# Why Religion's Burdens Are Light: From Religiosity to Implicit Self-Regulation

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**Sander L. Koole,[1] Michael E. McCullough,[2] Julius Kuhl,[3] and Peter H. M. P. Roelofsma[1]**

[1]VU University Amsterdam, Amsterdam, Netherlands
[2]University of Miami, Miami, FL
[3]University of Osnabrück, Osnabrück, Germany

**Corresponding Author:**
Sander L. Koole, VU University Amsterdam, Department of Social Psychology, van der Boechorststraat 1, 1081 BT Amsterdam, Netherlands Email: SL.Koole@psy.vu.nl

## Abstract

To maintain religious standards, individuals must frequently endure aversive or forsake pleasurable experiences. Yet religious individuals on average display higher levels of emotional well-being compared to nonreligious individuals. The present article seeks to resolve this paradox by suggesting that many forms of religion may facilitate a self-regulatory mode that is flexible, efficient, and largely unconscious. In this implicit mode of self-regulation, religious individuals may be able to strive for high standards and simultaneously maintain high emotional well-being. A review of the empirical literature confirmed that religious stimuli and practices foster implicit self-regulation, particularly among individuals who fully internalized their religion's standards. The present work suggests that some seemingly irrational aspects of religion may have important psychological benefits by promoting implicit self-regulation.

**Keywords** automatic process, implicit process, self-regulation, religion

## Introduction

> Take my yoke upon you, and learn of me
> For my yoke is easy, and my burdens are light
> *Edwin Hawkins Singers, after Matthew 11:29-30*

Virtually all religions teach their members to uphold sacred laws, ideals, and related standards for appropriate behavior. Among other things, religious standards specify what believers should and should not eat or drink; if, how, when, and with whom believers should have sex; and how believers should treat others and themselves. Maintaining religious standards often means that individuals must endure considerable discomfort and forsake many pleasurable experiences. Accordingly, one might expect religious individuals to display lower emotional well-being than nonreligious individuals. However, if anything, empirical evidence suggests the opposite. Religious individuals generally display fewer ruminative thoughts, lower levels of inner conflict, and higher levels of positive emotion compared to nonreligious individuals (e.g., Neyrinck, Vansteenkiste, Lens, Duriez, & Hutsebaut, 2006; Ryan, Rigby, & King, 1993; T. B. Smith, McCullough, & Poll, 2003).

The psychological profile of religious individuals is thus something of a paradox. Indeed, how do religious individuals manage to stay calm and content while they are struggling to meet the high standards of their religion? Psychologists have

offered a range of answers to this question by suggesting that religion may satisfy motives for self-enhancement (Sedikides & Gebauer, 2010), group acceptance (Ysseldyk, Matheson, & Anisman, 2010), attachment (Granqvist, Mikulincer, & Shaver, 2010), and terror management (Vail et al., 2010). Though compatible with these perspectives, the present article advances a more abstract theoretical analysis by relating religiosity to basic principles of human action control. From this perspective, religiosity may shape not only the contents of people's motives—whether this be self-enhancement, attachment, terror management, or other pressing concerns— but also the underlying mechanisms whereby people engage in motivated action. Specifically, the present article proposes that various religious practices and beliefs may lead people to adopt a self-regulatory mode that is flexible, efficient, and governed by largely unconscious processes. In this implicit mode of self-regulation, religious individuals may strive for high religious standards in a way that is congruent with their emotional needs. As such, implicit self-regulation processes may allow religious individuals to simultaneously maintain high emotional well-being and high religious standards.

In the remainder of this article, we elaborate the theoretical underpinnings of the implicit self-regulation model of religiosity and evaluate relevant empirical evidence. We begin by discussing classic and modern theories of the unconscious in religious behavior, which have generally depicted the unconscious as a primitive cognitive system. Subsequently, we turn to modern theories of the adaptive unconscious and discuss recent notions of implicit self-regulation processes. Next, we consider the rationale for assuming that many forms of religion facilitate implicit self-regulation. We then use the implicit self-regulation model to organize existing evidence on the interface between religiosity and self-regulation. Finally, we summarize our main conclusions and suggest directions for future research.

## Theories of the Unconscious

In his classic *Varieties of Religious Experience*, William James (1902/2002) ventured that the unconscious might be "the fountainhead of much that feeds our religion" (p. 374). These speculations were severely criticized by James's contemporaries, who argued that invoking the unconscious to account for religious experience "represents an attempt to explain the obscure by the almost totally dark" (Moore, 1938, pp. 199, 201; also see Wulff, 1997). Nevertheless, the significance of the unconscious in religious behavior was resumed by theorists from various psychoanalytic, depth-psychological, and behaviorist traditions (Freud, 1927/1989; Jung, 1938/1969; Vetter, 1958).

The aforementioned traditions have offered very different theoretical characterizations of the unconscious processes that might underlie religion. Nevertheless, they agree in their conception of the unconscious as an inherently crude and primitive system. A notable exception is the work by existential therapist Victor Frankl (1948/1975). Frankl proposed that all humans possess an unconscious form of spirituality, which he also referred to as "conscience" or a "pre-reflective ontological self-understanding" (p. 127). According to Frankl, this unconscious spirituality is grounded in highly personalize feelings and intuitions. Moreover, Frankl surmised that these intuitions are intelligent by being "more sensitive than reason can ever be sensible" (p. 39).

Frankl's (1948/1975) ideas about cognitively sophisticated unconscious processes foreshadowed modern research, which has shown that the unconscious regulates far more than instinctive or routine behavior. Rather, unconscious processes are integral to intelligent goal-directed actions that are performed in close interaction with dynamically changing environmental contingencies (Bargh & Ferguson, 2000; E. R. Smith & Semin, 2004; Kuhl, 2000). The unconscious may accomplish this through parallel-distributed processing (PDP; McClelland, Rumelhart, & PDP Research Group, 1986; also see Kuhl, 2000). PDP is capable of integrating vast amounts of information about internal constraints (i.e., needs, goals, motives) and external constraints (i.e., situational demands, contextual information). The parallel and integrative nature of this type of cognitive processing renders it inaccessible to introspection. Nevertheless, people may have some conscious access to the resulting cognitive products in the form of hunches, intuitions, or feelings (Baumann & Kuhl, 2002).

In recent years, notions of the adaptive unconscious have begun to find their way into theories of human self-regulation (Kuhl, 2000; Moskowitz, Li, & Kirk, 2004; Shah, 2005). This work seems highly relevant to the psychology of religion given that theorists have long assumed a close link between religion and the healthy functioning of the self (Frankl, 1948/1975; Fromm, 1950; Jung, 1938/1969; Maslow, 1964; May, 1953).

## Implicit and Explicit Modes of Self-Regulation

Within modern psychology, self-regulation is traditionally assumed to function like an "inner dictatorship" (Kuhl, 2000) that is conscious, effortful, and repressive toward automatic tendencies (Baumeister, Schmeichel, & Vohs, 2007). However, people may also go about the self-regulation process in a more flexible manner. Indeed, some forms of self-regulation appear to operate more like an "inner democracy" (Kuhl, 2000) by regulating people's actions in harmony with the totality of people's inner needs, motives, and autobiographical experiences. This implicit mode of self-regulation is not mediated by explicit intentions but rather by integrated feelings or intuitions about appropriate courses of action (Baumann & Kuhl, 2002).

We conceive of implicit self-regulation as a process in which a central executive (i.e., the implicit self) coordinates the

person's functioning by integrating as many subsystems and processes as possible for supporting a chosen course of action. The functional architecture for implicit self-regulation is provided by a parallel-processing system of extended (holistic) memory representations (extension memory; Kuhl, 2000) that are closely connected with the autonomic nervous system. Implicit self-regulation is likely to be especially advantageous when people have to deal with challenging conditions, such as high social demands (Jostmann & Koole, in press) or inner conflict (Koole, Govorun, Chang, & Gallucci, in press). Under such circumstances, implicit self-regulation can mobilize a wide variety of psychological resources that allow people to function flexibly and efficiently, such as implicit self-esteem (Koole, 2004), self-serving attributions (Brunstein & Olbrich, 1985), positive affect (Koole & Jostmann, 2004), intuitions (Baumann & Kuhl, 2002), implicit motives (Baumann, Kaschel, & Kuhl, 2005), automatic interpretive biases (Koole & van den Berg, 2005), affirmation of symbolic worldviews (Kazén, Baumann, & Kuhl, 2005), and increases in working memory capacity (Jostmann & Koole, 2006). Implicit self-regulation should further be useful in situations that are better grasped intuitively rather than analytically, such as multitasking environments (Jostmann & Koole, in press), emotional conflicts (Koole, 2009a), and existential problems (Koole & van den Berg, 2005).

Empirical evidence supports the importance of implicit self-regulation in many domains. For instance, subliminally priming self-related stimuli can lead to increased self-regulation of reflexive responses (Koole & Coenen, 2007; Macrae, Bodenhausen, & Milne, 1998). Likewise, priming individuals with autonomy-related stimuli can promote more intrinsic self-regulation, as evidenced by more voluntary task engagement, reduced self-serving bias, and increased psychological well-being (for a review, see Levesque, Copeland, & Sutcliffe, 2008). Other research has shown that self-regulatory processes can modulate implicit processes, for instance, leading people to actively respond to stimuli results in "unpriming," that is, spontaneous deactivation of the primed contents (Fiedler, Bluemke, Unkelbach, in press; Martin, 1986; Sedikides, 1990; Sparrow & Wegner, 2006). Relatedly, research has supported the existence of implicit counterregulation processes, which rapidly and flexibly undo the impact of previously activated motivational and emotional states (Fishbach & Trope, 2007; Koole & Jostmann, 2004; Rothermund, Voss, & Wentura, 2008; also see Koole, 2009a).

The functional independence of implicit and explicit selfregulation is corroborated by findings that the two kinds of self-regulation can mutually interfere with another. For instance, an emphasis on explicit goals may disrupt a person's cognitive access to implicitly represented needs, leading to motivational conflict and overall reductions in psychological well-being (Baumann et al., 2005). Conversely, an emphasis on the person's extended values can lead people to disengage from a specific goal at an appropriate time, for instance, when this goal was repeatedly frustrated (Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999).

The single-minded focus of explicit self-regulation is presumably hard to combine with the more holistic, person-oriented focus of implicit self-regulation. Indeed, implicit and explicit self-regulation are associated with antagonistic cognitive styles (Kuhl, 2000). Explicit self-regulation is closely associated with analytic processing, a cognitive style that is dependent on linguistic encoding, precise, sequential, rigid, and dissociated from emotional and sensorimotor systems. By contrast, implicit selfregulation is closely associated with integrative processing, a cognitive style that is largely independent of linguistic encoding, impressionistic, parallel, flexibly attuned to multiple meanings, and closely coupled with emotional and sensorimotor systems. A large volume of research supports the distinction between analytic versus integrative processing styles (Baumann & Kuhl, 2002; Brown, Ryan, & Creswell, 2007; Förster, in press).

Because of its holistic focus, implicit self-regulation is optimally suited to maintain the global integrity of the personality system (Kuhl, 2000). This global adaptive function operates in at least three distinct ways. First, implicit selfregulation has been shown to promote *volitional efficiency*, such that the individual is capable of forming appropriate intentions and translating these into action (Kuhl, 1985, 2000; for a review, see Jostmann & Koole, in press). Second, implicit self-regulation has been shown to promote flexible and efficient *affect regulation*, such that the individual can avoid becoming overwhelmed or stuck in emotional or motivational states (for a review, see Koole, 2009a). Third, implicit self-regulation has been shown to promote an implicit sense of *meaning* in life, such that the individual is capable of creating meaning out of new experiences and maintaining older networks of meaningful cognitive representations (for a review, see Heine, Proulx, & Vohs, 2006).

## Religiosity and Implicit Self-Regulation

The central proposal of the present article is that religiosity may facilitate implicit self-regulation. This proposal is based on the notion that a great deal of religious practices and beliefs are likely to draw on similar psychological processes as implicit self-regulation. Because of this overlap, religiosity may promote the acquisition of skills that are conducive to implicit self-regulation. In addition, engaging in religious practices or exposure to religious stimuli may activate cognitive procedures, motivational and emotional states, and other psychological mechanisms that increase people's readiness to engage in implicit self-regulation.

Following Atran and Norenzayan (2004), we conceive of religion as a broad cultural syndrome that is characterized by

deeply held beliefs in supernatural agents such as gods or spirits, along with ritualized and socially shared practices that sustain these beliefs. There are considerable individual and cultural differences in religious commitments, beliefs, and practices. Nevertheless, core aspects of religion can be found across virtually all human cultures and among the majority of individuals around the world today. As we show, at least some of these core aspects of religion appear to be highly compatible with implicit self-regulation.

A first way in which religion and implicit self-regulation are compatible is that both are oriented toward the whole person. Religion seeks to transform every aspect of the thoughts, feelings, and actions of the person. Indeed, practicing religious principles in a part-time or compartmentalized manner violates the basic principles of most religions. The holistic nature of religion points to a focus on the well-being of the entire person. To be sure, the well-being of the person is rarely the explicit focus of religion. Indeed, most religious traditions emphasize ideals that transcend the individual person, such as "living according to the will of God." However, not explicitly stating the person-oriented function of religion may paradoxically facilitate the operation of implicit self-regulation processes. This is because explicit goals are likely to trigger explicit self-regulation, which can easily interfere with implicit self-regulation processes (Kuhl, 2000). This reasoning is in line with Frankl (1966), who wrote, "Self-actualization, if made an end itself, contradicts the self-transcendent quality of human existence. Only to the extent to which man fulfills a meaning out there in the world, does he fulfill himself" (p. 99).

A second way in which religion and implicit self-regulation are compatible lies in their mutual reliance on integrative processing. Religious transformation can be seen as a process that allows a person to recognize and integrate experiences that were formerly repressed. For instance, by breaking with a person's self-centered view on life, religion may open the person up to other people's needs and wishes. Moreover, many religious practices and beliefs are connected with multiple meanings. For instance, the miraculous healings performed in religious stories often not just involve physical changes but also equally pertain to spiritual transformation. Religious practices and beliefs are laden with such metaphors, symbols, and latent meanings (Barsalou, Barbey, Simmons, & Santos, 2005; Jung, 1938/1969), which may implicitly guide believers toward self-actualization (Fromm, 1950; Jung, 1938/1969; Maslow, 1964). Among the most powerful religious metaphors is the portrayal of the divinity as an attachment figure, such as a loving parent. This metaphor may allow individuals to incorporate their prior experiences with attachment figures into their religious devotion (Granqvist et al., 2010; Kirkpatrick, 1998). Moreover, processing latent symbolic meanings calls on integrative cognitive capacities (Baumann & Kuhl, 2002) and as such facilitates a cognitive style that is conducive to implicit self-regulation.

A third way in which religion and implicit self-regulation are compatible is embodiment. Many religious practices involve actions that regulate bodily functioning, such as controlled breathing during meditation or closing one's eyes during prayer (Barsalou et al., 2005; Cahn & Polich, 2006). These bodily actions presumably serve to help individuals to attain a quiet state of mind. Moreover, bodily actions may have a deeper symbolic meaning. For instance, accepting the wine and wafer in communion provides a powerful metaphor for accepting Christ into one's life (Barsalou et al., 2005). Likewise, bowing one's head and kneeling during prayer may powerfully communicate the elevation and powerfulness of the divine (Schubert, 2005; Meier, Hauser, Robinson, Friesen, & Schjeldahl, 2007). The consistent use of such embodiments is likely to facilitate a deeper understanding of religious meanings (Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005). At the same time, the embodied nature of religion is highly compatible with implicit self-regulation, which is closely attuned to the person's bodily functions (Kuhl, 2000).

Orientation toward the whole person, integrative processing, and embodiment characterize most religions to some degree. Nevertheless, religious individuals may vary in the degree to which they incorporate these aspects. An intrinsic religious orientation (Allport & Ross, 1967), in which religious values are fully internalized, is highly compatible with implicit self-regulation. By contrast, an extrinsic religious orientation (Allport & Ross, 1967) is oriented toward obtaining specific material or social rewards. Such instrumental forms of religiosity are more compatible with explicit rather than implicit self-regulation. Similarly, religiosity may take the form of fundamentalism, which advocates moral absolutism, literal interpretation of sacred texts, and repression of evil forces within and outside the self (Altemeyer & Hunsberger, 1992). Fundamentalism is more compatible with an analytic cognitive style and hence antithetical to implicit self-regulation. More compatible with implicit self-regulation is a quest orientation toward religion, which involves honestly facing existential questions in their complexity (Batson & Schoenrade, 1991) and is characterized by a more integrative cognitive style (Batson & Raynor-Prince, 1983).

In sum, we propose a theoretical model that links religiosity to the dynamics of implicit self-regulation. According to the model, religiosity is likely to facilitate implicit selfregulation to the extent that (a) it is characterized by an orientation toward the well-being of the whole person, (b) it encourages integrative cognitive processing, and (c) it relies on embodied metaphors and practices to convey the meaning of its teachings. From the model, it follows that religiosity should primarily facilitate implicit self-regulation among individuals who regard religion as central to their lives and pursue their religion in an open-minded manner. Religious orientations that emphasize rational-analytic elements (e.g., extrinsic religion or religious fundamentalism) may be more likely to facilitate explicit self-regulation and potentially even interfere with

implicit self-regulation.

## Empirical Support for the Implicit Self-Regulation Model of Religiosity

A recent review found broad empirical support for the notion that religiosity fosters effective self-regulation (McCullough & Willoughby, 2009). Although this evidence is consistent with the present perspective, it falls short of demonstrating that religiosity can facilitate implicit forms of self-regulation. Consequently, the present review entails a more focused examination of the empirical evidence that religiosity might foster implicit self-regulation. The present review covers the self-regulation of action, affect, and meaning. Each of these domains is foundational to psychological well-being and known to be influenced by implicit self-regulation processes (Heine et al., 2006; Koole, 2009a; Shah, 2005).

Implicit processes have been operationalized in various ways (De Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009). In the present review, we draw on two types of evidence to establish the "implicitness" of self-regulatory effects of religiosity. First, we consider priming studies that have examined the effects of exposure to religious stimuli and practices on self-regulation. Arguably the strongest evidence for implicit self-regulation is formed by demonstrations that subliminally priming religious stimuli can elicit self-regulatory behavior. However, critical in establishing implicit effects is not whether people are unaware of a stimulus but rather whether people are unaware of the impact of the stimulus on their behavior (Bargh, 1992). Thus, our review also discusses studies examining the impact of supraliminal (but subtle) religious primes on self-regulation.

Second, the present review considers studies on the effects of religious stimuli and practices on implicit measures of selfregulation, such as response-time measures or event-related brain potentials. Implicit measures do not rely on introspection (Greenwald & Banaji, 1995) and are meant to tap into aspects of behavior that are not consciously controlled (De Houwer et al., 2009). As such, implicit measures offer an important window into the types of processes that are involved in the interface between religiosity and implicit self-regulation.

To establish that the effects of religious stimuli and practices go beyond the activation of general semantic meanings, it is important to show that these effects are amplified by religious involvement. Although experimental studies allow for causal inferences, it has proven difficult to manipulate religious involvement. The present review therefore also considers relevant individual differences. Theoretically, religiosity should mainly facilitate implicit self-regulation among individuals who are (intrinsically) committed to their religion. In addition, type of religious involvement may matter, such that the link between religiosity and implicit self-regulation is likely to be stronger among individuals who practice religion with an open-minded rather than a fundamentalist attitude.

## Religion and Implicit Regulation of Action

Psychologists have often treated religiosity in purely cognitive terms, as a set of beliefs. However, religiosity influences people's actions as much as their beliefs (McCullough & Willoughby, 2009). Accordingly, it is of major interest to see whether religiosity facilitates the implicit regulation of action.

### *Attentional Functioning.*

Attention plays a fundamental role in action regulation (Rueda, Posner, & Rothbart, 2005). Orienting attention is necessary for carrying out intended actions and for monitoring the consequences of those actions (Carver & Scheier, 1998). Moreover, through the distribution of attentional resources, people can coordinate their memories, thoughts, and emotions (Lutz, Slagter, Dunne, & Davidson, 2008; Rueda et al., 2005). Thus, if religious practices and beliefs facilitate implicit self-regulation, they may also facilitate the implicit regulation of attention.

A sizable body of research indicates that meditative practices, which are an integral part of many religious traditions, promote more efficient attentional functioning (for reviews, see Cahn & Polich, 2006; McCullough & Willoughby, 2009). Importantly, meditation may even influence attention on implicit levels. For instance, one study on event-related brain potentials showed that concentrative meditation enhances preattentive processing of auditory signals, which occur between100 and 250 ms after stimulus onset (Srinivasan & Baijal, 2007). Other studies have shown that Vipassana meditation, which is aimed at broadening one's attentional focus, fosters the ability to rapidly engage and disengage from target stimuli. In the latter studies, participants were present with two successive targets in a rapid stream of distracters. When two targets in a rapid stream of events succeed each other within 500 ms, the second target is often not detected. This "attentional blink" is believed to result from suppression of task-irrelevant information (Olivers & Meeter, 2008). Two experiments found that the attentional blink became significantly smaller among individuals who received 3 months training at Vipassana meditation (Slagter et al., 2007; Slagter, Lutz, Greischar, Nieuwenhuis, & Davidson, in press).

The effects of meditation have been obtained at stimulus presentations that are ordinarily too rapid to permit conscious

detection. It is further striking that experienced practitioners of meditation typically report a decreased voluntary effort in attaining concentration (Lutz et al., 2008). Moreover, many meditative techniques (e.g., Vipassana and mindfulness) encourage practitioners to release any explicit effort to control their mental states. Taken together, the effects of meditation on attention regulation appear to be meditated by implicit processes.

Beyond meditation, other forms of religiosity may similarly contribute to the implicit regulation of attention. For instance, several studies have shown that subliminally priming religious stimuli has a significant impact on self-regulatory behavior (e.g., Fishbach, Friedman, & Kruglanski, 2003; Weisbuch-Remington, Mendes, Seery, & Blascovich, 2005) and that subliminally priming emotional stimuli increases religious behavior (Birgegard & Granqvist, 2004). Thus, religiosity seems to stimulate a broad attentional vigilance for religious stimuli. Moreover, many of the behavioral effects that are reviewed in subsequent sections imply a broadening of attention, for instance, from the self to other individuals (e.g., Shariff & Norenzayan, 2007), from the here and now to the more distant future (Roelofsma, Koole, & McCullough, 2009), or from one's current feelings toward one's broader values (Hicks & King, 2008). Although more direct evidence is warranted, these preliminary findings suggest that other forms of religiosity than meditation may similarly facilitate implicit attention regulation.

### *Behavioral Effects of Religious Primes.*

Religious practicesand beliefs may also trigger implicit processes that promote the enactment of religious norms and goals. For instance, two studies found that when participants were first primed with God-related concepts such as "spirit," "divine," and "God" in an unrelated task, they behaved more generously in a standardized social interaction task than did unprimed participants (Shariff & Norenzayan, 2007). Related studies have found that priming religious contents increases prosocial behaviors such as honesty (Randolph-Seng & Nielsen, 2007) and volunteering to help a charity (Pichon, Boccato, & Saroglou, 2007). Notably, other studies have shown that priming God leads people to ascribe less authorship to their own actions (Dijksterhuis, Preston, Wegner, & Aarts, 2008), which further reduces the likelihood that the effects of religious primes are mediated by conscious intentions.

The effects of priming on behavior are often explained in terms of an automatic link from ideation to action (Dijksterhuis & Bargh, 2001). However, behavioral priming occurs mainly to the extent that it elicits changes in momentarily activated self-views (Wheeler, DeMarree, & Petty, 2007). Thus, behavioral priming effects appear to be mediated by implicit self-representations and may thus be considered a special form of implicit self-regulation (see Koole & Coenen, 2007). The latter interpretation fits well with observations regarding the behavioral effects of religious primes. First, the effects of religious are most pronounced among religiously identified individuals (Shariff & Norenzayan, 2007, Study 2), although some studies have also found effects among nonreligious individuals, a point to which we will return later (Randolph-Seng & Nielsen, 2007; Shariff & Norenzayan, 2007, Study 1). Second, the kinds of behaviors that are influenced by religious primes—generosity, honesty, volunteering—all involve novel, nonroutine, active components. As such, it seems unlikely that religious primes operate merely through the passive activation of habitual motor sequences.

### *Counterregulation ofTemptations.*

Further support for a linkbetween religion and implicit self-regulation was reported inresearch on counteractive self-control. In an experimental study, participants were subliminally primed for 50 ms with either a temptation-related concept such drugs, temptation, or premarital sex, a religion-related concept such prayer, bible, religion, and God, or a neutral word (Fishbach et al., 2003). After each prime, participants were asked to identify religionrelated words or temptation-related words as quickly as possible. The results showed that subliminal presentation of religionrelevant primes led to slower recognition of temptation-relevant words than did the subliminal presentation of the neutral primes. These and related findings suggest that religious concepts may unconsciously help people to exercise self-control in the face of temptation.

### *Temporal Discounting.*

Although the findings by Fishbach et al. (2003) are provocative, the relevant measure of implicit self-regulation was derived from response times in a lexical decision task. As such, the question arises whether religious primes could also influence self-regulation of socially meaningful behavior. This issue was addressed by experiments on the role of religion in temporal discounting (Roelofsma et al., 2009). Impulses toward immediate gratification can lead people to discount future rewards (Metcalfe & Mischel, 1999). Self-regulation can prevent such temporal discounting by maintaining the value of future rewards. Consistent with a general facilitative effect of religion on self-regulation, studies found that religious individuals displayed less discounting of future rewards (Roelofsma et al., 2009). Notably, the effects of religiosity on temporal discounting were enhanced after religious individuals had engaged in a prayer exercise. Because participants were unaware of the connection between the prayer exercise and the temporal discounting measure, these results suggest that religious activities such as prayer can implicitly promote self-regulatory behavior.

## Religion and Implicit Affect Regulation

James (1902/2002) observed that there exists "a common storehouse of emotions upon which religious objects may draw" (p. 24). The regulatory influence of religiosity on affective experience has indeed been confirmed by many empirical studies (e.g., Saroglou, Buxant, & Tilquin, 2008; T. B. Smith et al., 2003). But does the affect-regulatory influence of religiosity extend to implicit levels?

### *Affective Impact of Religious Imagery.*

Weisbuch-Remington et al. (2005) explored the hypothesis that religious imagery may unconsciously regulate people's affective states. In two studies. participants were asked to prepare and deliver a public speech, an activity that inherently arouses considerable emotional distress (Dickerson & Kemeny, 2004). The topic of some speeches was existentially threatening, in that participants had to speak about their own death. Other participants spoke about a nonexistential topic (going to the dentist). Before the speeches were given, participants were subliminally exposed to either pictures of positive religious images (e.g., Christ ascending to heaven, Mary holding the baby Jesus) or negative religious images (e.g., demons and satanic symbols).

The results showed that the cardiovascular responses of Christian participants, but not of non-Christian participants, were reliably influenced by the subliminal presentation of religious imagery. More specifically, Christian participants who had viewed negative religious imagery exhibited a pattern of cardiac reactivity associated with threat appraisals (i.e., greater total peripheral resistance) during the threat-related speech task. By contrast, Christian participants manifested a pattern associated with challenge appraisals (i.e., greater cardiac output) during the speech task if they had previously viewed positive religious images. Notably, no significant effects emerged when participants were subliminally presented with the same images that were blurred to remove their religious content. Thus, Weisbuch-Remington et al.'s (2005) findings point to an implicit affect regulation process that is specific to images with a religious meaning, though it is possible that similar effects would be obtained for any set of valenced images that had deep significance to a homogeneous set of participants (e.g., positive reminders of their families or their countries of origin).

Additional support for an affect-regulatory function of religious imagery was found in a brain imaging study (Wiech et al., 2008). In this study, practicing Catholic and nonreligious participants were exposed to noxious electric shocks while they were watching religious images of the Virgin Mary or equivalent images devoid of religious content. Religious imagery led to reduced pain reports among practicing Catholics, an effect that did not emerge for neutral imagery or nonreligious participants. Moreover, the modulation of pain by religious imagery specifically engaged the right ventrolateral prefrontal cortex, a brain region previously shown to be important in the cognitive down-regulation of pain. Although religious images were presented supraliminally in this study, all participants were presumably motivated to down-regulate the pain of the electric shocks. Thus, the modulation of pain by religious imagery was unlikely to be meditated by explicit intentions and may therefore be attributed to implicit self-regulation processes.

### *Emotionally Based Religiosity.*

Even the decision to turn to religion as a way of coping with one's feelings may be influ-enced by implicit processes. In real life, people often turn to religion in situations of emotional distress (Pargament, 1997). Two experiments showed that, relative to control conditions, priming individuals with social exclusion leads to stronger beliefs in supernatural agents such as God, angels, and ghosts (Epley, Akalis, Waytz, & Cacioppo, 2008). Thus, the pain of loneliness may implicitly increase people's receptiveness to religious beliefs.

Birgegard and Granqvist (2004) examined whether emotionally based religiosity can be instigated by subliminal distress cues. In three experiments, participants were subliminally primed with distress cues (e.g., "Mother has abandoned me") or neutral cues. Participants then reported how close they wanted to be to God to obtain a sense of security. The results showed that subliminal distress cues significantly increased proximity seeking in relation to God, especially among individuals with a secure attachment style. Individuals with an insecure attachment style did not display enhanced religiosity after subliminal distress primes, presumably because their religious commitments are relatively unstable (see Granqvist et al., 2010). Thus, at least among securely attached individuals, emotionally based religiosity can be instigated unconsciously.

### *Prayer and Affect Regulation.*

Both common sense and religious teachings suggest that prayer may help individuals in dealing with emotional distress. Correlational evidence indeed supports an affect regulation function of prayer (McCullough & Larson, 1999). Recent studies have experimentally tested whether prayer regulates people's affective states (Koole, 2009b). In one series of experiments, participants were first introduced to a person in need and then instructed either to think about or pray for the target person. Five studies showed that prayer consistently elicited reductions in negative mood. These reductions in

negative mood were apparent among participants high in intrinsic religious orientation but not among those low in intrinsic religious orientation. The implicit nature of these effects was supported in two studies where praying for a person in need (but not thinking about this person) led intrinsically religious participants to become faster at evaluating positive rather than negative words and in detecting happy faces among angry crowds (Koole, 2009b).

Prayer may also down-regulate specific emotions such as anger. Indeed, recent studies exposed participants to a provocation (i.e., insulting remarks about an essay), after which some participants were led to pray for a target person (either the person who made the insult or a different person; Bremner, Koole, & Bushman, 2009). Prayer led to a significant reduction in feelings of anger but not other kinds of negative mood (e.g., depression or anxiety). Other studies showed that prayer also reduced aggressive behavior and angerrelated appraisals after a provocation. Notably, the effects of prayer occurred even when the target was unrelated to the provocation and even when appraisals were assessed unobtrusively in an allegedly unrelated experiment. Taken together, there is converging evidence that prayer can elicit implicit affect regulation, particularly among intrinsically religious individuals.

## Religion and Implicit Regulation of Meaning

Across all known cultures, religions universally address questions about the meaning of existence (Atran & Norenzayan, 2004). Recent work has documented a key role of implicit processes in so-called "meaning maintenance" mechanisms (Heine et al., 2006; Koole, Greenberg, & Pyszczynski, 2006; Proulx & Heine, in press; also see Frankl, 1948/1975). Consequently, if religion facilitates implicit self-regulation, then religion might promote the implicit regulation of meaning.

### *Coherent Self.*

The self is a primary source of meaning among modern individuals (Baumeister, 1987). Conflicts between different self-aspects therefore represent an important threat to people's meaning systems (McGregor & Little, 1998). From the present perspective, religious practices and beliefs might reduce such conflicts within the self, even on implicit levels. This notion was tested in some recent studies on the impact of meditation on implicit and explicit self-esteem (Koole et al., in press).

Explicit self-esteem refers to people's consciously held beliefs about their self-worth, whereas implicit self-esteem refers to intuitive associations that the person has toward the self, regardless of whether he or she accepts these associations as valid (Koole & DeHart, 2007). Many individuals display discrepancies between the two types of self-esteem. These discrepancies are associated with meaning maintenance problems, such as defensiveness (Jordan, Spencer, Zanna, Hoshino-Browne, & Correll, 2003), excessive perfectionism (Zeigler-Hill & Terry, 2007), and self-doubt (Briñol, Petty, & Wheeler, 2006). Koole et al. (2009) hypothesized that meditation might make individuals more willing to heed intuitive associations about the self and thereby increase the congruence between implicit and explicit self-esteem. Consistent with this, two studies found that engaging in a meditation exercise leads to higher congruence between implicit and explicit self-esteem. The latter studies did not directly assess existential meaning. Nevertheless, it seems plausible that, by reducing implicit conflicts within the self, meditation may promote a sense of meaning in life (McGregor & Little, 1998). *Meaning in Life.* Religiosity may change the very basis of meaning in life, by shifting people's focus away from hedonic concerns about the pursuit of pleasure toward eudemonic concerns about living according to one's core values or authentic self (Saroglou, Delpierre, & Dernell, 2004; also see Ryan & Deci, 2001). Consistent with a religious shift away from hedonic concerns, positive affect predicts meaning in life more strongly among individuals with high rather than low religious involvement (Hicks & King, 2008, Study 1). The latter effect may occur even on unconscious levels. Indeed, subliminally priming Christians with positive religious words (e.g., *heaven*) has a similar effect as religious involvement, by weakening the association between positive affect and meaning of life (Hicks & King, 2008, Study 2). Although eudemonic concerns were not assessed in this study, these findings fit with the notion that religious concerns may unconsciously shift people from hedonic to eudemonic regulation.

### *Terror Management and Religiosity.*

An influential perspective on the regulation of meaning is terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986). Drawing from existential thinkers such as Kierkegaard, Heidegger, Rank, and Becker, TMT proposes that human awareness of the inevitability of death creates a potential for paralyzing existential anxiety. To manage this problem, people may adopt cultural worldviews that afford a sense of death-transcending meaning (i.e., literal or symbolic immortality). Consistent with TMT, many experiments have found that reminders of death lead to increased defense of cultural worldviews (for an overview, see Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004). Importantly, such terror management defenses are instigated unconsciously (Arndt, Greenberg, Pyszczynski, & Solomon, 1997) and draw on self-regulatory resources (Gailliot, Schmeichel, & Baumeister, 2006; Koole & Van den Berg, 2005).

TMT's relevance to religion has recently been reviewed elsewhere (Vail et al., 2010), so our discussion of the theory is

brief. Two recent studies showed that death reminders lead to increased belief in supernatural agents and in the efficacy of prayer among Christian participants but not among nonreligious participants (Norenzayan & Hansen, 2006). As such, religious individuals may recruit beliefs in the supernatural in defending against death concerns. Other studies have shown that the effect of death reminders on the defense of secular worldviews is reduced among religious individuals relative to nonreligious individuals (Jonas & Fischer, 2006; Norenzayan, Dar-Nimrod, Hansen, & Proulx, 2009). In addition, affirming religious beliefs eliminates the effect of death reminders on the defense of secular worldviews and death thought accessibility, especially among people high on intrinsic religion (Jonas & Fischer, 2006). Extrinsic religion had no parallel effects in these studies. Thus, intrinsic religious beliefs appear to be an important resource in dealing with the problem of death, even on implicit levels.

### *Terror Management and Religious Fundamentalism.*

Religious fundamentalism predicts less defense of secular worldviews after reminders of death (Friedman & Rholes, 2008, 2009). These findings could be taken to mean that religious fundamentalism, like intrinsic religion, has a protective function in dealing with death concerns. However, relevant studies manipulated death reminders through open-ended questions, and qualitative analyses showed that fundamentalists' responses to these questions were less cognitively complex and contained more positive emotion and more future and socially oriented than did responses by nonfundamentalists (Friedman, 2008). It thus appears that fundamentalists actually respond more defensively to death concerns by more rapidly engaging in defensive processing than nonfundamentalists (see McGregor, 2006, for a similar pattern among individuals with defensive high self-esteem).

Indeed, among individuals high rather than low in fundamentalism, death reminders cause greater defense of religious worldviews and greater avoidance of existential ambiguity (Vess, Arndt, Cox, Routledge, & Goldenberg, 2009).[1] Moreover, a recent study found that fundamentalist beliefs can be easily undermined by pointing out inconsistencies in sacred scriptures and that doing so triggers death thoughts among fundamentalists (Friedman & Rholes, 2007). Taken together, the available evidence indicates that religious fundamentalism offers a relatively fragile form of protection in dealing with the problem of death.

## Conclusions, Future Directions, and Outlook

Most religions impose many demands and constraints on their followers, yet religious individuals frequently display higher levels of emotional well-being than do nonreligious individuals. To explain this apparent paradox, the present article suggested that religiosity may facilitate a implicit self-regulatory mode that is integrative, embodied, and oriented toward the well-being of the whole person. In support of this model, the link between religion and implicit selfregulation was confirmed in more than 30 independent experiments conducted by different researchers using diverse paradigms, religious beliefs, and practices. Moreover, as hypothesized, the facilitation of implicit self-regulation by religion was more pronounced among individuals who had fully internalized their religious beliefs.

The empirical evidence for the implicit self-regulation model of religiosity is strong and consistent. Nevertheless, the evidence has limitations. First, studies linking implicit self-regulation to religiosity were partly correlational, which limits the ability to draw causal conclusions about the association between religiosity and implicit self-regulation. However, experimental manipulations of exposure to religious stimuli (e.g., Fishbach et al., 2003) or religious practices such as meditation (Koole et al., in press) or prayer (Koole et al., 2009) have observed reliable effects on implicit self-regulation. There is thus reason to believe that religiosity can, at least in principle, exert a causal impact on implicit self-regulation. Second, the available evidence is largely based on Christian and Western samples. It will be important for future studies to examine the interface of religiosity and implicit self-regulation among members of other cultures and religions. Third, studies have often neglected the multidimensional aspects of religious involvement by not including separate measures of intrinsic and extrinsic religion (Allport & Ross, 1967), quest (Batson & Schoenrade, 1991), and fundamentalism (Altemeyer & Hunsberger, 1992).

The frequent neglect of the multidimensional nature of religiosity may explain why some studies have failed to find moderating effects of religious identification (e.g., Randolph-Seng & Nielsen, 2007; Shariff & Norenzayan, 2007, Study 1). In addition, more attention to the multidimensional nature of religiosity may improve our understanding of the dark side of religion. From the present perspective, fundamentalism is likely to compromise the implicit self-regulatory effects of religion. This is because rigid belief systems may be maintained by explicit, analytic processing, which inhibits implicit self-regulation processes. Initial evidence for this reasoning was observed in a study on religious zeal and self-regulation (Inzlicht, McGregor, Hirsh, & Nash, 2009). Religious zeal, as indicated by endorsement of statements such as "My religious beliefs are grounded in objective truth," was found to be associated with self-regulatory deficits, as evidenced by a weaker neurological response to errors. Though preliminary, these findings suggest that the link between religiosity and implicit self-regulation may be attenuated or even reversed by religious fundamentalism.

Though the aforementioned issues must await future research, the model of implicit self-regulation offers a promising

new approach to the psychology of religion. The model draws on general principles of human self-regulation that operate over and above specific motives. The model of implicit selfregulation thus complements approaches that emphasize specific motives that may underlie religiosity, such as selfenhancement (Sedikides & Gebauer, 2010), attachment (Granqvist et al., 2010), and terror management (Vail et al., 2010). More generally, the model of implicit self-regulation helps to explain not only how religion influences people but also why religion is fundamentally important to people. The ability to regulate one's actions and emotions and the ability to construct a meaningful existence are foundational to psychological health. As we have shown throughout the present article, religion may facilitate these vital abilities, especially through implicit cognitive means.

Perhaps the most important notion that derives from the present work is that some seemingly illogical aspects of religion—such as beliefs in the supernatural, beliefs in mystical experiences, and attaching sacred meanings to mundane events—may in fact contribute to what is psychologically beneficial about religion. Psychologists have previously attributed illogical aspects of religion to superstitions (Vetter, 1958) or by-products of more basic cognitive adaptations (Boyer, 2001). Although the latter accounts should be evaluated on their own merits, they may overlook the broader significance of religion's defiance of logical thinking. By transcending logic, religion may lead people toward truths that are never fully understood yet deeply felt and experienced.

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### Note

1. Vess, Arndt, Cox, Routledge, and Goldenberg (2009) interpreted their findings differently, suggesting that "affirmations of the legitimacy of divine intervention in health contexts functioned to solidify a sense of existential meaning among fundamentalists who were reminded of personal mortality" (p. 344). However, their study assessed the search for existential meaning rather than the experience of existential meaning. Vess et al.'s findings are therefore also consistent with greater avoidance of existential ambiguity among religious fundamentalists. We favor the latter interpretation, in view of our theorizing and because of other findings suggesting greater avoidance of existential issues among religious fundamentalists (Friedman, 2008).

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