

Religion, Self-Regulation, and Self-Control: Associations, Explanations, and Implications

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Many of the links of religiousness with health, well-being, and social behavior may be due to religion's influences on self-control or self-regulation. Using Carver and Scheier's (1998) theory of self-regulation as a framework for organizing the empirical research, the authors review evidence relevant to 6 propositions: (a) that religion can promote self-control; (b) that religion influences how goals are selected, pursued, and organized; (c) that religion facilitates self-monitoring; (d) that religion fosters the development of self-regulatory strength; (e) that religion prescribes and fosters proficiency in a suite of self-regulatory behaviors; and (f) that some of religion's influences on health, well-being, and social behavior may result from religion's influences on self-control and self-regulation. The authors conclude with suggestions for future research.

Keywords: religion, self-control, self-regulation, motivation, personality

Religion is a potent social force. History testifies to religion's ability to focus and coordinate human effort, to create awe and terror, to foster war and peace, to unify social groups, and to galvanize them against each other. In addition to religion's social power, however, religion is a psychological force that can influence the outcomes of individual human lives. Indeed, the range of health-related, behavioral, and social outcomes with which religiousness is associated is both provocative and puzzling.

Consider these well-replicated findings. First, religiousness (measured variously as high levels of traditional religious belief; frequent involvement in religious institutions such as churches, synagogues, mosques, and temples; and engagement in religious practices such as reading scripture, worship, and prayer) has a small, positive association with longevity. In a meta-analytic review of 42 independent effect sizes, McCullough, Hoyt, Larson, Koenig, and Thoresen (2000) discovered that people who were highly religious were, on average, 29% more likely to be alive at any given follow-up point than were less religious people (95% confidence interval: 1.20 to 1.39). In a traditional narrative review of studies considered by the authors to be of high quality (e.g., studies with large, representative samples and adequate statistical control of potential confounds), Powell, Shahabi, and Thoresen

(2003) likewise concluded that frequent religious service attendance was associated with a 25% reduction in mortality.

Studies published after McCullough et al.'s (2000) and Powell et al.'s (2003) reviews have yielded similar conclusions in random samples of U.S. adults (Musick, House, & Williams, 2004); older Mexican Americans (T. D. Hill, Angel, Ellison, & Angel, 2005); and adults in Denmark (la Cour, Avlund, & Schultz-Larsen, 2006), Finland (Teinonen, Vahlberg, Isoaho, & Kivela, 2005), and Taiwan (Yeager et al., 2006). These latter studies have also revealed 25% to 30% reductions in mortality for religiously active people, even after controlling for reasonable sets of potential confounds and explanatory variables.

Relatedly, youths and adults (including Christians, Jews, and Muslims) who score higher on measures of religiousness are less likely to drink and smoke and are more likely to wear their seatbelts, see their dentists, and take their vitamins than are their less religious counterparts (T. D. Hill, Burdette, Ellison, & Musick, 2006; Islam & Johnson, 2003; Shmueli & Tamir, 2007; Wallace & Forman, 1998). These behavioral correlates of religiousness may help to explain why religious people tend to live slightly longer lives, because behaviors like these are among the major behavioral risk and protective factors vis à vis early mortality (Bogg & Roberts, 2004).

Religiousness is also significantly (albeit weakly) associated with psychological well-being. In a meta-analytic review of 147 independent effect sizes that was published in this journal, Smith, McCullough, and Poll (2003) found that religiousness (measured in a wide variety of ways) was associated with lower rates of depressive symptoms (mean effect size of $r = -.09$, $p < .000001$). Moreover, this overall mean effect size obscures the fact that some measures of religiousness (e.g., positive religious coping, intrinsic religious motivation, and positive God concepts) had even stronger negative associations with depressive symptoms (i.e., mean effect sizes in the range of $r = -.20$ to $-.18$), whereas measures of negative religious coping and extrinsic religious motivation were positively related to depressive symptoms (i.e., mean effect sizes

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This work was supported by a grant from the John Templeton Foundation and support from the Center for Study of Law and Religion at Emory University to Michael E. McCullough and by a doctoral fellowship from the Social Sciences and Humanities Research Council of Canada to Brian L. B. Willoughby. We thank Roy Baumeister, Jessie Bering, Charles Carver, Terrence Hill, Patrick McNamara, Mark Regnerus, Brent Roberts, Rich Sosis, and Kathleen Vohs for helpful comments on drafts of this article.

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in the range of $r = .14$ to $.16$). It is important to note that the religiousness–depression association was as strong among African Americans as it was among Americans of European descent and Northern Europeans, suggesting that the association is not limited to the White Protestants who are overrepresented in U.S. studies (Smith et al., 2003).

Similarly, a 2-decades-old meta-analysis (Witter, Stock, Okun, & Haring, 1985) concluded that religiousness was positively associated with subjective well-being (mean effect size of $r = .16$). A more recent meta-analytic review of data from 49 studies (Ano & Vasconcelles, 2005) also concluded that “positive” forms of religious coping (e.g., benevolent religious reappraisals of stressors, collaborative religious coping, and active religious surrender) were positively associated with scores on measures of positive psychological outcomes, such as satisfaction with life and happiness (mean $r = .33$), and negatively associated with measures of negative outcomes, such as anxiety and depression (mean $r = -.12$). “Negative” forms of religious coping (e.g., appraising one’s difficulties as due to demonic influences or God’s punishment), on the other hand, were not associated with positive outcomes (mean $r = .02$), but they were positively associated with negative outcomes (mean $r = .22$).

Consider also the negative association of religiousness with crime, delinquency, and youth sexual behaviors, all of which are risk factors for poor outcomes in adulthood. A meta-analysis of 60 effect sizes revealed that religiousness is associated with lower rates of crime and delinquency (mean effect size of $r = -.12$) and is even more strongly associated with lower rates of “victimless” crimes such as gambling and drug use (Baier & Wright, 2001). Moreover, studies of representative samples of U.S. youths show that White, African American, Hispanic, and Asian American adolescents who are religious (measured as frequency of church attendance and self-rated importance of religion) wait longer before first intercourse (Regnerus, 2007; Rotosky, Regnerus, & Wright, 2003), have lower rates of having ever given or received oral sex (Regnerus, 2007), and have lower rates of ever having been pregnant (Nonnemaker, McNeely, & Blum, 2003). Recent systematic and meta-analytic reviews (Lucero, Kusner, Speace, & O’Brien, 2008; Rotosky, Wilcox, Comer Wright, & Randall, 2004) concur with these conclusions.

Religious youths also tend to have higher grade point averages and standardized test scores than do their less religious counterparts (Regnerus, 2000; Regnerus & Elder, 2003). Indeed, a meta-analysis of 15 studies on the association of religiousness and school achievement in Black and Hispanic American youths (Jeynes, 2002) found that religiousness was positively associated with grade point average (mean $r = .21$) and achievement test scores (mean $r = .15$).

The association of religion with measures of social adjustment also extends to the marital realm. A meta-analytic review of dozens of studies showed that married religious adults are more likely to stay married over time (mean correlation of religious service attendance with divorce, $r = -.13$) and have higher levels of marital satisfaction (mean effect size of $r = .15$) and marital commitment (mean effect size $r = .19$; Mahoney, Pargament, Tarakeshwar, & Swank, 2001).

As this brief survey of well-replicated findings shows, many measures of religiousness are associated consistently (albeit, in most cases, weakly) with a wide variety of outcomes that are

relevant to health, well-being, achievement, and social flourishing. However, these associations present an interesting puzzle, because an overarching explanatory mechanism that might explain them has not been identified. Historically, theorists have focused on explanations such as (a) religion’s ability to prescribe health-promoting behaviors and proscribe health-compromising ones (T. D. Hill, Burdette, Ellison, & Musick, 2006; Strawbridge, Shema, Cohen, & Kaplan, 2001); (b) religion’s ability to confer social support (Joiner, Perez, & Walker, 2002); (c) religion’s ability to socialize children to conform with society’s norms (Baier & Wright, 2001); and (d) religion’s ability to promote effective coping with stress (Ano & Vasconcelles, 2005; Pargament, 1997).

To be sure, all of these explanations are important, but the list is incomplete. George, Larson, Koenig, and McCullough (2000) surmised that only 35% to 50% of the relationship between religiousness and various measures of health and well-being could be explained on the basis of the explanatory variables such as social support, health behaviors, and coping. If George et al.’s 35% to 50% estimate comes close, then social scientists have only gone one third to one half of the way in explaining scientifically how religion affects health, well-being, and social behavior. Clearly, there is room for conceptual innovation in this research domain.

Goals of the Present Article

In this article, we provide a systematic and comprehensive review of empirical evidence surrounding an underappreciated psychological process that may help explain why religious people tend to live slightly longer lives; suffer less from depressive symptoms; avoid trouble with sex, drugs, and the police; do better in school; enjoy more stable and more satisfying marriages; and more regularly visit their dentists. Specifically, we review evidence that is relevant to the ideas that (a) some types of religious belief, behavior, and cognition foster self-regulation and, more specifically, self-control and (b) that it is partly through its associations with self-regulation and self-control that religion obtains its associations with health, well-being, and social behavior. The idea that religion is effective at reining in socially non-normative behavior and promoting socially normative behavior has a long history in the scientific study of religion (Durkheim, 1965/1912; Malinowski, 1935). In contrast, the notion that religion fosters the self-oriented functions of self-regulation and control of the self has attracted little theoretical attention (for interesting exceptions, see Ainslie, 2004; Geyer & Baumeister, 2005). Nevertheless, as our review indicates, many propositions arising from these basic ideas appear to enjoy empirical support (though that support is preliminary in some instances).

Self-regulation and self-control are crucial for success in many life domains. College students with high self-control have better psychological adjustment, better interpersonal relationships, and better performance on achievement-related tasks (Tangney, Baumeister, & Boone, 2004), and self-control appears to be a better predictor of academic performance than even intelligence (Duckworth & Seligman, 2006). People with high self-control also have lower alcohol and substance use, lower rates of crime and delinquency, better self-assessed health, and better health behaviors (for a review, see Baumeister & Vohs, 2004). Moreover, Conscientiousness and its varied facets (including, notably, self-control) are negatively associated with many health-risk behaviors,

including physical inactivity, attempted suicide, risky sex, unhealthy eating, substance use, risky driving, and violence (Bogg & Roberts, 2004).

Research has also shown that young children who do well at delaying gratification (i.e., forgoing a small reward in the present so that they might obtain a larger reward after time has passed) perform better years later on measures of academic achievement and social adjustment (Mischel, Shoda, & Rodriguez, 1989). Some social scientists consider delay of gratification to be an important dynamic underlying the behavioral choices of people who believe in an afterlife in which their behavior during this life will be judged. For people with strong beliefs in such an afterlife, it would indeed be rational to deny short-term gains that might come from engaging in behavior that is proscribed by one's religion because the long-term (eternal) gains of not engaging in the behavior might outweigh the short-term gains associated with engaging in the behavior (Azzi & Ehrenberg, 1975; Iannaccone, 1998). In keeping with this idea, Turkish (Muslim) undergraduates who are highly religious tend to report considering the future in their present decision making to a greater extent than do less religious students (Oner-Ozkan, 2007). If religion is robustly related to self-control and self-regulation over the life course, then these connections might go far in explaining the associations of religiousness with many important life outcomes.

Method and Organization of the Review

In this article, we use Carver and Scheier's (1998) model of self-regulation to organize a review of research on the associations of religion with self-regulation and self-control. The Carver-Scheier framework enabled us to integrate several literatures (e.g., the literatures on the personality correlates of religion, on religion and goals, on religion and self-monitoring, and on the affective, cognitive, and behavioral effects of various religious rituals) that scholars have not considered as relevant to a unitary subject.

We organize our review of the literature around six major propositions, and some subsidiary propositions, that emerge from the basic idea that religion is related to high self-control and better self-regulation. These propositions appear in Table 1. In addressing some of the propositions, we found ourselves unable to locate adequate published research, but we had the good fortune to locate data sets that enabled us to evaluate those propositions directly. We report the analyses of those data as appropriate.

The studies we review herein resulted from an exhaustive search of PsycINFO through July 2008 and the additional published and unpublished works that we subsequently located by examining the reference sections of those articles. We also contacted authors who were prominent researchers in this area and requested access to relevant work through e-mail discussion groups for personality, social, and developmental psychologists. We explicitly tried to locate research studies whose results contradicted the propositions that form the backbone of this review. In other words, it was our intent to incorporate all of the empirical evidence that was relevant to the propositions in a thorough, unbiased, and systematic way. In addition, we worked assiduously to locate studies of non-White, non-Christian, and non-North Americans samples so that we could evaluate (informally, at least) the extent to which our propositions held up across a variety of ethnicities, religions, and cultures. The

Table 1

Key Propositions Regarding Religion, Self-Regulation, and Self-Control

Proposition
1. Religiousness can promote self-control
2. Religion influences self-regulation by influencing people's goals
a. Religion influences goal selection
b. Religion increases the importance of some goals by sanctifying them
c. Religion reduces conflict among goals
d. Religion influences how goals are internalized
3. Religion influences self-regulation by promoting self-monitoring
a. Perceived interaction with (and monitoring by) supernatural entities fosters self-monitoring
b. Religious communities, as moralistic audiences, foster self-monitoring
c. Many religious rituals deliberately activate self-monitoring
4. Religion influences self-regulation by building self-regulatory strength
a. Involvement in religious communities fosters the development of self-regulatory strength
b. Many religious rituals foster the development of self-regulatory strength
5. Religions influence self-regulation by prescribing and promoting mastery with specifically religious outputs for self-change
6. Religion affects health, well-being, and social behavior through self-regulation and self-control

article concludes with a series of recommendations for future research.

Definitions of Religion, Self-Regulation, and Self-Control

Before proceeding, it is useful to define the terms *religion*, *self-regulation*, and *self-control*. Following James (1958) and J. B. Pratt (1934), we define *religion* as cognition, affect, and behavior that arise from awareness of, or perceived interaction with, supernatural entities that are presumed to play an important role in human affairs. The psychological components of religion can be measured in a variety of ways (P. C. Hill & Hood, 1999), including (a) beliefs about the existence of gods or spirits and their involvement in human life, (b) level or quality of engagement in activities that are traditionally motivated by the awareness of supernatural forces (e.g., frequency of prayer or religious service attendance), and (c) strength of commitment to a particular religious belief system.

From a psychometric point of view, these aspects of religion are often so strongly intercorrelated as to be interchangeable (D'Onofrio et al., 1999; Gorsuch, 1984; McCullough, Enders, Brion, & Jain, 2005), especially in samples that are homogeneous with respect to religious tradition (e.g., Christian, Jewish, Buddhist). Nevertheless, it is widely acknowledged that two people can adhere to the same religious belief system for very different reasons (Allport, 1950; Ryan, Rigby, & King, 1993) and that these different ways of being religious can lead to different motivational and behavioral outcomes. Moreover, some aspects of religious belief, behavior, and experience might foster self-control and self-regulation, whereas others might hinder them. These distinctions become important later in this article.

We define *self-regulation* as the process by which a system uses information about its present state to change that state (McCullough &

Boker, 2007). Baumeister and Vohs (2004) defined it as “how a person exerts control over his or her own responses so as to pursue goals and live up to standards” (p. 500). Barkley (1997) defined *self-regulation* as “any response, or chain of responses, by the individual that serves to alter the probability of the individual’s subsequent response to an event and, in doing so, functions to alter the probability of a later consequence related to that event” (p. 68). What these definitions have in common is that when people self-regulate, they are guiding or adjusting their behavior in pursuit of some desired end state or goal (see Carver & Scheier, 1998). Self-regulation need not be a deliberative, effortful process: Much of it occurs in a relatively effortless and automatic fashion (Fitzsimmons & Bargh, 2004). This point is relevant to the present article because religious constructs can be activated outside of awareness (Shariff & Norenzayan, 2007; Wenger, 2003, 2004) and thereby influence cognition and behavior—perhaps through the self-regulatory process described presently.

We reserve the term *self-control* for situations in which people engage in behaviors designed to counteract or override a prepotent response (e.g., a behavioral tendency, an emotion, or a motivation), such as assaulting someone who has angered them, resting after a hard day at work instead of painting the kitchen, or playing hooky instead of going to school. In other words, when people exert self-control, they modify their response tendencies in a fashion that involves suppressing one goal so as to pursue another one that is judged to have greater long-term utility. Self-control is thus a more specific concept than is self-regulation. Not all psychological states that are self-regulated involve self-control in the sense for which we reserve the term here; however, self-control may rely on mechanisms that are also involved in self-regulation per se.

Self-control is not simply a process: It can also be conceptualized as a property of systems that possess effective self-control capabilities. In other words, most human beings *have self-control* in the sense that they can pursue one goal that conflicts with another, prepotent one, but inasmuch as people differ in the efficiency with which the mechanisms governing self-control operate, they also *differ in self-control*. When we use the term *self-control* in this latter sense, we refer to “the internal resources available to inhibit, override, or alter responses that may arise as a result of physiological processes, habit, learning, or the press of the situation” (Schmeichel & Baumeister, 2004, p. 86).

Proposition 1: Religiousness Can Promote Self-Control

The first proposition (see Table 1) is that some forms of religious belief, behavior, and institutional involvement can promote self-control. Evidence relevant to this proposition comes from four quarters. First, personality research shows that people with higher scores on measures of self-control and personality dimensions that subsume self-control also tend to be more religious. Second, family research shows that religious parents and families have children with high self-control and low impulsiveness. Third, several longitudinal studies shed light on the causal relations between religiousness and personality variables that subsume self-control. Fourth, a single published experiment suggests that religious cognition is automatically activated as a form of self-control in the face of temptation.

Personality Research on Religiousness and Self-Control

In the first known study of the link between religion and self-control, Hartshorne, May, and Maller (1929) found small (and not uniformly statistically significant) positive associations between children’s length of Sunday school attendance (controlling for children’s ages) and a performance-based measure of persistence (but not a performance-based measure of inhibition). Since then, many other studies have examined the association of religiousness and self-control, albeit with rating-based measures of self-control rather than with performance-based ones.

In addition to Hartshorne et al. (1929), we found 12 studies that examined the association of measures of religiousness with measures of general self-control (Aziz & Rehman, 1996; Bergin, Masters, & Richards, 1987; Bouchard, McGue, Lykken, & Tellegen, 1999; Desmond, Ulmer, & Bader, 2008; French, Eisenberg, Vaughan, Purwono, & Suryanti, 2008; Longshore, Chang, Hsieh, & Messina, 2004; McClain, 1978; Pfefferbaum & Wood, 1994; Richards, 1985; C. Walker, Ainette, Wills, & Mendoza, 2007; Welch, Tittle, & Grasmick, 2006; Wills, Gibbons, Gerrard, Murry, & Brody, 2003). Most of these studies measured self-control with previously published self-report measures (e.g., Gough, 1975; Rosenbaum, 1980) or self-report measures that authors created for these specific studies, although in one study (French et al., in press) self-control ratings were obtained from teachers who rated their students using a previously published instrument (Capaldi & Rothbart, 1992). Of these 12 studies, 11 found positive associations between religiousness and self-control, with associations (either correlation coefficients or standardized regression coefficients) ranging from .21 to .38.

For instance, Bergin et al. (1987) found that intrinsic religiousness was positively related to Rosenbaum’s (1980) Self-Control Schedule ($r = .38$) and the Self-Control scale of the California Psychological Inventory ($r = .32$) in a sample of Mormon college students. More recently, using data from the Add Health study (a nationally representative study of students from 132 U.S. middle schools and high schools), Desmond et al. (2008) found that self-reported religiousness (measured in terms of self-rated importance of religion, frequency of prayer, and frequency of church attendance) was positively and significantly associated with a multi-item measure of self-control, even after controlling for sex, age, race, socioeconomic status, parental education, family structure, attachment to parents, and religious denomination.

Also, French et al. (in press) found that a latent variable measuring religiousness based on self-reports and parent reports was positively associated (standardized coefficient = .36) with a latent variable representing self-control (as based on teacher reports of students’ inhibitory control and attentional control) in a sample of Muslim 8th and 9th graders in Indonesia. Likewise, Aziz and Rehman (1996) found that religiousness (measured with a 27-item self-report measure of Muslim religiousness) among postgraduate Pakistani Muslims was associated with higher self-reported self-control ($r = .35$). It is worth pointing out that the relationships of religiousness and self-control generally appeared to be as strong in samples of adolescents, university students, community-dwelling adults, and convicted drug offenders in North America as they were, for example, among Muslim adolescents and postgraduates from Indonesia and Pakistan (Aziz & Rehman, 1996; French et al., in press). Contradicting this trend for positive associations between

religiousness and self-control was a study yielding a near-zero correlation ($r = .04$) between a single-item measure of the personal importance of religion and the Self-Control scale of the California Psychological Inventory in a sample of 296 U.S. undergraduates (Pfefferbaum & Wood, 1994).

Two other exceptional findings merit mention. Bergin et al. (1987) found that extrinsic religiousness, as opposed to intrinsic religiousness, was negatively associated (though not significantly so) with two measures of self-control ($r_s = -.19$ and $-.13$). Bouchard et al. (1999) also found extrinsic religiousness to be virtually uncorrelated with the California Psychological Inventory measure of self-control ($r = .01$). Thus, whereas general religiosity and intrinsic religious motivation seem to be associated cross-sectionally with higher self-control, these latter findings suggest that extrinsic motivation for being religious is either negatively correlated or uncorrelated with self-control.

Research on Higher Level Personality Traits That Subsume Aspects of Self-Control

Higher level personality traits that subsume aspects of self-control also tend to be positively correlated with religiousness, as well as with people's religious ideals and their self-perceptions during important discrete religious experiences.

Religiousness and the Big Five personality taxonomy. Saroglou (2002) and Lodi-Smith and Roberts (2007) conducted independent meta-analytic reviews of research on the Big Five correlates of religious involvement, incorporating data from 13 and 38 independent studies, respectively (mostly, though by no means exclusively, conducted with students from the United States and Canada). Both meta-analytic efforts led to the conclusion that among the Big Five dimensions of personality (i.e., Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism), it is Agreeableness and Conscientiousness that are the most reliable correlates of religiousness (mean $r_s = .20$ and $.21$ for Agreeableness and mean $r_s = .17$ and $.12$ for Conscientiousness in the Saroglou, 2002, and Lodi-Smith and Roberts, 2007, meta-analyses, respectively). Agreeableness and Conscientiousness subsume aspects of self-control because they involve the ability to adapt one's behavior to the wishes and feelings of others and to task demands, respectively. Indeed, self-control may be the temperamental basis for the development of Agreeableness and Conscientiousness over the life course (Cumberland-Li, Eisenberg, & Reiser, 2004; Jensen-Campbell et al., 2002).

Although many studies relating religiousness to measures of personality traits such as Agreeableness and Conscientiousness have relied on self-reports (e.g., Ashton, Kibeom, & Goldberg, 2004), even studies in which personality was measured with informant reports (e.g., parents and teachers) or expert ratings have shown that Conscientiousness and Agreeableness are positively associated with religiousness (McCullough, Tsang, & Brion, 2003; Saroglou & Fiasse, 2003; Wink, Ciciolla, Dillon, & Tracy, 2007). McCullough et al. (2003) found that parent-rated and teacher-rated Conscientiousness predicted religiousness over a 19-year longitudinal follow-up from childhood to early adulthood in an archival sample of gifted children from California who were born early in the 20th century (The Terman Life Cycle Study of Children With High Ability). In another longitudinal study using the Terman data, McCullough et al. (2005) found that even when controlling for a

variety of potential confounds, people who were highly agreeable in early adulthood went on to have high levels of religiousness (based on expert ratings) through adulthood. Conversely, people with low Agreeableness in early adulthood tended to have low levels of religiousness through adulthood. Moreover, survey researchers rate religious respondents as more "cooperative," "open," and "enjoyable to interview" and less "suspicious" than their less religious counterparts (Brennan & London, 2001; Ellison, 1992; Morgan, 1983), all of which are indicative of Agreeableness.

High Agreeableness and high Conscientiousness also seem to form the core of religious people's (at least Christians') personality ideals.

For instance, people rate their prototypes of highly religious individuals as being particularly high in Agreeableness and Conscientiousness (L. J. Walker, 1999). In addition, in a study of Christian university students and a study of (mostly Christian) adults from Illinois (Nielsen, 2000; Nielsen & Stevens, 2001), participants completed measures of the Big Five to indicate how they felt about themselves during "important religious experiences." In both studies, participants indicated that during their important religious experiences, they perceived themselves as high in Agreeableness and high in Conscientiousness (as well as low in Neuroticism). In other words, these studies suggest that religious people are not only more conscientious and agreeable than are their less religious counterparts, but also that Agreeableness and Conscientiousness are held up as exemplary religious traits as well as experienced as temporary personality changes associated with memorable religious experiences.

Religiousness and Eysenck's personality taxonomy. Researchers have also evaluated the links between measures of religiousness and the personality variables in Eysenck's (1991) P-E-N (Psychoticism, Extraversion, Neuroticism) model of personality. In the Eysenck model, it is Psychoticism (which Costa & McCrae, 1995, argued is largely a conflation of Conscientiousness and Agreeableness) that is most strongly (and negatively) related to religiousness (e.g., Francis, 1997; Hills, Francis, Argyle, & Jackson, 2004). Indeed, Lodi-Smith and Roberts's (2007) meta-analysis of 19 correlations revealed that Psychoticism had a mean correlation of $r = -.20$ with various measures of religiousness. The association of religiousness with low Psychoticism has obtained not only in samples of Christian youths and adults but also in Muslim and Israeli samples (Francis & Katz, 1992; Wilde & Joseph, 1997).

Religiousness and Cattell's personality taxonomy. We also located four studies that evaluated the links of religiousness with the measures in Cattell's personality taxonomy. In a study involving U.S. college students and a replication with high school students from New Zealand (Barton & Vaughan, 1976; McClain, 1970), active churchgoers (versus nonchurchgoers) had higher scores on scale "G" (variously called "Superego," "Conformity" and "Expedient vs. Conscientious") of Cattell's 16PF questionnaire, which also measures self-control (Hofer, Horn, & Eber, 1997). Francis and Bourke (2003) also found that among English secondary school pupils, Scale G was the strongest 16PF correlate of attitudes toward Christianity ($r = .19$). Finally, in a sample of British students, the "G" scale was correlated $r = .60$ with a measure of traditional Christian religious belief and behavior (Rasmussen & Charman, 1995).

In summary, then, across the Five Factor, Eysenck, and Cattell personality taxonomies, personality dimensions associated with the ability to regulate one's behavior in a manner consistent with one's goals or out of concern for the wishes and feelings of others (e.g., high Agreeableness, high Conscientiousness, and low Psychoticism) are associated with religiousness. Although most of the research on this topic has been conducted on samples from North America and Western Europe (which implies that most people in those studies were affiliated with some form of Christianity), the basic associations have been replicated in Israeli and Muslim samples as well (Francis & Katz, 1992; Wilde & Joseph, 1997) and with a variety of measures of religiousness and traits relevant to self-control.

Religiousness versus spirituality and self-control. It is important to know whether the associations of religiousness with self-control, and related constructs such as Agreeableness and Conscientiousness, extend to measures of spirituality as distinct from more conventional manifestations of religiosity: Although religiousness and spirituality have some overlap, they also appear to have different personality correlates and different social consequences (Saucier & Skrzypinska, 2006). Therefore, we analyzed data from 257 undergraduate psychology students enrolled in a medium-sized southeastern university to address this question. Participants' ages ranged from 17 to 46 years ($M = 19.04$, $SD = 2.98$), and they were diverse in gender (60% female, 40% male) and ethnicity (63% White non-Hispanic, 15% Hispanic, 12% African American, 10% other ethnicities). Although we do not have the breakdown of religious affiliations for the participants in this particular sample, the students were drawn from a religiously diverse student body (46% Catholic, 25% Protestant, 17% Jewish, 2% Muslim, 2% Hindu, and 8% "other").

As part of a larger study, participants completed a packet of questionnaires on a single occasion. The Big Five Inventory (John, Donahue, & Kentle, 1991) measured the Big Five personality factors. The Self-Control Scale (Tangney et al., 2004) measured trait self-control. The Religious Commitment Inventory-10 (RCI-10; Worthington et al., 2003) measured participants' strength of commitment to their religious values ($\alpha = .95$). In addition, a

second religion scale was created by summing six items addressing importance of religion, religious involvement of one's friends, reading of sacred scriptures and religious literature, frequency of prayer, relationship with God, and experiences with God ($\alpha = .76$). The RCI-10 and the six-item religion scale were highly correlated ($r = .76$), so we standardized them and used the mean of the two standardized scores as a "religion composite."

Participants also completed the Self-Transcendence scale of the Temperament and Character Inventory (TCI; Cloninger, Svrakic, & Przybeck, 1993), which measures spirituality as distinct from conventional religion. The Self-Transcendence scale includes items such as "Sometimes I have felt my life was being directed by a spiritual force greater than any human being" and "I sometimes feel a spiritual connection to other people that I cannot explain in words." The Self-Transcendence scale's correlation with the composite measure of religion was $r(N = 257) = .46$, $p < .05$.

The correlation coefficients in the first two columns of Table 2 show significant positive relationships of the religion composite with Conscientiousness, Agreeableness, and Self-Control. Self-transcendence showed significant positive relationships with Openness and Agreeableness, but it was not related to self-control or Conscientiousness. The partial correlation coefficients in the last two columns of Table 2 show that when self-transcendence is partialled out of the religion composite, the correlations of the religion composite with Conscientiousness and self-control stay essentially the same (and, in fact, increase slightly) relative to those correlations prior to partialing. In addition, the correlation of the religion composite with Openness and Extraversion become significant and negative. Conversely, when the religion composite is partialled out of Self-Transcendence, the correlations of Self-Transcendence with Conscientiousness and self-control become significant and negative, the association of Self-Transcendence with Agreeableness becomes nonsignificant, and the association of Self-Transcendence with Openness is unaffected. These results suggest that the personality core of religiousness, as distinct from spirituality, is high Conscientiousness, high Agreeableness, and high self-control (and, to a lesser extent, low Openness and Extraversion). In contrast, the personality core of spirituality, as

Table 2
Zero-Order and Partial Correlations of the Big Five Personality Factors and Self-Control With a Religion Composite and Self-Transcendence

Personality factor	Zero-order correlations		Partial correlations	
	Religion composite	Self-transcendence	Religion composite, controlling for self-transcendence	Self-transcendence, controlling for the religion composite
Openness	.02	.36***	-.15*	.38***
Conscientiousness	.17**	-.02	.22**	-.14*
Extraversion	-.10	.06	-.15*	.11
Agreeableness	.22***	.18**	.15*	.08
Neuroticism	.07	.11	.03	.10
Self-Control	.20**	-.04	.26***	-.16*

Note. The religion composite was computed by averaging standardized scores on the Religious Commitment Inventory (RCI-10) and the standardized means of six single items addressing importance of religion, religious involvement of friends, reading of sacred scriptures and religious literature, frequency of prayer, relationship with God, and experiences with God.

* $p < .05$. ** $p < .01$. *** $p < .001$.

distinct from religiousness, is high Openness, low Conscientiousness, and low self-control.

These results lend credence to the idea that something about religious beliefs, behaviors, institutions, and rituals themselves (irrespective of the feelings of spiritual connectedness that religion often fosters) may be responsible for the links between religion and self-control. However, whether that “something” is (a) the fact that religion prescribes sets of rules that are legitimated on the basis of the preferences of an omniscient deity; (b) the conviction that one’s behavior is being monitored by that omniscient deity, who can administer rewards and punishments; (c) the self-discipline that is needed to maintain regular involvement in religious private and public religious rituals; or (d) something else remains an open question.

Religion and Self-Control in Research on Families and Child Development

We found four empirical articles addressing the associations between measures of parents’ religiousness and their children’s self-control (Brody & Flor, 1998; Brody, Stoneman, & Flor, 1996; Lindner-Gunnoe, Hetherington, & Reiss, 1999). Two of these studies involved African American children and youths from the rural southeastern United States (Brody & Flor, 1998; Brody et al., 1996), one study predominantly involved youth and adolescents from White, middle-class families around the United States (Lindner-Gunnoe et al., 1999), and a fourth study consisted of a nationally (U.S.) representative sample of first graders (Bartkowski, Xu, & Levin, 2008). In all four studies, investigators discovered positive (though not always statistically significant) relationships between parents’ religiousness and their children’s self-control.

In the most definitive study to date, Bartkowski et al. (2008) examined the links of parents’ religiousness and their children’s self-control among 17,000 children (57% White, 14% Black, 17% Hispanic, 6% Asian, and 5% other) from the Early Childhood Longitudinal Study, a representative survey of American 1st graders (95% of the students in the sample were 1st graders). The researchers found that parents who frequently attended church and who frequently discussed religion in the home rated their children as having higher self-control and lower impulsiveness. The children of religious parents were also rated by their teachers as higher in self-control and lower in impulsiveness than were children whose parents were less religious. These associations obtained even when controlling for children’s gender, ethnicity, and grade in school; parents’ gender, employment status, age, and educational level; family income levels; a variety of family structure variables; and several other potential confounds.

Similar results are reported in the three other studies with different measures of religiousness (e.g., multi-item measures of engagement in religious behaviors or self-rated importance of religiousness) and different measures of self-control (Brody & Flor, 1998, $r = .16$; Brody et al., 1996, $r_s = .10$ and $.21$; Lindner-Gunnoe et al., 1999, $\beta_s = .40$ and $.49$). Taken together, these studies suggest that religious families in the United States tend to raise children and adolescents with higher self-control.

Longitudinal and Experimental Studies Addressing the Causal Status of the Association Between Religiousness and Self-Control

It is important to consider not only the possibility that religiousness precedes changes in self-control (or traits that are relevant to self-control) but also the possibility that self-control (or traits related to self-control) precedes changes in religiousness. That is, if religiousness is predicated partly on the ability to exercise self-control, then people with low self-control might have difficulty becoming fully involved in (and committed to) religious beliefs, practices, and institutions. In light of this possibility, Hathaway, Douglas, and Grabowski (2003) conducted a study of 249 children (ages 5–12 years), and their parents, whom they recruited from religious congregations in Eastern Virginia. The researchers found that parents’ ratings of whether their children’s behavior was problematic in religious situations such as “preparing to go to a religious service,” “quiet times during the service,” and “family devotions” distinguished between children who had been diagnosed with attention deficit/hyperactivity disorder (ADHD) and those who had not. ADHD is commonly conceptualized as a disorder of self-control or self-regulation (Barkley, 1997). We therefore suspect that people with low self-control (including those with disorders of self-control such as ADHD) experience self-control difficulties in religious settings that reduce their religious interest and commitment. Longitudinal and experimental research on the religion/self-control relationship, therefore, is especially valuable for testing causal relations among these variables.

Longitudinal research suggesting that religiousness precedes changes in self-control–relevant traits. We located only one study that investigated whether individual differences in religiousness precede changes in self-control–relevant traits. Using an archival sample of (mostly White) California youths from upper middle class families, Wink et al. (2007) discovered that religiousness in adolescence was linked to increases over the life course in Agreeableness for women ($\beta = .33, p < .001$), although not for men ($\beta = -.05, ns$). On the other hand, the authors did not find that religiousness in adolescence was associated with increases over the life course in Conscientiousness for either women or men. It is worth noting that the lag between the baseline measurement of religiousness and the follow-up measures of personality in this study was more than 50 years.

Longitudinal research suggesting that self-control–relevant traits precede changes in religiousness. We located five longitudinal studies examining whether individual differences in self-control–related traits preceded changes in religiousness. First, as noted above, McCullough et al. (2003) found in a 19-year longitudinal study with data from the Terman study that children high in Conscientiousness (a trait that subsumes self-control) went on to become more religious as adults ($\beta = .14$), even when background variables influencing religiousness (e.g., being raised in a religious home, gender) were statistically controlled. Second, McCullough et al. (2005) found that young adults with low agreeableness (which is a personality trait reflecting the ability to control oneself out of concern for the feelings and desires of others) manifested a pattern of low religiousness through adulthood.

Third, Wink et al. (2007) found that Conscientiousness ($\beta = .17, p < .05$) and Agreeableness ($\beta = .20$ for women, $p < .05$; $\beta = .05$ for men, ns) in adolescence were associated with in-

creased religiousness through late adulthood. Fourth, Regnerus and Smith (2005) found that among American youths, religious students with high self-control (i.e., those who eschewed risk taking and who reported making decisions in a deliberative, effortful fashion) remained more religious (as measured by self-rated importance of religion and self-reported frequency of religious service attendance) 1 year later than did those religious students who initially had low self-control. Fifth, Heaven and Ciarrochi (2007) found that Australian high school boys whose Psychoticism scores declined over two time points reported higher scores on a multi-item measure of religiousness at a third time point ($\beta = -.17, p < .01$) and that high school girls whose Conscientiousness increased over two time points reported higher religiousness at the third time point ($\beta = .19, p < .01$). Taken together, these five studies lend credence to the idea that self-control-relevant traits precede changes in religiousness.

Experimental research on religion and self-control. We found only one experimental study addressing the possibility that religion promotes self-control (Fishbach, Friedman, & Kruglanski, 2003). In this experiment, which was part of a five-experiment investigation into the automatic nature of self-control in response to the automatic activation of temptation-related stimuli, undergraduates at the University of Maryland were subliminally primed for 50 ms with a temptation/sin-related concept (e.g., drugs, temptation, premarital sex), a religion-related concept (e.g., prayer, bible, religion, and God), or a neutral word. After each prime, participants were asked to identify religion-related words or temptation/sin-related words as either words or nonwords as quickly as possible.

Fishbach et al. (2003) found that the subliminal presentation of temptation/sin-related primes led to faster subsequent recognition of religion-relevant words than did the subliminal presentation of neutral primes. Conversely, subliminal presentation of religion-relevant primes led to slower subsequent recognition of temptation/sin-relevant words than did the subliminal presentation of the neutral primes. In the context of the four other experiments, the authors interpreted these results as evidence that people automatically recruit religious concepts to help them exercise self-control in the face of temptation and, conversely, that the activation of religious mental content reduces the accessibility of temptation/sin-relevant mental content. Fishbach et al.'s study is perhaps the best direct evidence available to date that religious mental content is capable of increasing self-control.

Summary of Studies on the Links Between Religiousness and Self-Control

Among 14 cross-sectional studies (13 of which were previously published and the 14th of which is reported herein), 13 indicated that individual differences in general religiousness and intrinsic religious motivation are positively associated with individual differences in self-control. In general, these associations are small to medium in magnitude (i.e., standardized coefficients generally range from .2 to .4). Two studies suggest that extrinsic religious motivation is either negatively related or unrelated to self-control.

In addition, the balance of more than 40 studies shows that religiousness is associated cross-sectionally with self-control-relevant personality traits, such as high Agreeableness, high Conscientiousness, and low Psychoticism. In addition, it appears that religious parents and families tend to have children who have

higher levels of self-control. These basic associations have been replicated in samples of children, adolescents, college students, and adults from a variety of religious backgrounds and nationalities.

The one longitudinal study that evaluated whether religiousness might lead to increases over time in traits that are relevant to self-control yielded some evidence consistent with this notion (Wink et al., 2007), at least for women, but five studies also suggest that traits relevant to self-control may influence later levels of religiousness. Thus, it seems plausible that religiousness and self-control-relevant traits influence each other longitudinally. The one experiment that has examined the link between religiousness and self-control indicates that religious mental content is automatically recruited when mental content related to sin and temptation has been previously activated (Fishbach et al., 2003). This experiment also showed that activating religious mental content makes sin and temptation stimuli less accessible, which may be one route by which religious content facilitates (automatic) self-control. Taken together, these results provide tentative support for the proposition that the links of religiousness and self-control are causal, although better longitudinal studies and experiments are needed to advance our understanding.

Religion and the Real-Time Process of Self-Regulation

Thus far, we have proposed that religiousness is associated with higher levels of self-control. However, some of religion's putative effects on behavior and well-being are not about "overriding prepotent responses" (which defines self-control), but rather, steering one's behavior according to goals more generally (which defines the broader concept of self-regulation). In Carver and Scheier's (1998) model of self-regulation, which was informed by cybernetic theory (e.g., Wiener, 1948), self-control is conceptualized as a dynamical process by which people bring their behavior into conformity with a standard through the operation of feedback loops consisting of several integrated functions. The first function is an *input* function that detects the system's state. In human terms, this is equivalent to one's perceptions of the self and the environment. The second function is a *comparator* function that compares the system's state to a reference value. A *reference value* can be conceptualized as a goal, a standard, or an ideal. When the comparator indicates that the state of a system matches the reference value, the system changes nothing, and the existing state is maintained. When the comparator registers a discrepancy between the system's actual state and its reference value, a third function, referred to as an *output* function, is activated to reduce that discrepancy. A self-regulating system continuously self-monitors for discrepancies and attempts to minimize those discrepancies through its outputs.

Effective human self-regulation, as conceptualized by Carver and Scheier (1998), requires several abilities. First, it requires clear standards or goals to pursue or preserve. These goals must be organized so as to permit effective management of conflict among them (Fitzsimmons & Bargh, 2004). Second, it requires sufficient self-monitoring so that one can detect discrepancies between one's behavior and one's goals. Third, it requires sufficient motivation or strength to change one's behavior. Finally, it requires effective mechanisms for behavioral change (Schmeichel & Baumeister, 2004). Insofar as religion influences self-regulation, it occurs by

influencing these functions, which leads to Propositions 2–5, presented in Table 1.

Proposition 2: Religion Influences Self-Regulation by Influencing People's Goals

Austin and Vancouver (1996) defined *goals* as

internal representations of desired states, where states are broadly construed as outcomes, events, or processes. Internally represented desired states range from biological set points for internal processes (e.g., body temperature) to complex cognitive depictions of desired outcomes (e.g., career success). Likewise, goals span from the moment to a life span and from the neurological to the interpersonal. (p. 338)

Religion may influence goals in four ways. First, religious belief systems may influence the goals that people adopt and assist people in prioritizing those goals. Second, religion may increase people's motivation to obtain their goals by sanctifying them, or imbuing them with a sacred significance (Mahoney, Pargament, et al., 2005). Third, religion may foster goal integration, thereby reducing the extent to which people experience conflict among their goals. Integrated goals are more easily obtained (Emmons, 1999). Fourth, religion may affect the manner in which goals are internalized. Below, we elaborate on these four subsidiary propositions.

Proposition 2a: Religion Influences Goal Selection

Religions dictate the domains in which people should attempt to self-regulate. Religions also prescribe the goals to which people should aspire in those domains. To discuss the effects of religion on goal selection, we first introduce some basic ideas about how goals are organized. Following Powers (1973), Carver and Scheier (1998) proposed that the goals that interest social scientists (as opposed to scientists exclusively interested in motor control) can be expressed with four-level goal hierarchies. At the highest level of these hierarchies are broad goals that Carver and Scheier referred to as "system concepts." An example of a system concept is one's ideal self (e.g., "Am I approaching my ideal for what I should be?").

System concepts are very abstract, so they lead to no obvious behavioral outputs. Instead, they give rise to less abstract goals that Carver and Scheier (1998) called "principles." Principles are global behavioral aspirations. Principle-based self-regulatory systems have abstract "be" goals (e.g., "be honest," "be thoughtful," "be organized,") as reference values. As Carver and Scheier noted, principles do not provide concrete direction for how one should behave. Instead, principles suggest certain types of "programs" as behavioral goals. For example, to fulfill one's value of being "forgiving," one might send a conciliatory note to a former enemy or suppress hostile thoughts toward a rude driver. Programs such as "distract oneself from hostile thoughts" lead to still more specific goals called "sequences," which are typically executed automatically with little conscious guidance. A sequence that subserves the program of distracting oneself from hostile thoughts might be, for example, turning on the car radio.

Through a hierarchical process by which system concepts lead to principles, principles lead to programs, and programs lead to

sequences, action can emerge that then functions as feedback for evaluating how well one is doing at minimizing discrepancies at the appropriate levels of specificity. For example, proprioceptive feedback and the sound of the radio constitute feedback indicating that (a) a certain sequence (i.e., turning on the radio) is completed, (b) progress has been made toward one's goal of distracting oneself from negative thoughts, (c) progress has been made toward one's goal of being a forgiving person, and (d) progress has been made toward becoming one's ideal self.

Religion, principles, and programs: Uniqueness among religious systems. Religion's most pervasive influences on goal selection probably occur at the principle and program levels. Specific religions dictate specific principles and programs by which adherents are supposed to organize their behavior. The unique goals prescribed by each religion probably arise from the unique emphases in the written scriptures of each religion, the social and physical ecology in which the religion emerged (e.g., the surrounding cultural alternatives from which supporters of various religions wish to distinguish themselves, along with the resources available), and the changing physical and social circumstances to which specific religions must continually adapt (Wilson, 2002).

One example of unique religious influences on goals comes from work on religious differences in valued emotional states. A study of self-identified Christians and Buddhists from various North American universities revealed that Christian students value high-arousal positive emotional states (e.g., "excited," "enthusiastic," "elated," "euphoric") to a greater extent than did Buddhist students (Cohen's $d = .44$, $p < .001$) and that Buddhist students value low-arousal positive emotional states (e.g., "calm," "peaceful," "serene," and "relaxed") to a greater extent than did Christian students (Cohen's $d = .29$, $p = .05$). That Buddhism and Christianity place differing emphases on the desirability of different emotional states was confirmed in two additional studies showing that Christian religious texts place a higher value on the high-arousal positive affective states and a lower value on the low-arousal positive affective states than do Buddhist religious texts (Tsai, Miao, & Seppala, 2007).

Another example comes from religious differences in people's goals regarding the control of thoughts. We located four studies that addressed this issue (Abramowitz, Deacon, Woods, & Tolin, 2004; A. B. Cohen, 2003; A. B. Cohen & Rozin, 2001; Sica, Novara, & Sanavio, 2002). These studies were conducted on samples from the United States and Italy consisting of undergraduate volunteers and volunteers recruited from religious organizations. In general, the four studies indicated that Christian individuals tend to believe that thoughts (e.g., lust, violent thoughts, contemplating the commission of a dishonest act) can be as immoral as the behaviors that follow them. In contrast, Jewish persons tend to believe that thoughts in and of themselves are neither blameworthy nor praiseworthy (A. B. Cohen, 2003; A. B. Cohen & Rozin, 2001). For this reason, highly religious Protestant and Catholic Christians set goals about controlling their cognitions that religious Jewish persons evidently do not.

Moreover, goals about the control of thoughts appear to increase with religiosity in Christian samples. For example, Sica et al. (2002) found that highly and moderately religious Catholic individuals placed more emphasis on the control of thoughts than did a group of largely nonreligious Catholic persons. Similarly, Abramowitz, Deacon, Woods, and Tolin (2004) found that highly

religious Protestants ascribed more significance to thoughts, and placed a much higher value on controlling their thoughts, than did moderately religious Protestants and atheists/agnostics. Some of these differences can be traced to passages in the Christian Bible in which Jesus explicitly teaches that thoughts have moral valence (Siev & Cohen, 2007) and, therefore, that they should be controlled.

Pan-religious influences on selection of principles. In addition to the unique ways that religions may influence their adherents' principles and programs, religions also seem to share some common effects on people's principles or "be" goals. We located a meta-analysis of data from 12 published studies on religion and values (Saroglou, Delpierre, & Dernelle, 2004), plus another empirical paper on the correlation of religious goals and other types of goals (Roberts & Robins, 2000), that were relevant to this issue.

First, Saroglou et al. (2004) conducted a meta-analysis of data from 12 previous articles that evaluated the associations of religiousness and values in 21 different surveys conducted in Belgium, the Czech Republic, Germany, Greece, Holland, Hungary, Israel, Italy, Mexico, Poland, Portugal, Spain, Switzerland, Turkey, and the United States ($N = 8,551$). In each sample, respondents completed the Schwartz Value Survey and a measure of religious salience (e.g., the personal importance ascribed to one's religion) or behavior (e.g., frequency of church attendance). Within each sample, participants' religious affiliations were largely homogeneous; across samples, the religious affiliations were diverse (i.e., there were several samples consisting largely of Jews, of Muslims, and of Christians).

Across the 21 samples, religiousness was most strongly positively associated with the value ascribed to Tradition (a scale that includes items such as "respectful," "helpful," and "responsible"; $r = .45$) and Conformity (which includes items such as "politeness," "self-discipline," and "honoring parents and elders"; $r = .23$). Religiousness was most strongly negatively correlated with the value ascribed to Hedonism (which includes items such as "enjoying life," "self-indulgent," and "pleasure"; $r = -.30$), Stimulation (which includes items such as "exciting life" and "varied life"; $r = -.26$), and Self-Direction (which includes items such as "freedom," "creativity," and "independent"; $r = -.24$). The value profiles of religious people were remarkably consistent irrespective of whether the sample was Christian, Jewish, or Muslim. In other words, it appears that strong adherence to Christianity, Judaism, and Islam leads people to embrace principle goals, such as being respectful, helpful, and polite, and to eschew principle goals such as pursuing pleasure, having an exciting life, and being independent.

In another effort, Roberts and Robins (2000) analyzed the goals of 672 American undergraduates. On the basis of a factor analysis of participants' ratings of 38 life goals, these authors found that students' life goals could be clustered into economic, aesthetic, social, political, hedonistic, and religious domains. Participants who intensely pursued religious life goals (e.g., "participating in religious activities" and "devoting attention to my spiritual life") also placed a relatively high value on (a) social goals (e.g., "working to promote the welfare of others"; $r = .32$); (b) relationship goals (e.g., "having a satisfying marriage/relationship" and "having harmonious relationships with my parents and siblings"; $r = .19$); and (c) political goals (e.g., "being influential in public affairs" and "becoming a community leader"; $r = .15$). Pursuing

religious goals was not significantly associated with the extent to which people pursued economic goals (e.g., "having a high standard of living and wealth"), aesthetic goals (e.g., "producing good artistic work," "becoming accomplished in one of the performing arts"), or hedonistic goals (e.g., "having new and different experiences," "having fun").

Taken together, the findings from Saroglou et al. (2004) and Roberts and Robins (2000) suggest that religiousness encourages the pursuit of goals related to family, social, and community harmony, and engagement. In addition, research conducted with the Schwartz Value Survey suggests that religion also discourages pursuit of principle-level goals related to individuality, independence, and personal pleasure (although Roberts & Robins, 2000, found religiousness to be uncorrelated with economic, aesthetic, and hedonistic goals). In other words, religiousness seemingly points people toward goals that facilitate effective coordination of their effort within families and larger social collectives, such as religious, ethnic, or cultural groups and communities. Ultimately, it may be through religion's effects on family-oriented and socially oriented principle goals that religion obtains its small but well-replicated associations with variables such as marital stability, marital commitment, and marital satisfaction (Mahoney et al., 2001).

In summary, the available evidence seems to suggest that religion can influence goal selection in two ways. First, specific religions can exert unique influences on goal selection at the level of principles and programs through the emphases of their scriptures, their histories, the lives of their major religious leaders, and the current ecological conditions in which they operate. Second, religion may promote "be" goals related to being respectful, polite, and concerned for the welfare of one's interpersonal relationship partners and community. Conversely, religion may promote rejection of goals related to independence, individuality, and personal gratification.

Proposition 2b: Religion Increases the Importance of Some Goals by Sanctifying Them

Religion can also influence goals by "sanctifying" them. Goals become sanctified when one appraises a particular goal as more important than a competing secular goal because the goal is attributed to a sacred source (Emmons, 1999). We located seven studies relevant to the proposition that religion can influence goals by sanctifying them. First, using Emmons's (1999) strivings assessment instrument, Tix and Frazier (2005) found a correlation of $r = .64$ between intrinsic religious motivation and participants' (268 university students recruited through psychology courses and campus religious organizations) average rating of the extent to which they pursued their 10 most important goals for "religious or spiritual reasons." Thus, intrinsic religiousness may cause people's goals to become saturated with religious meaning.

Goal sanctification of this nature appears to energize goal striving and, possibly, influence successful goal attainment. For instance, Mahoney et al. (1999) instructed 97 married couples who had had babies in the previous 6–24 months (identified through birth registries) to complete self-report measures of their marital functioning and a variety of measures of religiosity, including measures of the extent to which they had sanctified their marriages. The researchers found that both husbands and wives who

viewed their marriages as “sacred” and as “manifestations of God” reported better marital adjustment, less marital conflict (for wives), and more productive conflict resolution than did participants who did not view their marriages as sacred or as manifestations of God.

In another study, Mahoney, Carels, et al. (2005) found that the extent to which participants (289 college students from a university in the Midwestern United States) viewed their physical bodies as manifestations of God (e.g., “My body is a gift from God”) or as possessing sacred qualities (e.g., “holy,” “sacred,” “spiritual,” etc.) was positively associated with indices of behavioral health, including (a) the frequency with which participants engaged in health-protective behaviors such as wearing their seatbelts, getting enough sleep, and taking vitamins; (b) subjective satisfaction with their bodies; and (c) disapproval of, and abstinence from, illicit drug use. Many of these associations persisted after controlling for gender and race.

Similar results were found by Tarakeshwar, Swank, Pargament, and Mahoney (2001), who conducted a nationally representative survey of more than 2,000 members, elders (lay leaders), and ordained clergy of the Presbyterian Church (USA). In all three groups of respondents, the extent to which people sanctified the environment (i.e., endorsed the belief that nature is sacred because it was created by God and the belief that nature should be respected because it was created by God) was negatively related to the extent to which they endorsed the belief that humans take precedence over nature, positively related to the extent to which they endorsed the belief that human actions can hurt the environment, positively related to their stated willingness to make personal sacrifices for the environment, and positively related to their self-reported frequency of engaging in pro-environmental behaviors, such as recycling, carpooling, and environmental activism. Although these effect sizes were generally small (i.e., standardized regression coefficients on the order of .1 to .2), they persisted even when controlling for age, sex, marital status, education, income, race, orthodox Christian religious beliefs, and Christian religious conservatism.

In another line of work, Wrzesniewski, McCauley, Rozin, and Schwartz (1997) found that the greater the degree to which people (i.e., 196 staff and employees from a private liberal arts college and a large state research university) thought of their work as a “calling” (irrespective of whether this view came specifically from their religious beliefs), the more rewarding they found their work, the less eager they were to retire, and the more they took their work home with them. Those whose work was a calling even reported fewer days of work missed on account of illness than did participants who thought of their work as a “career” or a “job.”

Other research also supports the idea that goal sanctification promotes effective goal striving. Using Emmons’s (1999) goal assessment procedure, Mahoney, Pargament, et al. (2005) asked participants (150 community-dwelling adults in a midsized county in the midwestern United States who were reached by telephone through a list obtained from a national polling company) to list 10 important goals and then to rate them on several characteristics, including their importance, the level of commitment they engendered, and their likelihood of success. In general, goal sanctification was positively related to goal commitment ($r_s =$ approximately .36), perceived goal importance ($r_s =$ approximately .44), and perceived likelihood of success ($r_s =$.32). Using data gleaned from daily telephone calls to these participants over a 10-day

period, the researchers also discovered that people spent 34% more time “thinking, reading, or studying,” and 43% more time “doing things or talking with others” in pursuit of their two most sanctified goals than in pursuit of their two least sanctified goals. Thus, sanctified goals appear to generate more commitment, self-efficacy, and persistence than do nonsanctified goals. Emmons, Cheung, and Tehrani (1998) reported similar findings in two samples of community-dwelling adults.

Proposition 2c: Religion Reduces Conflict Among Goals

A third way that religion may influence goals is by organizing them so that conflict among them is minimized. Within an individual personality, goals are interdependent and can influence each other. Some goals are congruent: Accomplishing one of them raises the likelihood that another will be achieved. Other goals can conflict such that pursuing one reduces the likelihood of obtaining another.

We only located one study that addressed the link between religion and goal conflict. As described in Emmons (1999), Emmons et al. (1998) calculated the percentage of spiritual goals that participants reported within individualized lists of their personal goals. The researchers then correlated these percentages with a measure reflecting the amount of conflict that participants perceived among the goals that they listed. To generate the data for this measure of goal conflict, the researchers asked participants to indicate the extent to which pursuing each of the goals on their list impeded or facilitated progress in pursuing each of their other goals. The proportion of spiritual goals was strongly negatively correlated with the amount of goal conflict participants experienced ($r = -.52, p < .01$). The proportion of goals in which “God” was explicitly mentioned was also negatively correlated with the goal conflict measure ($r = -.39, p < .01$). Inasmuch as religious people hold many of their goals for “religious or spiritual reasons” (Tix & Frazier, 2005), they therefore probably also experience less goal conflict and, as a result, better goal attainment and better self-regulation. Our confidence in this proposition is limited by the paucity of research on the subject, however.

Proposition 2d: Religion Influences How Goals Are Internalized

A fourth way that religion might influence goals is by influencing how they become *internalized*, or converted into personally important principles (Ryan et al., 1993). As a result of internalization, the regulations that people acquire from their religion become personally meaningful and can be used to shape their own behavior in the absence of immediate environmental contingencies (Premack & Anglin, 1973).

Ryan et al. (1993) proposed two types of religious internalization. When people internalize a religious goal through *identification*, the goal is compelling and it feels personally chosen and valued. Studies with largely Protestant samples of U.S. college students, high school students, and adults (Ryan et al., 1993) and studies with Catholic youths and adults in Belgium (Neyrinck, Vansteenkiste, Lens, Duriez, & Hutsebaut, 2006) indicate that internalized religious goals are associated with higher self-esteem, greater personality integration, higher self-actualization, and lower scores on measures of anxiety, depression, somatization, and social

dysfunction than are less internalized religious goals. For example, Neyrinck et al. (2006) reported that a four-item self-report measure of identified religious internalization was correlated with a well-being composite (consisting of self-report measures of self-actualization, identity integration, global self-esteem, and life satisfaction) at $r = .31$ ($p < .001$) in a sample of 186 Belgian youths and adults.

In contrast, when people internalize a religious goal through *introjection*, they do so to avoid anxiety, guilt, or a loss of esteem in the eyes of others. Behaviors that are regulated by introjection feel less volitional and create greater conflict. Introjected goals are only partially assimilated, and the behaviors they motivate do not feel self-determined. As a result, introjected internalization of one's religious goals is associated with less self-esteem, less personality integration, less self-actualization, and higher scores on measures of anxiety, depression, somatization, and social dysfunction (Ryan et al., 1993). Ryan et al. (1993) and Neyrinck et al. (2006) found that the extent to which people had internalized their religious goals through identification was positively correlated with self-actualization, whereas the extent to which they had introjected their religious beliefs was negatively related to self-actualization. These studies, along with Bergin et al.'s (1987) and Bouchard et al.'s (1999) findings that extrinsic religious motivation is either uncorrelated with self-control or negatively correlated with self-control, suggest that researchers should attend to the methods by which individuals internalize their religious goals if they wish to better understand the links of religion with self-control and self-regulation.

Religion and Goals: Summary

Religion may influence the goals that people select, influence the importance associated with those goals, reduce conflict among those goals, and influence the process by which religious teachings are converted into personally meaningful principles. These links between religion and goals suggest some important routes by which religion can influence self-regulation. Although the available empirical support for some of these propositions is limited, the evidence is generally supportive of the propositions. In the case of the research on goal selection (Roberts & Robins, 2000; Saroglou et al., 2004) and goal sanctification (e.g., Mahoney, Carels, et al., 2005; Mahoney, Pargament, et al., 2005; Mahoney et al., 1999), however, the correlational evidence is ample and quite consistent. Nevertheless, further research on religion and goals is clearly needed, in particular, research that can identify causal relationships.

Proposition 3: Religion Influences Self-Regulation by Promoting Self-Monitoring

A self-regulating system must be able to detect deviations between the system's current state and its goal. In cybernetic theory, discrepancy-detecting devices are called *comparators*. Comparators can vary greatly in their sensitivity to error. If error sensitivity is low, then a self-regulating system might be (a) sluggish in responding, (b) tolerant of large deviations before acting to reduce the discrepancy, or (c) too imprecise in detecting discrepancies. As a result, the system's behavior might deviate considerably from its goal before the discrepancy is addressed. In

humans, self-monitoring has been likened to such a comparison process (Carver & Scheier, 1998), and factors that affect self-monitoring can powerfully influence self-regulation.

If religion facilitates self-regulation by influencing self-monitoring, it stands to reason that religion should be associated with chronically high levels of self-monitoring. We found two studies that reported near-zero correlations between religiousness (measured as a single-item self-rating in one study and as intrinsic religious motivation in the other) and private self-consciousness, which reflects a tendency to be aware of one's private, internal states (Saucier & Skrzypinska, 2006; Watson et al., 2002), among U.S. college student samples. We also found a study yielding a near-zero correlation of intrinsic religiousness with public self-consciousness in a sample of U.S. college students (Watson et al., 2002). However, we also found a study of 227 Iranian college students that yielded positive correlations ($r_s =$ approximately .40) of intrinsic religiousness with public and private self-consciousness (Watson et al., 2002).

To add to the empirical database from which we might draw conclusions about religion and self-monitoring, we also analyzed data collected in 1986 from 94 undergraduates at the University of North Carolina at Chapel Hill (Odum Institute for Research in Social Science, 1986). Participants completed a six-item measure of attitudes toward religion (e.g., "I believe the church [synagogue] is the greatest institution in America today;" "I consider myself favorable toward being religious"), which were rated on a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The six items formed an internally consistent linear composite ($\alpha = .91$). Participants also completed Fenigstein, Scheier, and Buss's (1975) measures of private self-consciousness (which includes items such as "I'm always trying to figure myself out" and "I'm often the subject of my own fantasies"), public self-consciousness (which includes items such as "I usually worry about making a good impression" and "I'm concerned about the way I present myself"), and social anxiety (which includes items such as "I get embarrassed very easily" and "Large groups make me nervous"). Religiousness was positively correlated with public self-consciousness, $r(N = 94) = .35$, $p = .001$, but not with private self-consciousness, $r(N = 94) = .14$, *ns*, or with social anxiety, $r(N = 94) = -.01$, *ns*.

In summary, in only one of four samples (three U.S., one Iranian) has a positive relationship emerged between religiousness and private self-consciousness. In two of three studies (two U.S., one Iranian), positive relationships have been found between religiousness and public self-consciousness. Further, individual differences research seems warranted to clarify the links of individual differences in religiousness with individual differences in goal-relevant self-monitoring. For such future research to be most effective, more appropriate measures of self-monitoring may be required. The Fenigstein et al. (1975) measures of public and private self-consciousness have more to do with trying to please others and being introspective, respectively, than they do with monitoring one's own behavior in light of other people's standards or one's own standards. Especially valuable would be measures of the extent to which people feel (a) that they tend to monitor their own behavior in light of their goals and standards; (b) that their friends, significant others, and members of their communities monitor their behavior in light of relevant goals or standards; or

(c) that God and/or other spiritual forces monitor their behavior in light of religiously prescribed goals and standards.

Individual differences in religiousness and their links to individual differences in self-consciousness notwithstanding, real-time religious experiences and chronic involvement in religious activities might influence self-monitoring through three specific routes. First, religion involves perceived social interaction with, and monitoring by, supernatural entities. The perception of being watched can increase self-awareness (Carver & Scheier, 1998). Second, religious communities are moralistic audiences that may increase self-awareness. Third, many religious rituals involve deliberately comparing one's behavior to one's standards.

Proposition 3a. Perceived Interaction With (and Monitoring by) Supernatural Entities Fosters Self-Monitoring

Most religious belief systems posit gods or spirits that observe humans' behavior, pass judgment, and then administer rewards or sanctions (Bering & Johnson, 2005). In most religions, these beings can also read thoughts and are not fooled by people's attempts to deceive them. The literature on self-regulation indicates that the perceived presence of an evaluative audience increases self-awareness, which in turn leads people to compare their behavior to their standards (Carver & Scheier, 1998).

One example of how perceived surveillance causes people to adjust their behavior comes from Haley and Fessler (2005). These investigators found that undergraduates at the University of California, Los Angeles, who volunteered, in exchange for pay, to play the dictator game (in which one player simply gives as much or as little money from an endowment as he or she wishes to a second player) on a computer were more generous toward their partners if eyespots—suggesting an audience that was monitoring the participants' behavior—appeared on the computer's desktop display. Bateson, Nettle, and Roberts (2006) reported a conceptual replication with a sample of 48 faculty members in a British department of psychology who had the option to pay for tea, coffee, and milk in the break room via an "honesty box" that was decorated during alternate weeks with either pictures of eyes or pictures of flowers. Participants donated nearly three times as much for what they consumed during weeks when the honesty box was decorated with eyes than during weeks when the box was decorated with flowers.

Several studies in which religious concepts have been activated explicitly or implicitly support the idea that perceived supernatural entities (or religious concepts more generally) can function like eyespots on a computer screen or an honesty box. For instance, Bering et al. (2005) found that people were less likely to cheat on a cognitive test when they had been led to believe that a research assistant had recently spotted a ghost in the laboratory.

We located five other published articles that are relevant to this idea, and each of them showed that activating religious mental content produces similar effects. For example, Baldwin, Carrell, and Lopez (1990) presented 46 Catholic undergraduate women at a Canadian university with subliminal pictures of (a) the Pope's scowling face, (b) Robert Zajonc's scowling face, or (c) a control condition (a blank card) after they had read a sexually explicit passage. The women who had been subliminally exposed to the Pope's face subsequently rated themselves lower on a composite measure of self-concept (including adjectives related to compe-

tence, morality, and anxiety) than did women who had been exposed to the other conditions. However, this main effect was qualified by an interaction between level of religious involvement and condition: The picture of the disapproving Pope (vs. the control conditions) had a negative effect on self-concept for practicing Catholic women ($p < .05$) but not for nonpracticing Catholic women. One possible explanation for this interaction is that the Pope's subliminal scowl caused the devout Catholic women to experience temporary discrepancies between their behavior and their (religiously informed) goals (as a result of their having previously read a sexually explicit passage), whereas the nonpracticing Catholic women experienced no such discrepancy after exposure to the Pope's scowl.

More recently, Shariff and Norenzayan (2007) found that when undergraduates at a Canadian university were subliminally primed with God-related concepts (e.g., "spirit," "divine," and "God") through a scrambled sentence task, they behaved more generously in the dictator game than did participants who were not primed with any consistent concept. In a second study reported in the same article, which involved adults from Vancouver, British Columbia, Shariff and Norenzayan (2007) replicated this finding and also found that priming people with words that activated the concept of secular institutions for social control (e.g., "police," "contract," "jury," and "court") produced similar increases in generosity. Studies with samples of university students from Belgium and the United States also showed that priming religious mental content increases prosocial behaviors such as honesty (Randolph-Seng, 2007; Randolph-Seng & Nielsen, 2007) and volunteering to help a charity (Pichon, Boccato, & Saroglou, 2007). Taken together, these results suggest that activating religious concepts can influence moral cognition and behavior—perhaps through enhanced self-monitoring.

Proposition 3b: Religious Communities, as Moralistic Audiences, Foster Self-Monitoring

Religious communities are social settings in which people evaluate each other's behavior in light of strong norms. Relative to other social settings (e.g., parks, streets, and even places of work), relatively few behaviors are appropriate in religious settings. Indeed, in one study, U.S. undergraduate psychology students reported that among six relatively comprehensive personality dimensions (i.e., adjustment, likeability, self-control, social inclination, intellectance, and dominance), self-control is the most appropriate trait to express in religious settings (Kenrick, McCreath, Govern, King, & Bordin, 1990). Price and Bouffard (1974) also found that among 15 common settings in which students find themselves (e.g., church, job interviews, movies, restrooms, dorm lounges, and their own rooms), "church" was the setting in which 15 behaviors (e.g., eating, talking, laughing, writing, and crying) were judged by U.S. university students to be, on average, least appropriate (one's own room was the setting in which the 15 behaviors were judged to be most appropriate). These findings suggest that religious settings are high-constraint settings in which relatively few behaviors are appropriate and in which the exercise of self-control is judged to be socially appropriate.

For this reason, we speculate that religious people, by virtue of the amount of time they spend in these high-constraint religious settings, may spend more time in front of evaluative, moralistic

audiences than do less religious people. As a result, we hypothesize that religious people engage in greater self-monitoring, which, in turn, leads them to make frequent real-time behavioral adjustments. Direct evidence for this proposition, however, is lacking.

Proposition 3c: Many Religious Rituals Deliberately Activate Self-Monitoring

A third way in which religiousness may promote self-monitoring is through religious rituals that are expressly suited for this purpose. Many religious rituals, including certain forms of prayer and meditation, involve a deliberate comparison of one's behavior with one's standards. For example, preparing for weekly confession (for Catholics), the season of Lent (for many Christians), and the Yom Kippur holiday (for Jews) are supposed to involve examinations of one's spiritual and moral shortcomings.

There is some evidence that religious rituals of this nature have the intended effect. Wenger (2007) found that when people are directed to think of ways in which their behavior has fallen short of their religious standards, they became preoccupied with seeking opportunities to improve themselves in the religious domain. In a first study, Wenger found that undergraduate psychology students from the University of West Alabama (all of whom identified with Christianity) who participated in an experimental condition in which they thought about previous instances in which they had not done a good job of living up to the standards of their religion had longer reaction times in naming the colors of pairs of words that related to religious goals (e.g., "say prayers") than the colors of pairs words that related to nonreligious goals (e.g., "study notes"). This color-naming latency for religious goals did not occur for people who had participated in an experimental condition in which they thought about instances when they had done a good job of living up to the standards of their religion. Such effects are consistent with the idea that thinking about one's religious shortcomings led to the activation of religious goals, which interfered with performance on the color-naming task. In a second study, Wenger showed that students from the same population who participated in the experimental condition in which they thought about instances in which they had failed to live up to their religious standards spent more time reading an essay about personal religious growth than did students who participated in the experimental condition in which they thought about instances in which they had successfully lived up to their religious standards. These findings provide fairly clear evidence that comparing one's religious standards to one's actual performance in the religious domain does indeed promote self-regulation.

Summary

Prior theory and research indicate that perceived audiences have robust influences on self-awareness and goal-behavior discrepancy management (Carver & Scheier, 1998). More recent theorizing about the behavioral effects of belief in moralistic supernatural agents (Bering & Johnson, 2005), recent experiments on the effects of "eye" stimuli on generosity and honesty (Bateson et al., 2006; Haley & Fessler, 2005), several studies on the behavioral effects of religious primes (Baldwin et al., 1990; Pichon et al., 2007; Randolph-Seng & Nielsen, 2007; Shariff & Norenzayan, 2007), and a study on the effects of a purported ghost sighting on

honesty (Bering et al., 2005), therefore, seem consistent with the proposition that religion can influence self-regulation through self-monitoring.

Likewise, two studies showing that religious settings require a high degree of self-control and involve strong public approval and disapproval for appropriate and inappropriate forms of behavior (Kenrick, McCreath, Govern, King, & Bordin, 1990; Price & Bouffard, 1974) suggest that public religious involvement may influence self-regulation through chronic contact with moralistic, evaluative audiences. Finally, two experiments show that awareness of one's religious shortcomings (i.e., discrepancies between one's religious goals and one's actual religious behavior) leads to a redoubling of religious goal-directed effort (Wenger, 2007). Taken together, these findings provide some initial support for the possibility that religion influences self-regulation through self-monitoring. However, some of the findings we have reviewed in light of this proposition have other interpretations, so we look forward to new experiments that can address the links between religion and self-monitoring with less ambiguity. We also look forward to more (and better) research on the links between individual differences in religiousness and individual differences in goal-relevant self-monitoring, as the previously published studies on this point (Saucier & Skrzypinska, 2006; Watson et al., 2002) and the novel results we have described herein yield inconsistent conclusions.

Proposition 4: Religion Influences Self-Regulation by Building Self-Regulatory Strength

An important aspect of self-regulation is the ability to correct discrepancies between one's behavior and one's standards once a discrepancy has been detected. The generic capacity for bringing one's behavior back in line with a standard—termed *self-regulatory strength* (Schmeichel & Baumeister, 2004)—can be likened to a muscle that can be weakened through acute exertion but that can also be strengthened through repeated use over time (Muraven & Baumeister, 2000). Exercising self-regulation over one's behavior in one area (e.g., commencing a regular program of study or paying attention to one's posture) creates self-regulatory strength that people can then apply in other areas (Muraven, Baumeister, & Tice, 1999; Oaten & Cheng, 2006). The "muscle" model for self-regulation also implies that acute self-regulatory exertion draws upon a finite resource (Muraven & Baumeister, 2000). The notion that self-regulatory strength works like a muscle has important implications for how religion comes to be associated with self-regulation and for how religion facilitates behavior in nonreligious domains (for reviews, see Baumeister & Exline, 2000; Geyer & Baumeister, 2005). We propose that religion may build self-regulatory strength in two ways, though the evidence supporting these proposals is currently quite thin.

Proposition 4a: Involvement in Religious Communities Fosters the Development of Self-Regulatory Strength

As noted above, religious congregations are high-constraint settings (Kenrick et al., 1990; Price & Bouffard, 1974) that may provide social incentives for self-regulation and impose social sanctions for self-regulatory failures. Being a good religious person, then, may therefore require large, regular expenditures of

self-regulatory effort. If this is the case, then chronic involvement in religious settings may build self-regulatory strength in the same way that psychological investment in other social roles does (Lodi-Smith & Roberts, 2007) and in the same way that coming from a collectivistic cultural background, believing in the importance of accommodating to the needs of others, and tending to regulate one's behavior according to socially prescribed values does as well (Seeley & Gardner, 2003).¹

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Proposition 4b: Many Religious Rituals Foster the Development of Self-Regulatory Strength

Second, religious rituals, such as fasting; postural control (e.g., during meditation); sleep deprivation; alms giving; long periods of prayer or meditation; and generosity with one's time, energy, and resources, may require self-regulatory strength. Consider religiously motivated fasting. During the month of Ramadan, Muslims fast during the day, although they continue to eat at night. Observant fasters typically become more irritable and anxious during Ramadan, they increase their consumption of stimulants such as tea and coffee (Kadri et al., 2000), and their performance on even basic perceptual tasks is impaired (Ali & Amir, 1989). In addition, Muslims' rates of traffic accidents, emergency room visits, and on-the-job accidents increase during Ramadan (Fazel, 1998). These findings suggest that Ramadan-related fasting may tax the cognitive bases of self-control, such as attention, task switching, emotion regulation, and conflict monitoring (Banfield, Wyland, Macrae, Münte, & Heatherton, 2004). The fact that Ramadan fasting additionally reduces blood glucose levels (Fazel, 1998) is also consistent with the idea that Ramadan fasting depletes self-control: Low blood glucose impairs performance on tasks that require self-control (Gailliot et al., 2007).

On the basis of the strength model of self-regulation (Muraven & Baumeister, 2000), one might also surmise that religiously motivated fasters will, over time, develop greater self-regulatory strength that then becomes available for pursuing other goals (El-Azayem & Hedayat-Diba, 1994). Consistent with this intuition, a survey of Christian adults from Muncie, Indiana, found that people who indicated that they fasted for religious reasons (e.g., out of "obedience to God" or "to gain spiritual power") also tended to cite "expressing self-control" as a reason for fasting (Tamney, 1986).

We could locate no experimental evidence for evaluating these propositions regarding religion and self-regulatory strength, but three predictions seem worthy of future study. The first is that religious practices that engage self-regulatory processes will deplete self-regulatory strength in the short term, just as people are able to lift more weight at the beginning of a weightlifting session than at the end. The second is that longer term religious involvement will lead to chronic increases in self-regulatory strength (Muraven et al., 1999). The third is that religious people (or people who have had religious mental content activated) will experience less self-regulatory depletion after tasks that rely on self-regulatory strength (e.g., Seeley & Gardner, 2003; e.g., Vohs, Baumeister, & Ciarocco, 2005).

Proposition 5: Religions Influences Self-Regulation by Prescribing and Promoting Mastery With Specifically Religious Outputs for Self-Change

In addition to self-regulatory strength, people must have a repertoire of effective psychological and behavioral tools for self-change in order to self-regulate. In the terminology of cybernetic theory, such tools for self-change are called "outputs" (Carver & Scheier, 1998).

Religion can motivate people to use outputs that are not particularly religious. For instance, Worthington et al. (2001) found, in a sample of U.S. university students, that highly religious people were more likely than less religious people to deal with sexual attraction to someone other than their primary romantic partner by (a) physically distancing themselves from the attractive person and (b) psychologically distracting themselves from thoughts of the attractive person. Such outputs have been found to be effective for self-regulation in other areas of research as well (Mischel et al., 1989). However, part of religion's unique effectiveness in fostering self-regulation may come from a broad repertoire of specifically religious outputs. As Rachlin (2000) noted,

The great advantage of the religious point of view is that it offers a way to achieve self-control. Buddhism, for instance, suggests certain mental and physical exercises. Judaism and Christianity suggest study of sacred texts. All suggest prayer . . . While the particular advice that religions prescribe may not be accepted by every person in modern culture, religions at least offer practical access to self control. (p. 13)

Several studies now support Rachlin's notion that some religious behaviors function as outputs of this nature.

Prayer, Meditation, and Self-Regulation

Galton (1872) was the first social scientist to propose that prayer serves an affect-regulatory function. With the benefit of insights from modern neuroscience, McNamara (2002) made a similar but physiologically more sophisticated claim: that one effect of religious behaviors such as prayer and meditation is the activation of the frontal lobes. As a result of this prayer-induced activation, McNamara argued, people become more effective at executive functions such as emotion regulation and impulse control. Likewise, in a recent review, Cahn and Polich (2006) defined meditation as "practices that self-regulate the body and mind, thereby affecting mental events by engaging a specific attentional set" (p. 180).

If prayer and meditation really do create neurophysiological changes that are relevant to self-regulation, then where would we expect to find those effects? Fuster (1989), among others, pro-

¹ However, religion probably is probably also distinct from other social investments and psychological collectivism in some respects because (a) believing in a god (or gods) and spirits that set norms, monitor behavior, and apply rewards and sanctions is a powerful force for activating self-regulatory processes that is, by definition, unique to religious belief systems and religious communities and (b) the sorts of behaviors that religions make available for self-regulation (e.g., prayer and meditation) may make most sense to religious people and, therefore, may generate the most compliance and efficacy when they are moored to religious justifications for their use.

posed that the prefrontal cortex is central to self-regulation because it helps people chain together sequences of simple behaviors so that they can pursue complex goals. More recently, neuroscientists have established the importance of the prefrontal cortex (namely, the dorsolateral and ventromedial prefrontal cortex) and the anterior cingulate cortex for various elements of executive functioning, attention, conflict monitoring, and cognitive control (Banfield, Wyland, Macrae, Münte, & Heatherton, 2004; Kerns et al., 2004; McDonald, Cohen, Stenger, & Carter, 2000). Thus, these should be precisely the cortical areas that are differentially influenced by prayer and meditation if such religious or spiritual behaviors promote self-regulation.

By consulting a comprehensive review of the electroencephalogram (EEG) and magnetic resonance imaging studies on meditation (Cahn & Polich, 2006) and conducting our own search of the literature to retrieve newer studies, we found five studies that were relevant to this claim. Azari, Missimer, and Seitz (2005); Newberg, Pourdehnad, Alavi, and D'Aquili (2003); and Ritskes, Ritskes-Hoitinga, Stodkilde-Jorgensen, Baerentsen, and Hartman (2003) all found that meditative forms of prayer were associated with increased activity in the prefrontal cortex and/or the anterior cingulate. Most of these studies simply involved having experienced meditators or "pray-ers" engage in meditation or prayer during functional brain scans; these scans were then contrasted with nonmeditative or nonprayer states. In addition, Aftanas and Golosheykin (2005) reported that long-term meditators have weaker anterior cortical responses (measured via EEG) to aversive movie clips than do age-matched control participants who are not long-term meditators. The implication here is that through their repeated involvement in a form of meditation characterized by "thoughtless awareness accompanied by an emotionally positive experience of bliss" (Aftanas & Golosheykin, 2005, p. 903), long-term meditators develop an ability to moderate their responsiveness to environmental stimuli that typically recruit high levels of attention and negative emotion. Likewise, Brefczynski-Lewis, Lutz, Schaefer, Levinson, and Davidson (2007) found that experienced meditators had greater activation in brain regions associated with attention and response inhibition, including areas of the dorsolateral prefrontal cortex and the anterior cingulate.

Consistent with these findings, Tang et al. (2007) found that short-term training in meditation improved inexperienced meditators' (Chinese undergraduate students') abilities to resolve mental conflict (as measured with a cognitive measure called the Attention Network Test), which is an executive process that is supported by the anterior cingulate and the prefrontal cortex. Finally, Chan and Woollacott (2007) found that experienced meditators (who were recruited from meditation centers in the Berkeley, California, area) performed better on the Stroop task (which measures the operation of the same executive attentional network whose performance is measured by the Attention Network Test) than did nonmeditators (who were recruited from the University of California, Berkeley, and a community senior center). Moreover, correlational analyses showed that interference during the Stroop task was negatively associated ($r = -.31$) with the number of minutes per day that participants reported meditating in daily life.

To investigate the affect-regulatory function of prayer more rigorously, Koole (2007) conducted five experiments in which undergraduate students at a Dutch university were exposed to someone in need and then instructed (a) to think about the person,

(b) to pray for the person, or (c) to construct a positive reappraisal of the person's plight. In the first study, participants who prayed for the person in need experienced greater reductions in negative affect than did people in the other conditions (particularly those in the "think about" condition). In successive studies, the prayer condition yielded significant preintervention–postintervention reductions in negative emotion for participants who were highly religious but not for those who were low in religiousness. Taken together, Koole's (2007) five experiments make a reasonable case that prayer serves an affect-regulatory function—at least for religious people.

Of course, the terms *prayer* and *meditation* comprise very diverse forms of mental activity: It would be odd, indeed, if all of them were related to self-regulation or self-control in the same ways. However, as the extant studies show, some forms of prayer and meditation do appear to influence self-regulation, affect regulation, and the brain areas that have been implicated as crucial to effective regulation of cognitive and affective states. Leary, Adams, and Tate (2006) presented a compelling argument for how meditative states might promote self-regulation. Future work in this area seems warranted.

Engaging in Religious Imagery

As Rachlin (2000) suggested, religious imagery may also be a specifically religious output for affect regulation. Weisbuch-Remington, Mendes, Seery, and Blascovich (2005) subliminally presented pictures of positive religious images (e.g., Christ ascending to heaven, Mary holding the baby Jesus) and negative religious images (e.g., demons and satanic symbols) to Christian and non-Christian undergraduate students at the University of California, Santa Barbara. Having viewed this imagery, participants then prepared and delivered short speeches about their own deaths or about a control topic. Christian (but not non-Christian) participants who had viewed the negative religious imagery exhibited a pattern of cardiac reactivity associated with threat appraisals (i.e., greater total peripheral resistance) during the death-related speech task, whereas (Christian) participants manifested a pattern associated with challenge appraisals (i.e., greater cardiac output) during the speech task if they had previously viewed the positive religious images. Thus, the positive religious imagery evidently had an automatic affect-regulatory effect because it helped religious people (for whom the imagery was personally relevant) to mount more adaptive psychophysiological responses to the death-related speech task.

Consulting Religious Texts

Consulting one's religious scriptures, as Rachlin (2000) proposed, can also be conceptualized as an output for effecting self-change because religious scriptures can provide behavioral guidance that is more likely to be followed as a result of the fact that the guidance emanates from a sacred source. As noted above, Wenger (2007) found that when people considered their religious shortcomings (e.g., by writing about a time when they did not live up to their religious beliefs), they went on to spend more time reading a short passage entitled, "How can I know when it is God who is speaking to me?" On the basis of this finding, it seems tenable that people in such situations would be similarly motivated

to consult their scriptures for behavioral guidance and that they would engage in self-change efforts on the basis of that guidance.

Summary

Prayer, meditation, religious imagery, and scripture reading all appear capable of serving self-regulatory functions. There are likely to be many other religious outputs that perform in similar ways. There is no well-established catalogue of religious outputs that one might use for developing a program of research on this topic, but systematic attempts to catalogue religious methods of coping with stress might provide a productive starting point in developing one. Coping, after all, is often conceptualized as a discrepancy-reduction process (Folkman & Moskowitz, 2004), even though coping typically refers to self-regulation in the context of stressful life events, whereas self-regulation is not predicated on stressful life events.

Pargament, Koenig, and Perez (2000) developed a 17-factor self-report scale to measure a wide variety of religious strategies that people use to cope with negative life events. These strategies include: (a) taking a religious focus (i.e., engaging in religious activities, such as prayer, to distract oneself from a stressor), (b) using collaborative religious coping (i.e., seeking control over a stressor through a problem-solving partnership with God), and (c) seeking support from clergy or members of one's congregation. Pargament et al. also measured several discrete types of "negative" religious coping (e.g., attributing one's problems to demonic influences or God's punishment) that one might reasonably expect to impair self-regulation.

It seems that some of these methods of religious coping could be viewed as religious outputs that might be applied for self-regulation in situations that are not particularly negative or stressful. It is beyond the scope of this review to provide an exhaustive catalogue of religious outputs for self-regulation, but future work on religious outputs might seek to recast the religious coping literature in a more generic light to this end. Recent attempts to identify religious coping strategies associated with religions such as Judaism (Dubow, Pargament, Boxer, & Tarakeshwar, 2000) and Hinduism (Tarakeshwar & Pargament, 2003) should also be examined in the interest of comprehensiveness.

Proposition 6: Religion Affects Health, Well-Being, and Social Behavior Through Self-Regulation and Self-Control

The sixth and final proposition around which we have organized this review is that self-regulation and self-control help to explain religion's well-established associations with measures of health, well-being, and social behavior, such as longevity (McCullough et al., 2000), depressive symptoms (Smith et al., 2003), marital functioning (Mahoney et al., 1999), crime and delinquency (Baier & Wright, 2001), and school achievement (Jeynes, 2002). We believe that this proposition is highly plausible, because self-control, like religion, is consistently associated with such outcomes.

For example, Kokkonen et al. (2002) found that 14-year-old children with poor self-control tended to engage in higher levels of alcohol and tobacco use. As a result of their substance use, many had developed high levels of physical disability, low self-rated health, and physical symptoms by age 36. Moreover, self-

regulatory or self-control capacity, as captured by the higher order personality trait of Conscientiousness, is associated with many of the behavioral risk factors for premature death. In a meta-analysis, Bogg and Roberts (2004) found that conscientious people have slightly higher levels of physical activity; less alcohol, tobacco, and drug use; healthier eating habits; safer driving; safer sexual practices; lower risk for suicide; and less involvement in violence than do less conscientious people. Religiousness also has been associated with many of these health-promoting behaviors (T. D. Hill et al., 2006; T. D. Hill & McCullough, 2008; Merrill & Thygeson, 2001; Russell, Bullock, & Corenblum, 1977; Wallace & Forman, 1998).

In addition, there is evidence for a negative association between self-control and criminality (Hirschi, 2004; T. C. Pratt & Cullen, 2000; Vazsonyi, Pickering, Junger, & Hessing, 2001), a positive association between self-control and the functioning of romantic relationships (Finkel & Campbell, 2001; Kelly & Conley, 1987), and a positive association between self-control and academic achievement (Duckworth & Seligman, 2006; Mischel, Shoda, & Rodriguez, 1989). In light of this evidence, it seems plausible that religion's associations with such outcomes are partially due to religion's ability to promote self-control or self-regulation.

We located four papers incorporating analyses from five independent data sets addressing the proposition that religion's associations with measures of health, well-being, and social behavior are due, in part, to religion's ability to foster self-regulation or self-control (Desmond et al., 2008; C. Walker et al., 2007; Welch et al., 2006; Wills et al., 2003). All five studies evaluated the associations of religiousness with delinquency, adolescent substance use, or adolescent sexual behavior. In four of the five data sets, self-control appeared to partially mediate the associations of religiousness with these outcome variables.

First, Welch et al. (2006) explored whether religiousness and self-control operate as independent predictors of crime and delinquency. Participants were a random sample of 350 Oklahoma City residents age 18 years and over. Personal religiosity was measured with a multi-item scale including religious behaviors (e.g., frequency of prayer) and religious salience (e.g., importance of religion). Self-control was measured with a scale whose items reflected rule following and behavioral inhibition (e.g., wearing a seatbelt, resisting liquor). Perceived likelihood of future criminal activity was measured with an index of participants' predictions of their likelihood of engaging in several crimes (e.g., illegal gambling, petty theft, driving under the influence of alcohol) in the foreseeable future.

Welch et al. (2006) reported that the association of personal religiosity and behavioral self-control was significant ($\beta = .38$), that religiosity and self-control had significant unique associations with likely future criminal activity ($\beta_s = -.32$ and $-.38$, respectively), and that the coefficient for the association of religiosity and likely future criminal activity was reduced to $\beta = -.23$ when behavioral self-control and religiousness were used jointly to predict likelihood of future criminal activity. Welch et al. (2006) did not conduct a formal test of mediation, so we performed this analysis by exporting these regression coefficients (adjusted for gender, race, age, educational level, family intactness during childhood, and type of place of residence during childhood) to the Mplus statistical package (Muthen & Muthen, 1998–2004).

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With only three variables (religiosity, behavioral self-control, and likelihood of future criminal activity), the model was just identified, so no formal tests of overall model fit were possible; nonetheless, the model yielded unbiased parameter estimates. All model paths were statistically significant, $ps < .05$ (see Figure 1). Most importantly, the indirect path from personal religiosity and future criminal activity through behavioral self-control (i.e., the indirect or mediated effect) was statistically significant (estimate/ $SE = -4.57, p < .01$). The fact that the mediated effect was statistically significant indicates that the strength of association between religiousness and perceived likelihood of future criminal activity was significantly reduced (though not eliminated entirely) by including the mediator in the model (Baron & Kenny, 1986). The model explained 18% of the variance in future criminal activity, and 36% of the association of religiousness and future criminal activity was mediated by self-control.

Next, C. Walker et al. (2007) found that religiousness (measured with a multi-item scale that included items related to the self-rated importance of religion) was negatively associated with self-reported substance use (i.e., an index that encompassed measures of cigarette smoking, drinking beer or wine, marijuana use, and heavy alcohol consumption) in two different cross-sectional data sets: a sample of 1,273 middle-school students and a sample of 812 high school students. The negative association of religiousness with substance use in both samples was significantly mediated by a latent variable measuring good self-control.

Finally, Desmond et al. (2008) found that self-control partially mediated the cross-sectional associations of a three-item self-report measure of religiousness (the mean of self-rated importance of religion, frequency of church attendance, and frequency of prayer) with alcohol use and marijuana use in the Add Health data set (a study of students from a nationally representative sample of 132 U.S. middle schools and high schools). These mediational effects obtained even when controlling for participants' sex, age, race, parental education, socioeconomic status, family structure, students' grades, associations with delinquent peers, attachment to their schools, religious denomination, and several other variables.

We located only one study in which a measure of self-control was found not to mediate a relationship between religiousness and an outcome of interest. Wills et al. (2003) examined the cross-sectional predictors of sexual behavior and substance use in a sample of 297 African American adolescents. In a complex structural equation model involving 18 constructs, Wills et al. (2003) found no evidence that self-control mediated the relationships of religiousness with sexual behavior and substance abuse.

In summary, four of five relevant studies indicated that religious individuals' relatively high self-control explains why religious

adolescents have lower rates of substance use and why religious adults are less likely to engage in crime and delinquency. Most of the domains of health, well-being, and social behavior for which we have speculated that self-control or self-regulation may mediate religion's associations (e.g., longevity, psychological symptoms, marital and family functioning, and school achievement) have not been examined, however. Moreover, all of the extant research on this proposition is correlational (and cross-sectional). Stronger tests of causality and tests using a broader array of outcomes than those typically associated with religion are sorely needed.

Conclusions and Directions for Future Research

This article represents the results of a comprehensive review of empirical research on religion, self-regulation, and self-control, which we organized around several propositions that flow from the basic idea that certain elements of religious belief and behavior are capable of fostering self-control and self-regulation. Using Carver and Scheier's (1998) model of self-regulation as an organizational framework enabled us to integrate several literatures (e.g., the literature on the personality correlates of religion; the literature on religion and goals; the literature on religion and self-monitoring; and the literature on the affective, cognitive, and behavioral effects of various religious rituals) that scholars have not previously considered as relevant to a unitary subject.

Conclusions

On the basis of this review, five conclusions are warranted. First, there is strong evidence for our proposition that religion is positively related to self-control as well as to traits such as Agreeableness and Conscientiousness that are considered by many theorists to be the basic personality substrates of self-control (e.g., Aziz & Rehman, 1996; e.g., Bergin et al., 1987; Desmond et al., 2008; French et al., in press). There is also substantial evidence that religious parents tend to have children with high self-control (Bartkowski et al., 2008). Except for one study suggesting that individual differences in religiousness precede longitudinal changes in Agreeableness (at least for women) and a single experiment showing that religious cognition is automatically recruited for self-control (Fishbach et al., 2003; Wink et al., 2007), however, the available evidence for evaluating whether religion causes self-regulation or self-control is rather meager.

Second, evidence supports our propositions regarding how religion influences goal selection, goal pursuit, and goal management. Specific religions prescribe specific goals for their followers to pursue. Recall, for instance, the research on differences in Christian and Buddhist individuals' ideals about low-arousal and high-arousal positive affect and the research on differences in Jewish and Christian ideals about controlling one's thoughts (e.g., A. B. Cohen & Rozin, 2001; Tsai et al., 2007). Moreover, some specific values (which are highly abstract goal states) are particularly important to religious people from several world religions: Jewish, Christian, and Muslim individuals from around the world appear to value positive social relationships and social harmony more, and individualistic and hedonistic pursuits less, than do nonreligious people (Roberts & Robins, 2000; Saroglou et al., 2004). Several studies also indicate that sanctified goals (i.e., goals

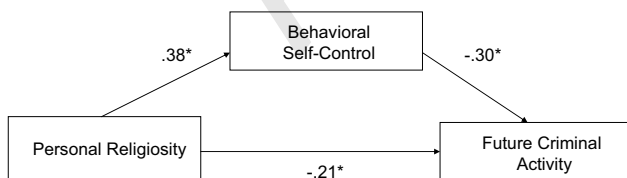


Figure 1. Self-control partially mediates the association of religiousness and anticipated future criminal activity among adults. The figure is based on a re-analysis of data from Welch, Tittle, and Grasmick, (2006). Coefficients are standardized regression coefficients. * $p < .05$.

that are endowed with a spiritual or religious importance) generate more goal striving (e.g., Mahoney, Carels, et al., 2005; Mahoney, Pargament, et al., 2005; Mahoney et al., 1999) and less goal conflict (Emmons, Cheung, & Tehrani, 1998).

Third, the evidence for the proposition that religiousness promotes self-monitoring is mixed. On one hand, some results suggest that individual differences in religiousness are associated with higher public or private self-consciousness (which have been used previously as proxies for self-monitoring), but other studies have found no such relationships. On the other hand, several experiments support the idea that religious cognition promotes self-monitoring (Baldwin et al., 1990; Wenger, 2007) and (perhaps through its intermediate effects on self-monitoring) behavioral change in the direction of prosocial goals, such as honesty and generosity (Randolph-Seng & Nielsen, 2007; Shariff & Norenzayan, 2007). This preliminary research should be bolstered by more stringent tests in the future. We also found little data for evaluating the proposition that religion promotes the development of self-regulatory strength.

Fourth, the existing evidence seems reasonably supportive of the proposition that some religious rituals (e.g., meditation, prayer, religious imagery, and scripture reading) promote self-regulation. For example, studies show that some forms of meditation and prayer (a) affect the cortical regions that subserve self-regulation (e.g., Aftanas & Golosheykin, 2005; Azari et al., 2005; Brefczynski-Lewis, Lutz, Schaefer, Levinson, & Davidson, 2007; Newberg et al., 2003); (b) influence attentional variables that are foundational to self-regulation (Chan & Woollacott, 2007; Tang et al., 2007); and (c) dissipate negative emotion, especially among religious participants (Koole, 2007). Other studies suggest that positive religious imagery (Weisbuch-Remington et al., 2005) and scripture reading (Wenger, 2007) may serve similar regulatory functions, although more research on this proposition is clearly needed.

Fifth, we found four studies that supported (Desmond et al., 2008; C. Walker et al., 2007; Welch et al., 2006), and only one that refuted (Wills et al., 2003), the proposition that religion's ability to promote self-control or self-regulation can explain some of religion's associations with health, well-being, and social behavior. However, studies that are better suited to evaluating cause and effect, with a more diverse collection of outcomes and more religiously diverse samples, will be necessary in the future to improve scientific confidence in the roles of self-control and self-regulation as mediators of religion's associations with health, well-being, and social behavior.

It is worth noting that even though most of the research we reviewed herein was conducted in North America with people who were predominantly from Christian backgrounds, the evidence gathered from people from other nations, and from other religions, is also generally consistent with our conclusions (e.g., Aziz & Rehman, 1996; Francis & Katz, 1992; French et al., in press; Saroglou et al., 2004; Watson et al., 2002; Wilde & Joseph, 1997). We therefore suggest (with openness to the possibility that we are incorrect) that the conclusions we have drawn herein may reflect not simply how religion operates within a particular nation, or a particular society, or a particular religion, or at a particular time in history, but rather, a general feature of religion itself.

Directions for Future Research

Given the state of current knowledge about religion's relationships with self-regulation and self-control, we see six high priorities for future research. One large knowledge gap concerns whether religion (either as a primed concept or as an individual difference) facilitates comparison of one's goals with one's current behavior. Another large knowledge gap concerns whether religious mental activity consumes self-regulatory resources acutely, whether it builds self-regulatory strength over time, and whether it delays depletion of self-regulatory strength during regulatory effort. We hope researchers who test these hypotheses will move beyond cross-sectional studies to longitudinal and experimental studies that can address questions of causality (e.g., Fishbach et al., 2003). With newly developed techniques for manipulating religious cognition in the laboratory (e.g., Shariff & Norenzayan, 2007; Wenger, 2003, 2004, 2007), experimental studies are eminently feasible.

Second, it would be useful to know whether (and if so, how) religion influences the cognitive components of control themselves—for example, conflict monitoring (Kerns et al., 2004), attention (J. D. Cohen et al., 2004), and task switching (Yeung, Nystrom, Aronson, & Cohen, 2006)—and whether these cognitive underpinnings help explain religious differences in self-control or self-regulation. We also hope researchers will turn to the behavioral and cognitive measures of self-regulation and self-control that have been largely neglected in religious research since Hartshorne et al. (1929).

Third, work should be done to distinguish the aspects of religion that are associated with better self-control or self-regulation from those that are related to poorer self-control or self-regulation. We identified many studies indicating that general religiousness (e.g., self-rated importance of one's religion, frequency of engagement in public or private religious practices) and intrinsic religious motivation are associated with higher self-control (e.g., Bergin et al., 1987; French et al., in press). We also found evidence that some forms of prayer and meditation are related to better self-regulation (e.g., Koole, 2007; Tang et al., 2007) and that subliminally presented positive religious imagery improves self-regulation (Weisbuch-Remington et al., 2005).

However, we also located studies showing that extrinsic religious motivation tends to be either unrelated or negatively related to self-control (e.g., Bergin et al., 1987; Bouchard et al., 1999) and that subliminally presented negative religious imagery leads to less effective self-regulation (Weisbuch-Remington et al., 2005). In addition, we located an article indicating that people with very strong confidence in their religious beliefs, in comparison with those with less confidence in their religious beliefs, experienced smaller increases in *error-related negativity* (ERN), which is an event-related potential generated in the anterior cingulate cortex, 80 ms after receiving feedback that they have made a mistake in a cognitive task (Inzlicht, McGregor, Nash, & Hirsh, 2008). ERN is thought to be a signal the brain uses to recalibrate responding after errors. Thus, it is considered a neurological index of self-regulation (Inzlicht et al., 2008).

Inzlicht et al. used the Stroop color-naming task to engender cognitive errors as they measured ERN with EEG methods. In a first study, Inzlicht et al. found that a multi-item measure of religious zeal (consisting of items such as "I would support a war

that defended my religious beliefs”) was correlated with less ERN following Stroop-related errors but not with EEG activity following correct responses. In a second study, this finding was replicated with a single-item measure of how certain participants were in their belief in God. Findings such as these underscore the need for more careful empirical work that can separate the aspects of religiousness that promote self-regulation from those that hinder self-regulation.

Additionally, it is worth noting that some religious phenomena (e.g., ecstatic or mystical experiences, speaking in tongues, and other religiously normative rituals that involve altered states of consciousness) seem to generate losses of self-control. Although the psychological and behavioral data that would permit reflection on this point are currently quite limited, it seems worthwhile to consider religiously justified losses of self-control and what purposes such phenomena might serve in the lives of religious people, if any.

Our fourth recommendation is for application of the self-regulatory framework to religion’s negative behavioral and social effects, which may be legion. There is no reason to think that religion’s effects on human life are uniformly good or socially desirable, even though most of the research on religion that has been relevant to this review has involved outcomes that are generally valued (e.g., health, psychological well-being, relational harmony, staying out of trouble with the police, school achievement). Indeed, the evidence for religion’s ability to motivate aggression (Bushman, Ridge, Das, Key, & Busath, 2007) and prejudice (Altemeyer & Hunsberger, 2005) is at least as convincing as is the evidence for religion’s ability to facilitate cooperation (Shariff & Norenzayan, 2007) and other forms of prosocial behavior (Saroglou, Pichon, Trompette, Verschuere, & Dernelle, 2005), especially when the religion is of a fundamentalist, authoritarian variety (Altemeyer & Hunsberger, 2005; Rowatt et al., 2006).

Extending the self-regulatory framework to religion’s negative effects would be quite easy to do. Religion seems almost infinitely flexible in the kinds of goals it can prescribe or help to sanctify. When a goal comes under religion’s hegemony, we anticipate that the people who adhere to that religion will acquire additional motivational power for attaining the goal. Even though, for example, the strategic goals of terrorism usually have little to do with religion per se (Kruglanski & Fishman, 2006; Pape, 2005), and even though terrorists typically are no more religiously devout than are nonterrorists (Atran, 2003), using religion to sanctify terrorism should be useful for generating additional motivational force to impel individual acts of terrorism as well as to sustain collective will for long campaigns of terrorism (Atran, 2003; Juergensmeyer, 2003).

Indeed, means–end analysis of terrorism (Kruglanski & Fishman, 2006) implies a role for cultural (including religious) factors that influence many facets of self-regulation, including (a) the goals people select, (b) the motivational force that becomes attached to those goals, (c) error monitoring, (d) self-regulatory strength, and (e) the outputs at people’s disposal for modifying their behavior to maintain progress toward goal attainment. In other words, a self-regulation analysis of religion suggests that religion is well suited to motivate any behavior that is predicated on self-control and self-regulation, whether that behavior is studying hard for final exams or donning an explosives belt and then detonating it on a crowded city bus.

Fifth, we recommend a more thorough integration of the biological dimensions of the phenomena we have discussed herein. Individual differences in self-control have a clear genetic basis (Yamagata et al., 2005) as do individual differences in religiousness (Koenig, McGue, Krueger, & Bouchard, 2005), so an important question to consider is whether the associations of religiousness with self-control (or processes relevant to self-regulation more generally) are the product of shared environmental influences, shared genetic influences, or both. Also, in light of the research we reviewed herein showing that religious rituals such as prayer and meditation activate brain regions associated with executive functions (e.g., Brefczynski-Lewis et al., 2007; Ritskes et al.), we would like to see more attention paid to McNamara’s (2002) proposal that some religious rituals can strengthen the brain’s executive networks.

Sixth, and finally, we recommend more research on the extent to which the links of religion to the various self-control and self-regulatory phenomena discussed herein obtain across religions and societies. The available research from non-Western and non-Christian samples suggests that these links are not restricted to North American Christian individuals, but more attention to these links across a wider range of religious and cultural diversity would help us to know whether it is warranted to characterize religion broadly as a human cultural innovation that characteristically facilitates self-control and self-regulation.

The hypothesis that religion exists to control people’s behavior is one of the oldest hypotheses in the scientific study of religion (e.g., Durkheim, 1912/1965; Malinowski, 1935). In the present article we have extended this line of thinking by evaluating evidence relevant to the proposal that religion also controls behavior indirectly by facilitating self-control and self-regulation. This review has led us to conclude that religion, self-control, and self-regulation are indeed intimately related. However, many of the interconnections among these concepts require further empirical scrutiny. We hope that this review will help stimulate a new wave of research into the relations of religion with self-control and self-regulatory processes, as we believe that these relationships have considerable potential to advance understanding of how religion exerts its broad and varied effects on human behavior and mental processes.

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Received September 14, 2007

Revision received July 29, 2008

Accepted August 4, 2008 ■

AUTHOR QUERIES

AUTHOR PLEASE ANSWER ALL QUERIES

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