, & Goldsmith, 1982; Prior, Wallace, & Milton, 1984) exposed to response-independent reinforcement schedules is sometimes odd in that it is inconsistent with obtaining the anticipated reinforcer. However, the patterning of the behavior is more complex than Skinner reported. Staddon and Simmelhag noted a dichotomous pattern of responding over the course of the interval between reinforcement presentations (the interreinforcement interval). Toward the beginning of the interval, behavior is remarkably variable and is not well matched to the upcoming food. For example, rather than pecking in anticipation of food, the animals engaged in head bobbing, wing flapping, and other seemingly stereotyped behaviors—the sorts of behaviors that captured Skinner's attention. Toward the end of the interval, on the other hand, their behavior became more consistent with obtaining the food (i.e., pecking increased) and, therefore, less likely to be mistaken for superstitious behavior. This dichotomous response pattern persisted across experimental sessions, qualifying it as steady-state behavior. The two sets of behaviors were labeled *interim* responses and *terminal* responses, respectively.

Experimentally Induced Behavior

In addition to the fact that they comprise one component of a complex, dichotomous patterning of behavior that is induced rather than shaped, a second feature of terminal responses is important to the present discussion. Once the dichotomous patterning of responding is established via adequate exposure to the schedule, the activities that comprise the terminal response typically persist despite being irrelevant to procuring reinforcement. This is true to the extent that they are topographically consistent with the natural response of that species of animal. For example, prior to obtaining food contingent on dropping a coin into a slot, raccoons have been observed to clean the coins (Breland & Breland, 1961). This cleaning behavior is species typical in that it is consistent with how raccoons in the wild behave in the presence of food. It arises in the laboratory after some amount of exposure to a schedule in which food is the operative consequence. Interestingly, this behavior has been shown to arise and persist despite being irrelevant to, or even contrary to, procuring food. To the extent that it persists despite being counterfunctional, that behavior has been identified as falling into a class of behavior that includes instincts, emotions, and sign tracking (autoshaped behavior). Segal (1972) has described such behavior as *induced*, and as occupying a middle ground between a pure operant and reflexes. In addition to consummatory behavior, schedule-induced behavior has been observed in response to aggression, pain, and extinction. Induced behaviors have in common that they are not shaped into existence, but instead emerge in the context of exposure to response-

independent reinforcement. According to Segal, induced behavior includes "topographies that are neither clearly reflexive nor clearly operant, that is, which appear to be under complex stimulus control and not so tightly bound to stimuli as classic reflexes are, and yet not obviously under the control of reinforcement contingencies" (p. 10).

Therefore, there exists an experimentally derived model of reinforcement-resistant behavior that has no basis in ontogenetic functionality. That behavior may arise in the context of exposure to response-independent schedules of reinforcement. The behavior and its persistence are induced (i.e., emergent) in the sense that they are part of a complex response that was not specifically shaped into existence.

Reinforcer Insensitivity

According to the present formulation, the variability of religious behavior—how it ebbs and flows over time—is not a reflection of its differential effectiveness at procuring reinforcement. Instead of being shaped into existence and maintained by differential reinforcement, I am suggesting that religious behavior is schedule induced. This conclusion is based on several pieces of evidence. First, the occurrence of monumental life events is largely independent of the behavior of an organism, in a manner reminiscent of reinforcement schedules that induce complex and compulsive response patterns (Flagel et al., 2007, 2008). Second, religious behavior waxes in response to these events, despite the fact that it is not reinforcing, nor does it signal obvious reinforcers. In this way religious behavior resembles instinctual behavior—it is responsive to antecedents in the apparent absence of reinforcement. This explains why attempts to punish religious behavior may have the paradoxical effect of increasing it. Putative punishers induce religious behavior to the extent that they stimulate verbal behavior concerning immortality. For example, religious persecution often takes the form of the threat of death, which prompts behavior concerned with an afterlife. Such behavior is, by definition, religious. In this way, contingencies established to reduce religious behavior may in fact induce it.

It is these two aspects of religious behavior that the present formulation attempts to explain: that much religious behavior is evoked by certain antecedents while at the same time it is unresponsive to tangible reinforcement. To the extent that this is true, the present formulation is preferable to the socially mediated reinforcement hypothesis. That is because, according to that hypothesis, if the behavior is simply an operant made insensitive to contingencies by rule governance or a history of intermittent reinforcement, it should not remain sensitive to antecedents. The power of the antecedent derives from its association with a reinforcer. Nevertheless, that is what religious scholars (Haught, 2004; James, 1902/1958; Merton, 1948) and empirical studies (Cotton et al., 2006; Ironson et al., 2006) suggest: a response class that is sensitive to antecedents and insensitive to consequences. Such a pattern of responsiveness is consistent with schedule-induced behavior (Segal, 1972).

ACQUIRED RELIGIOUS BEHAVIOR

As was previously noted, religious scholars contrast foundational, genuine, or graceful religious expressions with what might be called *effortful* religious behaviors. These two classes are distinguished not in terms of their form or topography, but rather in terms of their controlling variables. Unlike foundational religious behavior, effortful religious behavior is controlled by its consequences. It is effortful and intentional in the sense

that it is directed toward and dependent on obtaining or experiencing tangible reinforcers. It weakens if not reinforced. In contrast, foundational religious behavior is unaffected by consequences. Moreover, it does not arise out of the efforts of the person who seeks it. This avolitional quality of genuine or graceful religious experience is captured in the words of Merton (1948): "And no one can believe these things merely by wanting to, of his own volition. Unless he receive grace, an actual light and implosion of the mind and will from God, he cannot even make an act of living faith" (pp. 209–210).

In contrast, Merton highlights the meretricious quality of effortful religious acts:

> And therefore, even when we are acting with the best of intentions, and imagine that we are doing great good, we may be actually doing tremendous material harm and contradicting all our good intentions. … The only answer to the problem is grace, grace, docility to grace. (p. 206)

Therefore, the distinction between foundational and acquired religious behaviors involves the difference between that which is graceful and effortless and that which is effortful, purposeful, and functional. Distinguishing between these two forms of religious behavior is so fundamental to religious scholarship that to ignore it in the service of explaining religion is to explain something other than religion. And yet the distinction is ignored by traditional behavior-analytic (Schoenfeld, 1993) and evolutionary (Dawkins, 2006; Dennett, 2006) accounts of religion.

In contrast, the present formulation not only accommodates the distinction, it captures the nature of the relation between the two classes of behavior that comprise it. The grace spoken of by Merton (1948) is a reference to the response-independent quality of foundational religious behavior. Acquired religious behaviors, on the other hand, are operants that are functional from the perspective of how the individual interacts within the context of worldly contingencies. It is important to note that that does not make acquired religious behavior synonymous with irreligious behavior. Acquired religious behavior has in common with irreligious behavior that they are both operants. Unlike irreligious behavior, however, acquired religious behavior originates from induced behavior. Induced behavior serves as the minimal unit out of which acquired religious behavior arises.

To illustrate the relation between these two classes of religious behavior, imagine a soldier in a foxhole. "In a foxhole, no one's an atheist" is a cliché that speaks to the religion-inducing power of that situation. It reflects the fact that regardless of one's belief system, when faced with death people often pray or experience peculiar self-reflective and sensory experiences (as when one's life flashes before one's eyes; James, 1902/1958). According to the present formulation, these experiences are genuine, graceful, and foundational. They do not arise out of previous reinforcement but, instead, are induced by the confluence of a history of verbal training that permits organizing behavior according to the frame of self-as-infinite, and a proximal stimulus that triggers that response pattern.

Continuing with the example, suppose our soldier—a professed atheist—survives the foxhole and returns home. It is possible that he will engage in no further religious behavior. On the other hand, he might wrestle with his experience in the foxhole and conclude that he is, after all, a religious person. A new chapter in his life commences, highlighted by public proclamations of religiosity, comingling with similarly committed individuals, and religious service attendance. In this way, a genuine religious act—prayer in the foxhole—serves as a minimal unit out of which less foundational, acquired

religious behavior results. That is, the acts of revising one's self-descriptions, of seeking likeminded companions, and attending religious services, are effortful, not graceful. Each of these acts can be understood in terms of the individual's history of reinforcement and relevant worldly consequences. The redescription of self, for example, functions to generate consistency between current verbal descriptions of the self and one's actual past behavior. Such efforts derive from past social interactions in which reinforcement accrued to the construction of self-narratives characterized by consistency between word and deed (Skinner, 1974). Similarly, seeking out and interacting with like-minded individuals and attending services occur in the context of social reinforcement. The point of the example is to illustrate the relation between graceful religious behavior and effortful religious behavior. These two classes of behavior, and the relation between them, are consistent with concepts and processes that arise from the experimental analysis of behavior.

In sum, it is the switch from the interim response (irreligious behavior) to the terminal response (religious behavior), induced by a monumental life event, that is the foundational object or experience described by religious scholars.[2] This experience is evoked rather than emitted, although it serves as the basic unit for emitted behaviors.

RELIGIOUS DARK PERIODS

The distinction between these two classes of religious behavior explains why religious leaders and mystics report religious dark periods (see, e.g., Kolodiejchuk, 2007). Dark periods involve great striving and obedience without the presence of God's grace. According to the present perspective, this experience involves continued effortful behavior without the foundational, induced behavior. It is a basic tenet of religious scholarship that these dark periods are common, and how they are managed distinguishes great religious personages from the rest. There is reverence for those who persevere with a calling in the absence of the felt grace of God. Although it is not graceful, it is noble, and is a reflection of grace (Merton, 1948).

Unlike acquired religious expressions, grace cannot be grasped through effort; instead one must be grasped by it (Haught, 2004). The fact that the absence of grace is considered a dark period suggests that the phenomenology associated with graceful and effortful religious behavior is different. Induced religious behavior is apparently more rewarding than acquired religious behavior. Perhaps the great religious mystics are distinguished by the fact of their continual religious striving despite full awareness that such effort is not functional in terms of securing the rewards they desire.

DEBATING A RELATIONAL DEFINITION OF RELIGIOUS BEHAVIOR

According to the present formulation, it is responding to the world

[2] It may be that foundational religious experiences are more complex than simply responding to the frame of self-as-infinite. Instead, such experiences might involve some element of response oscillation between competing contingencies. This idea is borrowed from Ainslie (2001), who argues that concurrent schedules may give rise to attentional switching, which is the basis for a variety of experiential-behavioral phenomena including compulsions, addictions, psychogenic itches, and pains. These phenomena differ from one another in terms of the frequency of the attentional switching. This formulation is appealing in the present context because it highlights that behavioral phenomena may be defined in terms of the patterning of responding that occurs across multiple schedules. Accordingly, graceful religious experiences may require, and may be defined by, some frequency of response switching between competing deictic frames, self-as-infinite and self-as-finite.

from the perspective of self-as-infinite that defines religious behavior. This places religious behavior within a category of response classes termed *relational*, *generalized*, *higher order*, and *overarching* (Catania, 2007; Strand, Coyne, & Silvia, 2008). As such, it is not possible to generate a definitive list of religious behaviors or describe their appearance. That is because the members of relational response classes are defined functionally, without reference to topographical features. This makes it difficult to obtain interobserver agreement. For example, sitting quietly, walking, and eating a meal may or may not be religious acts. Therefore, the identification of whether some behavior is religious is highly dependent on verbal self-reports (Hayes, White, & Bissett, 1998) and the analysis of extended time samples (Baum, 2005).

A relational definition also appears to be contrary to Skinner's (1935) original definition of a response class, which included topographical considerations (Palmer, 2004). This prompted Palmer to suggest excluding relational phenomena from consideration as response classes. Although such a definitional proscription would align with Skinner's original definition and might improve interobserver agreement, it would nevertheless be iatrogenic for the field. That is because, as Palmer notes, it would apply equally to all relational response classes. This would throw into confusion what to do about well-established relational phenomena, including generalized imitation (Baer, Peterson, & Sherman, 1967), attention (McIlvane, Serna, Dube, & Stromer, 2000), equivalence relations (Sidman, 1994), novelty (Pryor, Haag, & O'Reilly, 1969), and operant variability (Neuringer, 2002).

In addition, a relational definition of religious behavior is appealing with respect to some important aspects of that behavior. Conceiving of religious behavior as a relational response class accounts for how religion can be both stable and unstable at the level of cultures. Religious behavior, in the abstract, is stable in the sense that it has apparently existed in all human cultures both past and present (Wilson, 1998). Nevertheless, the form of religious practices and symbols is undoubtedly unstable across time and cultures. Religious behavior, then, is identifiable as a pattern extended across time and space, despite the absence of a common topography.

A relational definition also makes sense of the concept of *spiritual growth*. In many religious traditions spiritual growth involves an attempt to expand the response class (religious behavior) to include the evermore mundane, simple, and repetitious aspects of life. This goal has been perhaps most celebrated in Eastern religious traditions that identify spirituality with being in the moment (Hahn, 1998). However, the emphasis on experiencing everyday acts and routines as religious is also evident in Western religious traditions. Mother Teresa, for instance, implored her Sisters to recognize their simplest activities as most holy (Kolodiejchuk, 2007). This is an attempt to expand the response class to include topographically diverse phenomena, and supports the idea that religious behavior transcends topography.

AUTOMATIC REINFORCEMENT, RELIGION, AND COMPULSIVE BEHAVIOR

An alternative formulation for why a behavior, religious or otherwise, might persist in the absence of observable reinforcers, and even in the face of putative punishers, relies on the concept of *automatic reinforcement*. Reinforcement is automatic to the extent that the behavioral act itself is reinforcing. Religious behavior, for example, might maintain itself to the extent that it is inherently calming or

perhaps because religious narratives reduce unpredictability. Given the apparent parsimony of this account, why consider the more complex, schedule-induced account?

One reason for such consideration involves recent research illustrating a strong link between schedule-induced behavior and compulsive behavior. Specifically, laboratory research with rats has illustrated stable individual differences with respect to susceptibility to schedule-induced behavior (Flagel et al., 2007; Tomie, Grimes, & Pohorecky, 2008). Such susceptibility is highly predictive of compulsive and addictive behaviors; that is, rats that engage in schedule-induced behavior are much more likely to respond to cocaine administration with increased psychomotor sensitization than are rats that do not engage in schedule-induced behavior (Flagel et al., 2008). Note that psychomotor sensitization is recognized as the animal equivalent of compulsive and addictive behavior in humans. Given that religiosity is strongly linked to compulsive behavior (Trimble, 2007), these laboratory findings suggest that schedule-induced behavior, or susceptibility to it, is perhaps the behavioral primitive for various complex behavior patterns that might include religious behavior.

CONCLUSION

> "Imagine there's no Heaven.
> It's easy if you try.
> No hell below us, above us only sky."

This quote by John Lennon appears to be true; it is easy enough to imagine an existence without religion. However, living a life completely free of religious behavior is perhaps impossible for verbal humans. That is because verbal training in perspective taking establishes the verbal frame self-as-infinite as a stimulus to which we can respond. Such responding is induced by exposure to monumental life events that are experienced according to a response-independent schedule. Therefore, according to the present analysis, complex, schedule-induced behavior may emerge as a by-product of verbal training.

The applied implications of this conceptual analysis seem to contradict the larger message of Lennon's song. It may be unrealistic to establish a better world by attempting to reduce religiosity, for the same reasons it is difficult or impossible to extinguish the schedule-induced behavior of nonhuman animals. The best option appears to be to take advantage of the arbitrary nature of religious beliefs and the fact that religious writings are subject to multiple interpretations. However, attempts to highlight some interpretations and discourage others should be informed by the knowledge that religiosity arises from the inevitability of responding to ourselves as infinite.

By alluding to schedule-induced behavior, the present formulation is admittedly appealing to a class of behaviors that is not well understood. As such, it can be criticized as using one poorly understood concept to explain another. In addition, schedule-induced behavior has been largely ignored, apparently the product of contrived laboratory preparations with little or no real-world significance. In response to these criticisms, I argue that even though schedule-induced behavior is enigmatic with respect to its origins it is, nevertheless, a well-documented phenomenon that can be examined in highly controlled settings. As such, it has the potential, through continued empirical scrutiny, to improve prediction and control.

In support of this hopeful position is the fact that, as noted previously, stable individual differences are apparent with respect to susceptibility to schedule-induced behavior. These differences are predictive of a behavior pattern associated with religiosity, compulsive behavior. Therefore, rather than being of only esoteric

interest, schedule-induced behavior may be the behavioral basis for a variety of complex behavior patterns, including religious behavior.

Independent of these considerations, the value of the present formulation lies in the fact that it posits a personal-experiential foundation for religion that is consistent with the writings of philosophers and religious scholars. This is accomplished with recourse to behaviorally legitimate phenomena only. Moreover, the present conceptualization is consistent with the philosophical commitments of behavior analysis in that it urges replacing post hoc explanations of behavioral stability with experimental analyses of religious variability as it occurs across the life span.

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