

The Role of Self-Control, Social Support, and Reliance on Others in the Religiosity-

Health Link

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Dissertation submitted in partial fulfillment of
the requirements for the degree of Doctor
of Philosophy in the Department of
Psychology & Neuroscience in the Graduate School
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2015

ABSTRACT

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Abstract

Religious observance has been reliably shown to improve a wide variety of health outcomes across the lifespan. Significant work has already been done to find mediating processes that explain this relationship, but as yet no studies have been published that attempt to integrate these mediators into a single model to see if they all work together. The current study presents three possible mediators of the religiosity-health link: social support, self-control, and reliance on others. Participants were recruited from Amazon.com's Mechanical Turk worker system ($N = 112$) for a 14-day diary study in which all relevant constructs were measured on a daily basis, with daily health behaviors being the outcome. Social support, self-control, and reliance on others were all found to be simultaneous partial mediators of the religiosity-health link, though some questions remain as to the causal flow between religiosity and each of these mediators. It is concluded that each of these mechanisms is related to religiosity and in turn aid in the pursuit of superior health.

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1. The Role of Self-Control, Social Support, and Reliance on Others in the Religiosity-Health Link

One of the most intriguing findings in health research within the last twenty years is the discovery that those that are religiously observant demonstrate better health than those who are not (for reviews, see Koenig, 2012; Townsend, Kladder, Ayele, & Mulligan, 2002). The list of health outcomes and behaviors that have been empirically linked to religiosity is wide-ranging and impressive. On the behavior side, religiosity – which term will be used herein synonymously with “religious observance” – is inversely associated with substance abuse (Miller, Davies, & Greenwald, 2000), smoking cigarettes (Garrusi & Nakhaee, 2012; Wallace & Forman, 1998), and risky sexual behavior (Burdette, Ellison, Hill, & Glenn, 2009; Nonnemaker, McNeely, & Blum, 2003) and positively associated with exercise (Gillum, 2006) and healthful eating (Hart, Bowen, Kuniyuki, Hannon, & Campbell, 2007). In terms of health outcomes, high religiosity predicts less cardiovascular disease (Obisesan, Livingston, Trulear, & Gillum, 2006), reduced occurrence of cancer (Dwyer, Clarke, & Miller, 1990; Kinney et al., 2003), increased immune function (Koenig et al., 1997), and – lastly and most importantly – a large decrease in overall mortality (M. McCullough, 2001).¹

¹ Religion is also positively associated with mental health across a variety of domains (Kennedy, Kelman, Thomas, & Chen, 1996; Krause, 2003; Regnerus, 2003; Trevino et al., 2010), but a discussion of such effects lies outside of the domain of the current investigation.

It is worthwhile to consider that the effects mentioned above are all based on either religious attendance or religious belief, with the bulk being related to attendance. There may be effects of non-religious spirituality on health as well, and while such research questions are of great interest, for the current investigation the focus will remain restricted to religious belief and attendance without further reference to non-religious spirituality. Additionally, the majority of the studies cited throughout this review use attendance at religious services as a proxy for the construct of religiosity, but people may go to church, synagogue, mosque, or any other place of worship for a variety of reasons; the behavior of religious attendance is likely the result of a variety of cognitive and social processes. In truth, religiousness is a multifaceted construct (Hogg, Adelman, & Blagg, 2010; Kirkpatrick, Hood, & Hartz, 1991; Noam, 1988), the subsets of which might be related to self-control – and thus to health – in unique ways. Commonly referred-to facets of religiosity are intrinsic religiosity, or the internalized motive to view and experience all aspects one’s life through the lens of religion (Allport & Ross, 1967), extrinsic religiosity, or the motive to seek religion for solace, social support, and status (Allport & Ross, 1967), and quest orientation, or the motive to seek religion as a means toward questioning, gaining, and understanding truth and the world around us (Batson & Schoenrade, 1991). These facets can be found to apply across a wide array of denominations and religious traditions, and may even be universal.

1.1 Mediation of the Religiosity-Health Link

Various mechanisms have been investigated as being central to the connection between religiosity and health outcomes, but thus far, none have been shown to completely mediate the relationship. Quite logically, foremost among the posited mediators – both in terms of amount of research and predictive power – is health behavior. A number of longitudinal studies indicate that those who attend religious services practice healthier habits such as exercising and avoiding smoking or substance abuse, and that this in turn explains a large portion of their mortality advantage (Hummer, Rogers, Nam, & LeClere, 1999; Musick, House, & Williams, 2004; Strawbridge, Cohen, Shema, & Kaplan, 1997). What is less well-established from an empirical standpoint is *why* religious persons often have healthier behaviors; in other words, what mediates the link between religiosity and health behaviors? There are several logical possibilities. In the first place, many religions teach that the body is sacred, which could naturally lead to beliefs that the body should be cared for (George, Ellison, & Larson, 2002). A number of religions promote health practices more directly, often by prohibiting harmful substances like tobacco or illegal drugs (Merrill, Hilton, & Daniels, 2003). Religious persons might also practice healthier behaviors because religious involvement provides them with role models of healthy living, reduces exposure to harmful influences, and/or enforces behavioral norms through the possibility of formal or informal social sanctions (Ellison & Levin, 1998).

1.1.1 Social Support

The effect of religion on physical health also may be partially due to the social support that people find in religious organizations. There are a number of reasons to think religious involvement provides social support. In the first place, religious activities are frequently social in nature: people attend services with others, people enjoy church-sponsored social events, and people participate in religion-based volunteering that requires interpersonal interaction. Many religions also teach the importance of caring for others, which might encourage interpersonal activities aimed at providing support. Church-based support might also be more beneficial in that it incorporates a wide variety of people (leading to larger social networks) who are likely to share values and therefore become friends and provide more support. Ellison and George (1994) provided some evidence for the idea that religious groups foster social support, finding that frequent church attenders had more non-kin ties than non-attenders, had more frequent contact with them, received a larger variety of social support, and perceived their support as being of higher quality. A recent linguistic analysis of Twitter users found that Christians talk more about social connection than atheists (Ritter, Preston, & Hernandez, 2014), and Strawbridge et al. (1997) provided longitudinal evidence that attending services once a week or more predicts more stable marriages and an increased number of social connections.

1.2 Moving Toward a Model

The relations between religiosity, health outcomes, and their mediators as covered by the existing literature are illustrated in Figure 1. The mediators of the religion-health link discussed to this point have all been social or didactic in nature, most of which are spoken of as having their origin in either social influence or social support.

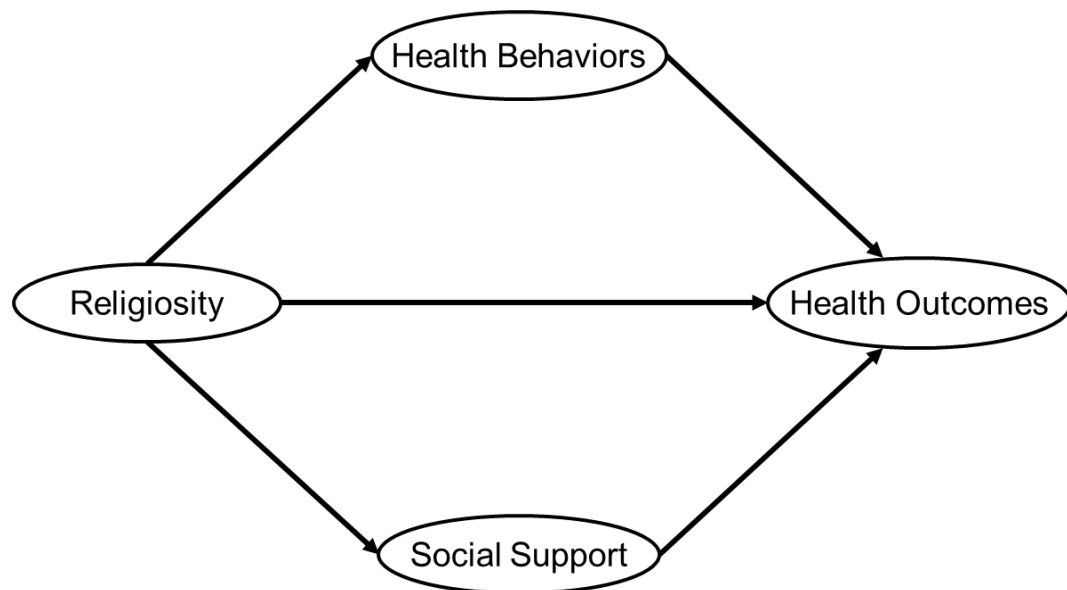


Figure 1: Mediation model based on current literature.

To date, there has not been very much debate about intrapsychic processes that might contribute to the religion-health relationship. Why, for instance, do religious practitioners smoke less than others? Is it solely because they do not wish to be seen engaging in proscribed behaviors, or is there something about the teaching and practice of religion that fosters thoughts and actions that lead to healthier choices and behaviors? Additionally, what is it about social support that creates improved health? Is it the mere

physical presence of others that impacts health, or are there social cognitive processes that become active in religious social contexts that have some bearing on health? What are the mediating processes, in other words, which explain the effects of the established mediators of the religion-health link?

1.2.1 Religion and Self-Control

Self-control seems to be an obvious candidate for such a mechanism, as it is a virtue commonly espoused in religious texts and sermons as well as being a psychological construct with well-established ties to improved health (Crescioni et al., 2011; Friese, Hofmann, & Wiers, 2011; Schroder & Schwarzer, 2005). In fact, researchers have argued that religion evolved within the development of the human race specifically in order to promote the self-control of behavior (Baumeister & Exline, 2000). There is some existing support for self-control as a mediator: four out of total of five studies that looked for a mediation effect did indeed find that self-control partially mediated the relationship between religiosity and health behaviors (M. E. McCullough & Willoughby, 2009). Another recent report concurs with these findings, showing that self-control partially mediated the effect of religiosity on drug and alcohol use in the Add Health longitudinal data set (Desmond, Ulmer, & Bader, 2013). It is important to note at this point that all of the above-mentioned studies focused solely on adolescents, and thus their conclusions lack wide generalizability; however, a study among “Bible-Belt” college students investigating the effect of religiosity on sexual behaviors likewise

found that self-control mediated religiosity's effect on the delay of onset of sexual debut (Vazsonyi & Jenkins, 2010), an important marker of health-risk for that age group.

Weatherly and Plumm (2012) found that various aspects of religiosity held independent relationships with delay discounting, a laboratory-based task in which participants express their preference for receiving some monetary or tangible goods either at full value at a specified point in the future or else a discounted portion thereof immediately. Delay discounting operates as a function of self-control – the less a person displays a preference for a discounted, immediate payout, the greater self-control he or she possesses, all else being equal (Madden & Bickel, 2010). In the work of Weatherly and Plumm (2012), participants scoring high on intrinsic religiosity displayed less of a tendency to discount (i.e., displayed greater self-control), while those who scored high on religious fundamentalism displayed more of a tendency to discount. Extrinsic religiosity held no predictive power on delay discounting in a simultaneous multiple regression, and quest orientation was not measured. This work suggests that whatever mediating power self-control has on the religiosity-health behavior relationship likely operates through the internalizing of teaching, doctrines, and religious behaviors rather than through desires for self-presentation or social acceptance. A cross-cultural investigation conceptually replicated this finding by demonstrating that intrinsic (but not extrinsic) religiosity was negatively associated with locally-relevant definitions of deviance across a variety of cultures (i.e., crime, unacceptable or dangerous sexual

activity, etc. – many of which are health-risk behaviors), and this link was partially mediated by self-control (Klanjšek, Vazsonyi, & Trejos-Castillo, 2012).

Other studies have attempted to measure religion's effect on self-control in a more experimental way. Although manipulating participants' religious adherence would be difficult to achieve and unethical besides, researchers have introduced subtle manipulations to make religious thoughts more or less salient in order to measure the causal effect of religious thought on self-control. Rounding, Lee, Jacobson, and Ji (2012) showed that though the use of self-control usually leads to a decrement in the ability to exert self-control in immediately-subsequent attempts, priming thoughts of God eliminated this diminution of self-control across a variety of self-control tasks.

One recent investigation found further (if mixed) support for the idea that religious cognitions influence self-control by demonstrating across several studies that activating the construct of God increased participants' resistance to temptations but decreased their active goal striving (Laurin, Kay, & Fitzsimons, 2012). The authors posited that salient thoughts of God increased the perception of deity as "present," leading on the one hand to an increased desire to "behave" in a religious sense, but on the other hand a decreased sense of personal responsibility to achieve one's own goals, as demonstrated by a line from a popular country song: "Jesus, take the wheel." Extending this finding on to the concept of self-control as a mediator for the religiosity-health behavior, one might expect to find that activating thoughts of God might help us

not reach for our cigarettes, but perhaps be less effective in getting us to make that overdue appointment with the cardiologist. This distinction between inhibition of impulse and initiation of positive action has begun to be recognized as an important new area for study among self-control researchers (Carver, 2010; Davisson, 2013), and may help to parse out the beneficial effects of self-control on health.

1.2.2 Reliance on Others

While the classic view of self-control is that of a powerful, self-circumscribed individual exerting the sheer force of his or her willpower to overcome any and all temptations, there is a line of research that calls such a narrative into question. It suggests that behavioral control frequently succeeds or fails because of the influential presence of the people around us as well as our thought processes about them. Fitzsimons and Finkel (2011) found that thinking of the help given by a romantic partner to achieve health goals led to less planned health activity, especially for those who had just completed a task that required self-control. In effect, participants anticipating the help of a proximate other planned to exert less effort themselves, thus “outsourcing” to their romantic partners.

While the effect in that particular study refers to the broader concept of self-regulation as it relates to planning and future events rather than in-the-moment self-control, others have found direct behavioral effects of the reliance on others on self-control. An experience sampling study focused on desire and behavior enactment found

that the presence of others in a situation involving goal conflict and desire was related to increased self-control, whereas the presence of others who had already engaged in the behavior in question was related to decreased self-control and increased behavioral enactment (Hofmann, Baumeister, Förster, & Vohs, 2012). In fact, situational factors such as the presence of others accounted for a greater proportion of the variance in behavior enactment than did personality factors. In a like manner, Walton, Cohen, Cwir, and Spencer (2012) found that when people were in the presence of someone whom they perceived as being an in-group member, they persisted longer on their experimental tasks. Although it may be argued that interpersonal reliance as described above is difficult to disentangle from behavior modification due to social expectations or self-presentational concerns, there does seem to be some subset of persons and situations that we employ as aids to our self-control or that serve as impediments to successful behavioral control.

In fact, there may be situations in which we employ others to bolster our self-control efforts even if they are not physically present. Merely thinking of someone we know can prime our thinking to favor the relevant characteristics we associate with that person, which – if we are thinking of a self-control exemplar – can lead to increased self-control performance (vanDellen & Hoyle, 2010). Interestingly, Fitzsimon and Finkel's original outsourcing study discussed above (2011) demonstrated precisely this kind of

thinking about participants' romantic partners, yet found decreased self-control rather than the improvements found by vanDellen and Hoyle (2010).

It may be that reliance on others in pursuit of self-control actually forms a part of the construct we normally consider "social support." This idea is worth exploring, given that the ultimate interest of this study is explaining the religiosity-health connection, for which social support is generally assumed to be an important mediator. What is social support? If "social support" is simply the realization or reality that we have reliable, available others to drive us to the hospital when we need and bring flowers when granddad passes away, we should not expect the construct to vary between the religious and non-religious as it does. If, however, the construct includes having exemplary others on whom we can rely – both in person and in our heads – when we need to control our health-related behavior, then the construct of reliance on others seems to fit reliably alongside or possibly even inside "social support." Analysis of the data resulting from the methods described below ought to reveal whether or not the two constructs share any variance.

1.3 The Proposed Model

In the interest of exploring the relation between religiosity and health effectively, the resources available were considered; given a relatively short time-frame and the desire to collect repeated (daily) data from a decently-sized sample, the usual health outcomes such as cancer survival, mortality rates, or even blood pressure employed in

this literature seemed inappropriate – the rate of change on such variables over a short time span is simply too small. Thus, the current study moves backward one step in the causal chain for viable outcomes and instead measures health behaviors. Religiosity serves as the primary predictor of health behavior; self-control, reliance on others, and social support are included simultaneously in the model as possible mediators, as illustrated in Figure 2.

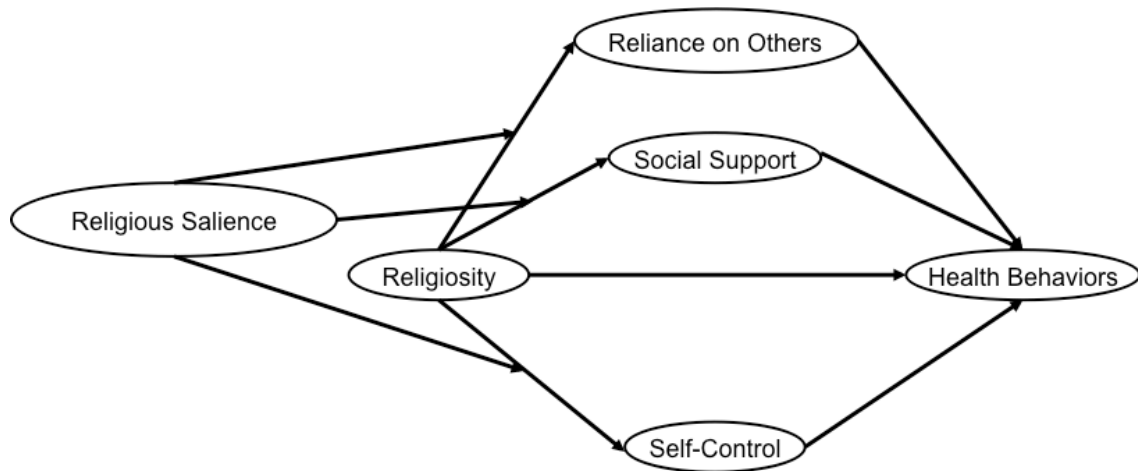


Figure 2: Moderated mediation model proposed for the current study.

This model builds upon the existing mediation studies focused on the religiosity-health link in two ways: first, by integrating multiple, separately-established mediators into a single model, and secondly, by introducing the reliance on others as a possible mediator to sit alongside – or perhaps within – the construct of social support. As can also be seen in Figure 2, the salience of religion will be manipulated to see whether it moderates the pathways between religion and the mediators.

1.4 The Current Study

In order to assess the independent effects that self-control, reliance on others, and social support have in mediating the religiosity-health link, it is important to recognize that certain types of measures may be better suited to the collection of these data than others. We as humans are famously bad at accurately judging certain aspects of our personality (Cook & Campbell, 1979) or even remembering exactly what we usually do (Schachter, 1999), meaning that the usual social-psychological method of measuring traits may garner biased data, especially for behaviors as ingrained and quotidian as gauging how we normally eat or how often we usually exercise. Measuring these behaviors on a repeated, daily basis should provide more accurate data regarding the constructs at hand. Moreover, these effects may vary both between persons and within the individual from day to day or even moment to moment based on the salience of religious cues, the presence of shared-religion vs. non-shared-religion others, etc. Daily diary studies are designed to adequately capture such within-persons variance, and the principal part of this study follows that paradigm. Participants provided baseline data on a variety of relevant psychosocial constructs during an initial intake session, and those that chose to participate further were thereafter notified via email each morning and evening with directions to complete a short survey reporting on the self-control challenges and interpersonal contacts that occurred during the preceding day; this

sequence continued for two weeks. The two parts of this study – intake session and daily diary surveys – are detailed below.

2. Method

2.1 Participants

Determining the sample size needed for adequate power in a multilevel design requires an estimation of effect size for the primary parameters of interest as well as estimated means and covariances among the variables of interest. Data from Davisson's (2013) dissertation, Dwyer et al. (1990) and Desmond et al. (2013) were used to glean the necessary correlations. Conservatively presuming small to medium effect sizes ($d = .30$) for the relationships between religiosity, self-control, reliance on others, and health behaviors, a power analysis was performed using the PiNT software (Snijders & Bosker, 1993; Snijders, Bosker, & Guldemond, 1996). A minimum of 135 individuals was indicated as the minimum desirable number needed to reliably detect the principal effects of the model. Using similar past studies as a guide, an attrition rate of 30% was expected (Boynton & Richman, 2014), so attempts were made to recruit 225 participants from the Amazon Mechanical Turk (MTurk) worker system. A qualifying survey hereafter referred to as the *intake session* was administered to 585 people, from which number all participants that qualified (which requirements are explained hereafter, $N = 235$) were sent recruitment notices. Of those persons sent recruitment materials, 112 participated in the daily diary portion of the study. Those who participated in the daily diary were significantly older ($M = 36.85$, $SD = 11.36$) than those who did not ($M = 32.97$, $SD = 10.81$), $t = -3.21$, $p = .001$. However, there were no differences in rates of participation

versus non-participation by gender, $t = 1.45, p = .15$, level of education, $F = 1.10, p = .52$, or household income, $F = 1.08, p = .63$. The attrition rate across the 14 days of participation was well within acceptable levels at 18%. Payment for the intake session was \$1.00. Those participants who agree to participate in the daily diary portion of the study were paid \$0.50 for each day's completed surveys and an additional \$3.00 for successfully completing at least 85% of their daily surveys. This bonus was offered in order to encourage compliance and minimize missing data. Payment was handled within the MTurk worker system, with all payments deposited into participants' Amazon accounts.

2.2 Procedure

2.2.1 Intake Session

Given that the primary interest in this study is to find successful mediators of the religiosity-health behavior link rather than simply reproduce said link, it seemed wise to restrict the sample for the daily-diary portion of this study to those who profess some religious attachment. The intake session is where this religiosity data was gathered, and so the session serves two purposes: first, to gather a large number of respondents from which to recruit participants for the daily diary study, and also to gather baseline data for those recruits.

Prospective participants found this intake study listed among other available tasks in the MTurk worker system. Upon providing consent, all respondents completed

the following battery of surveys, described below and included in their entirety in Appendix B.

2.2.1.1 Measures

Participants provided information on a variety of health behaviors. Eating habits (specifically how often the person eats “out”) was gauged using a matrix of checkboxes where columns represented days of the week and rows corresponded to breakfast, morning snack, lunch, afternoon snack, dinner, and late night snack. Participants were instructed to check any boxes corresponding to meals or snacks that they customarily eat at restaurants or fast food establishments, whether eating there or taking out.

Identical matrices were presented to capture the frequency with which they eat servings of both fruits and vegetables, and yet another to gather the frequency of consuming sweets or dessert. This measure is similar in function and form to the eating measure in Skoyen, Blank, Corkery, and Butler (2013), though in this instance it is adapted to habitual intake rather than reporting on a specific day. The same measure was used in the daily diary portion of this study. Reliability is excellent ($\alpha = .80$ for the current study), and the measure captures food intake with an accuracy that is acceptably comparable to more detailed food journaling (Helsel, 2006).

Participants’ exercise habits were also measured in a like manner, with a matrix of checkboxes representing days of the week on the horizontal and types of exercise on the vertical. Cardiovascular exercise, weightlifting, and physically active work/play are

the categories included. One last set of matrices was used to gather customary sleep and wake times, with columns again representing days of the week and rows being hour increments on the clock. As an example, a person might check off a bedtime of 10 PM on Thursdays and 1 AM on Fridays, etc.

Another series of health-related questions was then presented to participants that was similar in format to the above-described matrices, but rather than simple checkboxes the measure asked for numbered input from the participant for each day of the week. A series of fill-in-the-blanks prompted for customary alcohol consumption. For each day of the week, the person entered a number for how many drinks he/she normally consumes. A definition of what a standard drink is in terms of wine, beer, and hard liquor was presented alongside this question. One final series of response boxes was used to ask participants for day-specific number of hours they spend on the computer, tablet, or smartphone for leisure purposes, another for hours spent watching television, and another for hours spent sitting in any other leisure activity.

The final aspect of health information requested from respondents was that of currently experienced stress levels. The Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983) was administered to measure the global level of stress in participants' life at the current time. The 14-item scale asks participants to respond to questions such as, "In the last month, how often have you felt that you were unable to control the important things in your life?" on a five-point scale ranging from "Never" to

“Very Often.” The Perceived Stress Scale demonstrates a Cronbach’s alpha ranging from .73 to .88 across studies (.83 in the current study), and correlates moderately to other stress scales (Lee, 2012).

Trait levels of self-control were measured using the Capacity for Self-control Scale, a relatively new measure of self-control developed by Hoyle and Davisson (in press) which offers a more nuanced operationalization of self-control than the standard self-control measure that social psychology researchers have tended to use in recent years (Tangney, Baumeister, & Boone, 2004). This measure allows for more granular analysis of self-control-related variables by separating the capacity for self-control into three types or subscales: inhibition of impulses, initiation of effort, and continuation of effort. Alphas for the three subscales range from .82 to .92 (.86, .83, and .87 in the current study, respectively), and the factors, though correlated with the commonly-used Tangney et al. (2004) self-control scale in the .70 to .79 range, offer incremental prediction when scores from both measures are used to predict behaviors that require self-control.

In order to assess religiosity, participants were asked to report their level of religiosity, first with a general self-rating, and thereafter with questions prompting for frequency of attendance at religious services, personal prayer, and use of religious media such as sacred texts or religious-oriented television programming. Participants who reported any level of religiosity above “none” also completed a version of the

Revised Intrinsic/Extrinsic Religiosity Scale (Gorsuch & McPherson, 1989) that generalizes the wordings of certain items to be applicable to a variety of religions. This particular scale is desirable for the purposes of the current study as the extrinsic religiosity factor is separated into “personal benefits” and “social relationships” subfactors, which may prove useful in connection with the focus on social support and reliance on others. The alphas of the different subscales range from .62 to .88 (Gorsuch & McPherson, 1989), and this measure has been considered the gold-standard for measuring religiosity for the last twenty years. Alphas for the three subscales in the current study were .75 (intrinsic), .81 (extrinsic-personal benefits), and .77 (extrinsic-social relationships).

Measuring social support was accomplished by adapting the Perceived Social Support scale from Procidano and Heller (1983) by presenting additional contexts (the original scale only asks about family and friends) that are commonly integral to social interactions, namely work and religious group, and asking respondents to report how close they feel to the group as a whole, and how important that part of their life is. The original measure evidences a Cronbach’s alpha of .90 and a test-retest reliability of .83 (Heitzmann & Kaplan, 1988). Alpha for the current study was .80, which though lower than that of the original scale, reaches acceptable levels of reliability given the adaptation of the source measure.

Measuring the tendency to rely on others is slightly problematic in that the existing literature (which refers to the phenomenon as “outsourcing”) generally views it as a phenomenon that occurs when a certain set of conditions are fulfilled rather than as a personality construct that can be measured and that may vary between persons. However, drawing from materials from Fitzsimons’s (2014) unpublished study of outsourcing, a small set of statements were adapted to assess participants’ likelihood of engaging in interpersonal reliance in pursuit of self-control success. Respondents were asked to rate their agreement with statements such as, “I would like to rely on the people around me more for help with my goals” and “I would be excited if the important people in my life wanted to share in my goals.” Cronbach’s alpha for the current study was .76. Interestingly, these items are quite similar in content to the partner influence measure in Skoyen et al. (2013), though the author does not provide psychometric data for the items.

The final section of the intake survey collected relevant demographic data: time zone (used to time signals in the daily diary portion of the study), age, education level, income level, marital status, and religious identification. At the end of the intake session participants who rated themselves with any level of religious involvement other than “none” were allowed to indicate their interest in participating in the daily diary portion of the study. Those respondents who did not qualify for continuation were instead directed immediately to debriefing materials and the end of the survey session.

Because MTurk workers are primarily accustomed to “one-and-done” studies, the ongoing nature of the diary study was explicitly made clear. They provided their consent for the diary study as well as an email address for daily communications. The start date of the daily diary portion was the same for all participants and occurred within one week of the completion of the intake study.

2.2.2 Daily Diary

There were two parts within the daily diary component of the study. The first and most important part from a data-collection standpoint was the nightly signal that contained a link to the end-of-day survey. The signals were sent at 8 PM in the participant’s local time with instructions to complete the survey as close to bedtime as possible. In order to minimize the number of missed surveys and the resulting missing data, participants were reminded each day that completing at least 85% of the daily surveys qualified them for a monetary bonus above and beyond the agreed-upon pay for the study, as discussed above.

2.2.2.1 Measures

Health behaviors were assessed in a similar fashion to the intake session, but only for the day that was currently ending for the participant. Measuring the day’s eating behavior again consisted of a matrix of checkboxes, though in this case the meals (breakfast, morning snack, lunch, afternoon snack, dinner, late snack) were listed as columns, while the rows asked the participant to check the box if they agreed with the

following statements about each meal: "I ate take-out/restaurant food/ fast food for this meal," "I ate fruit with this meal," "I ate vegetables with this meal," "I ate sweets or dessert with this meal," and "I feel like I ate too much."

Exercise was gauged at the daily level by prompting the respondent to enter the number of minutes they spent that day in three separate categories: cardiovascular exercise, weight lifting, and physically active work/play. Similarly, participants were asked to report the number of alcoholic drinks they had, how many hours they spent on the computer/tablet/smartphone, watching television, and total estimated hours sitting in leisure. Daily stress level was measured by asking the participant to rate how stressed they felt that day.

After that, participants were asked to think back over the day and identify a moment in which they felt they had to exert themselves either to avoid a temptation or do something they knew they ought to do. They were asked to describe the situation in a brief sentence and rate both how important the goal involved was to them and how successful they feel they were at controlling their behavior. They then answered whether or not they were with someone else at the time (excluding incidental or superficial interaction partners, e.g., cashier, other customers in a store). Respondents then rated how much they felt that person helped them achieve their goal during that episode of temptation or exertion. In a separate question they also rated how much they felt the person hindered them from achieving that goal.

As discussed earlier, reliance on others can occur even in the absence of an interaction partner (vanDellen & Hoyle, 2010). In light of this possibility, participants were asked to consider the self-control episode they identified and try to recall whether or not anyone came to mind during the experience. In the case that such thinking occurred, the same questions described above for a physically-present interaction partner were adapted to probe the characteristics of the thought-of person: how much did thinking of that person help you exert self-control? How much did those thoughts hinder self-control? These questions were interspersed with similar questions asking whether thoughts of the person affected their mood, their outlook, and their thought processes in order to avoid alerting participants to the central thrust of the research question and creating unnecessary demand characteristics. This is doubly important in this particular case, as much of the previous work in this area has involved nonconscious primes and processes (Dalton & Chartrand, 2007; Shah, 2003).

Social support was gauged by prompting participants to rate how connected they felt that day in general to their friends and the people in their work, family, and religious life, as well as whether or not they spoke with anyone from those contexts that day. The daily level of the respondent's religious attachment was measured by a series of questions asking them to rate how connected they felt to God that day, whether or not they prayed, whether they attended any religious meetings or activities, and whether they interacted with anyone that shares their religious beliefs. These questions marked

the end of the daily survey, and the each session concluded with a reminder to check for an email in the morning within a half an hour of waking.

The second daily signal for the diary study was sent to participants at 5 AM in their own local time. The email signal contained a link to a very short survey that began by asking the person to record their bedtime the night before, the time at which they awoke, and a rating of the quality of their sleep. The primary purpose of the morning signal, however, was to introduce a salience manipulation. On seven randomly assigned days participants were asked to spend three minutes in silence thinking about their relationship with God and reflecting on their own level of religious engagement. The questionnaire page containing this instruction contained a visible timer, but they were not allowed to proceed until they had spent three minutes in quiet reflection.

The other seven morning surveys of the fourteen-day study contained instructions for a control condition in which they spent three minutes quietly reflecting on the day ahead and their relationship with the people around them. Every participant completed both conditions of this salience manipulation on matching days of the week with the order of the conditions counterbalanced across participants. Days of the week were matched for the two condition to avoid the very real prospect of day-of-the-week effects – people responding differently on a variety of constructs on a Saturday as opposed to a Tuesday, for example – which demands that the manipulation be held constant in order to compare days of the week directly across conditions. At the

conclusion of the manipulation, participants completed the survey and were reminded to check for the evening signal before bed.

2.3 Analysis

The research question of primary importance in this study is whether self-control, reliance on others, and social support function as independent simultaneous mediators of the religiosity-health link. Secondary to that is the question of whether day-to-day religious salience moderates the religiosity-health relationship or the mediation paths. The nature of those two questions, each of which has significance to the advancement of the research literature independent of the other, led to the decision to create a standard one-level mediation model to address the first question, essentially replicating past mediation studies and attempting to fit all three mediators in a single model using the broadest sample possible (from the intake session data), and then move to a multilevel moderated multiple mediation model to approach the second question while simultaneously taking advantage of the possibly-more-accurate daily data.

The single-level mediation question was handled using a macro created for SAS 9.3 called PROCESS (Hayes, 2013). As mentioned above, a mediation model using the intake session data was created, with religiosity as the independent variable, customary health behaviors as the outcome, and self-control, tendency to outsource, and perceived social support as simultaneous mediators. Health behavior questions were aggregated to create a health-behavior outcome variable. The eating variables aggregate to a sum of

the reported instances of that type of eating in the intake session; fast-food eating and treats consumption were reverse-scored and the three matrix sums were averaged to create a single eating variable so that food input did not weigh more heavily (so to speak) than other health variables. Likewise, sitting, TV watching, and computer use sums were combined to create a single inactivity score, which was subtracted from the sum of the exercise questions. While difference scores are not generally the preferred way to aggregate scores of opposing sign (Edwards, 2001), in this instance it was deemed appropriate due to the net positive and negative effects on health from strenuous movement and inactivity. Eating, movement, sleeping, and stress scores were all equally weighted, while the level of alcoholic drinks were weighted so that an average number of drinks per day beyond three contributed an equal amount as overeating for a single meal, getting one hour of sleep less than seven, or sitting at leisure for an extra hour. These scores were then all combined to create a single health score. This sort of aggregation across health domains is not commonly done; generally researchers focus on one domain or another or use multivariate-outcome statistical methods. Creating a single health-behavior score, however, imparts a face validity that these other options lack – our daily decisions in the real world do aggregate to form some net positive or negative contribution to our overall health.

An exploratory factor analysis of the components of this aggregate health outcome supported this decision. The initial analysis suggested the presence of three

factors (as shown both by a moderate “elbow” in the scree plot at 3 factors as well as only having three factors with eigenvalues greater than 1. All items showed primary factor loadings of at least .30 and were all subsequently retained. The final factor analysis therefore restricted the number of factors to three and employed a varimax rotation. Factors split neatly into consumption (food and alcohol), activity, and inactivity (including sleep), with the sole exception of cardiovascular exercise, which displayed cross-loadings on both the consumption and activity factors. The full list of factor loadings can be seen in Table 1.

Table 1: Factor loadings for aggregate health behavior outcome.

	Factor 1 Inactivity	Factor 2 Activity	Factor 3 Consumption
Sleep quality	.75	.03	-.01
Sleep hours	.69	-.01	.02
Smartphone use	.43	.01	.03
Computer use	.39	.12	.04
Other sit relax	.37	.09	.00
TV watching	.30	-.04	-.13
Weights	-.03	.66	.11
Active Play	-.06	.59	.01
Cardio	.08	.44	.32
Fast food	-.03	.16	.51
Fruit & veg	-.01	-.07	.46
Treat eating	.00	.09	.45
Overeating	.08	-.06	.39
Alcoholic drinks	.03	.08	.32

Religiosity scores were calculated by summing religious self-rating, frequency of worship attendance, frequency of prayer, and frequency of religious media consumption. Self-control scores were taken from the sum of the Capacity for Self-

Control Scale (Hoyle & Davisson, in press), and social support was measured by the sum of the Perceived Social Support Scale (Procidano & Heller, 1983) across domains.

The PROCESS macro estimates the direct and specific indirect effects of the independent variable on the outcome through each of the proposed mediators and also provides bootstrapped confidence intervals for each pathway parameter. While normal theory statistical tests are also provided, these rely on an unrealistic assumption of normality for the sampling distribution of each specific indirect effect, making bootstrapped confidence intervals the more accurate method for assessing the difference of each parameter from zero. SAS code and output for the proposed mediation analysis can be found in Appendix A.

Adding the moderation implicit in the religious salience manipulation to the model found in Figure 2 moves the analysis to a multilevel moderated mediation as discussed by Lachowicz, Sterba, and Preacher (2015) which allows us to employ the daily diary data in order to assess the impact of day-to-day religious salience on each individual's relationship between religiosity and health behavior. Health scores were created in an identical manner to the aggregation described above for the mediation analysis, but using daily data instead of intake session data. The intraclass correlation of this outcome variable must be obtained in order to determine whether substantial variability exists within persons – that is, do individuals vary in their health behaviors from day to day compared to how much different people vary in their health behaviors

on average? If significant within-person variability does appear in the outcome variable, multilevel moderated mediation is the proper analysis. Conceptually, it seemed most likely that the effect of religious salience would operate on the relationship between religiosity and the mediators (as seen in Figure 2) rather than the paths between the mediators and health. MPlus 7 was used to estimate this model; code and selected output demonstrating the analysis is included in Appendix A.

Daily health behavior outcomes were computed in an identical manner to the one for intake data. Daily religiosity was computed as an aggregate of all religious behavior variables (prayer, talking about religion, etc.). Self-control scores were generated by taking the product of the severity of the day's reported instance of self-control and the rating of self-control success for that instance. Reliance on others was calculated as the incidence of thinking or not thinking of another person (whether present or absent) in a given instance of self-control (0 for no, 1 for yes) multiplied by the rated utility of that reliance. Social support was calculated as the sum of ratings of support across all life contexts for that day. Group-mean-centered terms were generated for religiosity as well as for the three mediators to isolate the day-level effects of each mediator in its own model. The grand-mean-centered mean score for each individual across days was produced to test between-person differences.

Random slopes for religiosity and each of the mediators were estimated and, as described for the previous model, the direct effect of religiosity as well as its indirect

effect through the included mediator on daily health behavior was then estimated. Bootstrapped confidence intervals were created for each parameter; the absence of zero in each interval indicates that the path associated with that parameter is significant. Of primary interest is the parameter for the religious salience moderator, which reflects whether religious salience moderates the path between daily religiosity and the mediator included in that particular model.

3. Results

3.1 Intake Data Analysis

Religiosity was a significant predictor of health behavior in the intake session, $b = 2.39$ ($t = 6.86, p < .001$). Mediators of the relationship between religiosity and health behaviors were then examined. Perceived social support did not mediate the religiosity-health relationship; the indirect effect was not significantly different from zero at a value of -0.02 . Bootstrap procedures provided a 95% confidence interval ranging from -0.12 to 0.02 . Self-control did serve as a significant mediator, with an indirect effect of 0.13 ; its bootstrapped 95% confidence interval ranged from 0.03 to 0.31 . Likewise, the tendency to rely on others served as a significant mediator of the religiosity-health behavior relationship, with an indirect effect of 0.10 ; its bootstrapped 95% confidence interval was from 0.05 to 0.15 . The direct effect of religiosity on health behavior remained significant at 1.48 ($t = 5.20, p < .001$) but reduced from its total effect of 2.39 , indicating the mediating effect of both self-control and the tendency to rely on others. See Table 2 for the correlations between the variables involved. SAS code and output can be seen in Appendix A.

Table 2: Correlations among variables for intake session data.

	1	2	3	4
1. Religiosity	-			
2. Social Support	-.05	-		
3. Self-Control	.11**	-.37***	-	
4. Rely on Others	.33***	-.08	.01	-
5. Total Health	.31***	-.03	.19***	.09*

Note. * = $p < .05$, ** = $p < .01$, *** = $p < .001$

3.2 Multilevel Mediation from Daily Reports

The correlations among variables for the daily data are reported in Table 3. As is usual for multilevel models, first an “empty” model was computed in which no predictors were entered but the intercept was allowed to vary along the clustering variable – in this case, individuals. This allows us to get a rough gauge of how much variability exists from day to day within persons, and how much exists between persons. In the current data set, the aggregated health outcome was found to have an intraclass correlation of .50, strongly suggesting that variability exists at both the day- and person-levels, thus indicating that a multilevel modeling approach is the most appropriate.

Table 3: Correlations among variables for daily diary data.

	1	2	3	4	5
1. Aggregate Health	-				
2. Day Religiosity	.18***	-			
3. Day Self-Control	.11**	.23***	-		
4. Day Social Support	.24***	.64***	.33***	-	
5. Day Rely on Others	.03	.12***	.13***	.15***	-
6. Condition	.02	-.01	.02	.02	.01

Note. ** = $p < .01$, *** = $p < .001$

As mentioned above, though substantive and interesting questions might be asked of the data at the day level, the hypotheses outlined in this investigation focus on between-person questions, and the reporting of results is thus focused on the level-2 effects. It bears mentioning as well that though henceforth certain variables are spoken of as “predicting” others, all analyses of the daily data were performed comparing the levels of one construct on a certain day to other constructs on the same day, and thus the relationships suggested by these analyses cannot be considered causal in nature. The sole exception to this caveat is the religious salience manipulation, which, since it was delivered soon after waking, can be assumed to predate and thus influence the levels of the other constructs measured throughout that day. Though all effects reported below are between-persons effects (level-2), let it be noted that significant variability in slope (day-to-day variation within persons) was found for the relationship between religious adherence and self-control (residual variance = 14.62, $p < .001$) and the relationship between religious adherence and social support ($r.v. = 3.22, p < .01$) but not for the link between religious adherence and reliance on others ($r.v. = .31, p = .42$), nor for any of the paths from these three mediators to health behavior. The primary question of interest related to this model was the manipulation of religious salience, which did not significantly predict any of the intra-person variability in mediation paths.

Daily religious adherence was a significant predictor of same day health behavior, $b = .34, p < .01, 95\% CI = .23$ to $.45$. In the presence of all three mediators

(perceived social support, self-control, and reliance on others), the direct effect of religious adherence on health behavior was smaller but still significant, $c' = .24$, $p = .01$, 95% CI = .09 to .39, suggesting possible partial mediation in accordance with the intake analyses. The indirect effect of reliance of others appeared to have the strongest mediating impact with a coefficient of .11, $p < .01$, 95% CI = .07 to .15. The indirect effect of self-control was also significant at .08, $p < .01$, 95% CI = .03 to .13, as was the indirect effect of perceived social support at .05, $p < .05$, 95% CI = .01 to .09. See Figure 3 for a visual representation of this entire model.

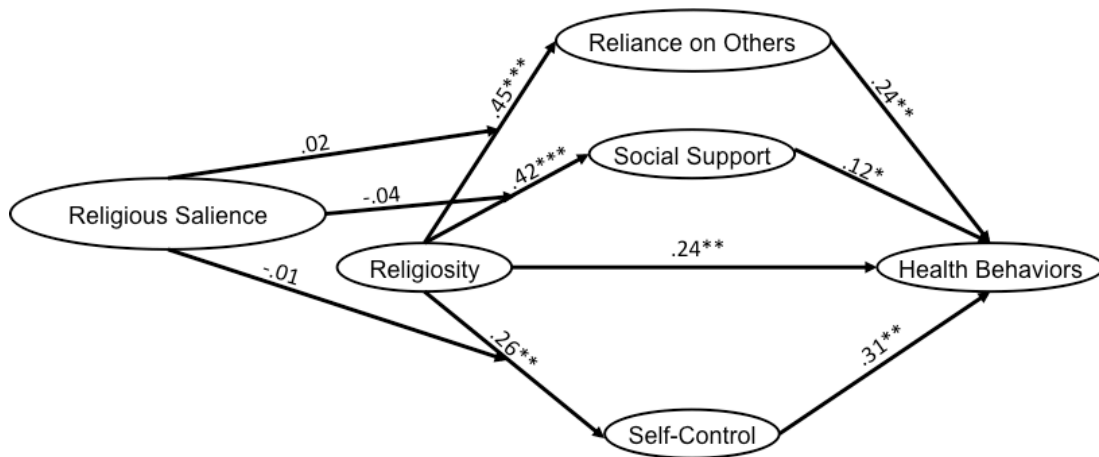


Figure 3: Multilevel mediation model based on daily diary data.

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

Plainly said, on average, participants who were more religiously adherent during the two weeks of data collection relied more on others, and those who relied more on others than their peers engaged in healthier behaviors during that period in the observed domains. Likewise, participants with higher religious adherence demonstrated higher levels of self-control success (though variability exists in this relationship), and

those who had greater self-control success enacted healthier behaviors than others.

Lastly, more religiously-adherent participants demonstrated higher levels of perceived social support (again, variability exists in this relationship), and those with more perceived social support engaged in healthier behaviors on average than did their peers who perceived less social support. These three variables together explain some part of the religiosity-health behavior relationship, but not all of it.

4. Discussion

The existing literature on mediators of the religiosity-health relationship is supported and extended by the current findings. The intake data analysis comes closest to replicating the findings of previous researchers by providing additional support for the mediating effect of self-control (Desmond et al., 2013; M. E. McCullough & Willoughby, 2009) and introduces for the first time the possibility that reliance on others may also function as a mediator of this relationship.

It is interesting that the mediator most firmly established in the literature, social support (Ellison & George, 1994; Ritter et al., 2014), did not mediate the religiosity-health behavior link in our first model. Even the most basic relationship seems absent among the observed variables for this path from the intake session. Yet such is not the case for the daily data, where social support serves as a partial mediator as expected. It appears, then, that some aspect of the alterations made to the Perceived Social Support Scale (Procidano & Heller, 1983) for the purposes of fitting it to the present study may have altered its composition in a way that made it unsuitable as a mediator.

It may also be the case that the mediation of social support in the religiosity-health relationship found in past studies is not present in this study because of the presence of reliance on others as a significant mediator. As discussed above, it is an open question as to whether reliance on others is actually a subset of social support rather than an independent predictor. The construct of reliance on others, as referenced

throughout this study, is understood to be the utilization of another person's presence or thoughts of that person with the aim of either helping oneself behave well or providing justification for behaving poorly (Laurin et al., 2012; vanDellen & Hoyle, 2010). This could include but is not limited to interaction with, encouragement by, or intervention from this person. Alternatively, it could be as simple as remembering that one friend who was able to run that extra mile when you weren't, thus shaping your response to whatever relevant stimulus is at hand. This construct shares significant overlap with two subsets of social support commonly referred to as emotional support (Langford, Bowsher, Maloney, & Lillis, 1997; Wills, 1991) and instrumental support (Heaney & Israel, 2008; Langford et al., 1997) while not fitting neatly into either. Both of these subsets of social support are treated as external sources of aid, the presence of which is related to improved health (Uchino, 2004), while reliance on others is an intrapsychic reaction to those sources of aid. In truth, there is insufficient consensus as to the definition of social support (Uchino, 2006) to either include or exclude reliance on others *a priori*. The idea that including reliance on others as a mediator in the intake session analysis "threw out" the mediation of social support, while somewhat plausible, is not entirely supported by the data at hand, as there exists in the intake session data a marginally significant negative correlation between social support and reliance on others, meaning that those with higher levels of perceived social support were *less* likely to report depending on others. This lacks face validity; in all aspects, the social support

variable from the intake session did not perform as expected, possibly due to measurement error.

Despite the lack of evidence for social support as a significant mediator, this first analysis yields encouraging results in that multiple simultaneous partial mediators of the religiosity-health relationship are shown to function in a model similar to those that other researchers have used, replicating previous findings and extending them by introducing reliance on others as a partial mediator alongside self-control. It appears that not only does relying on others help us exert self-control and be our best selves (Hofmann et al., 2012; Walton et al., 2012), but that effect then translates best into good health behaviors when a person is consciously religiously adherent.

The model from the daily reports is more novel in nature, and yet it shows a structure more in line with the existing literature than the prior, simpler model. Here, all three mediators – self-control, social support, and reliance on others – partially mediate the religiosity-health behavior link, as hypothesized for this study. It seems likely that the day-to-day reporting of unremarkable health behaviors such as eating your vegetables and watching less TV leads to a more accurate assessment of those behaviors (Helsel, 2006; Skoyen et al., 2013) as well as a better view of how they are influenced by the minor fluctuations of the explanatory variables. Given the transitory nature of these behaviors and their long-term minute-but-additive effect on health outcomes such as mortality and the development of serious disease (Ou et al., 2012; Plunk,

Syed-Mohammed, Cavazos-Rehg, Bierut, & Grucza, 2014; Ukawa, Tamakoshi, Wakai, & Kurozawa, 2014), the daily diary study seems to have the proper level of granularity to capture their effect.

The lack of the hypothesized moderating effect of religious salience (which was not correlated with any single other variable in the data set) runs counter to past research (Laurin et al., 2012) and is quite likely due to an ineffective manipulation more than any actual lack of effect. The remote, computer-aided administration of that manipulation as necessitated by the use of the MTurk system allowed for unacceptable variability in its application. Participants were asked to focus for three minutes either on their relationship with God or else on what they planned to do that day, and were unable to finish the survey until three minutes had elapsed. However, without any supervision, all that can be known is that three minutes elapsed. The participants may have concentrated as requested, but they could have just as easily been in the other room brushing their teeth, or talking on the phone, or any other number of activities that would necessarily attenuate any increase in religious salience induced through this manipulation. Even in the case of perfect compliance, no evidence exists that three minutes of reflection in this context is sufficient to affect a person's cognitions throughout the rest of the day. Simply put, it was a weak manipulation. The desire to minimize the length of the daily surveys and not overtax the goodwill of participants in order to increase completion rates led to the creation of the protocol used, but in

subsequent iterations of this work that decision will need to be revisited. It is also possible that asking people to consider their relationship with God (the experimental condition) produced similar cognitions to asking people to consider their relationships at large (the control condition) in that both are active considerations, and they are not necessarily mutually exclusive. Lastly, the lack of moderation could be due to the possibility that neither condition had enough impact on participants to raise the level of contemplation above the base rate existing in the population on a daily basis.

4.1 Limitations

The findings from this study are in accordance with past research and generalizable to the general population only insofar as the sample studied is representative of that population. Although this sample was quite diverse in age, income, and ethnic background, questions persist about the generalizability of studies performed using the MTurk worker system. MTurk workers do tend to be more educated than the average populace, but in many important respects do not differ (Paolacci & Chandler, 2014). Some researchers are also concerned that remote computer administration of psychological measures such as is done in the MTurk system necessarily leads to degradation in the quality of data collected (Rouse, 2015), while others find no evidence of such effects (Azzam & Jacobson, 2013; Casler, Bickel, & Hackett, 2013). The MTurk population at large is primarily urban, racially diverse, computer-literate, well-educated, and less religious on the whole than the general

population of the United States (Berinsky, Huber, & Lenz, 2012). This characterization, it should be noted, holds true only for the intake session part of this study; the daily diary participants were a subset thereof chosen for their religious adherence. As such, the generalizability of the results found herein is limited to urban, educated, religious Americans due to the unique makeup of the sample chosen.

The other important limitation to this study is the untested outcome measure based on an aggregation of a variety of health behaviors. The justification for choosing this measure is discussed above, and the findings of the study – well in line with the findings of other researchers employing more standard outcomes (Ellison & George, 1994; M. E. McCullough & Willoughby, 2009) – suggest that this aggregate outcome functions as it ought to. While some might suggest that employing statistical methods that allow for multivariate outcomes would strengthen the findings of the current study (Hidalgo & Goodman, 2013; Schervish, 1987), but the primary utility of such an approach lies in its ability to unpack differential predictions for a variety of outcomes. In the case of the current study, the extant literature did not suggest different relationships between the predictors/mediators and the various health behaviors measured (Crescioni et al., 2011; Klanjšek et al., 2012; Strawbridge et al., 1997), so no advantage existed in using multivariate statistical methods over the chosen path of creating an aggregate health outcome. If future research focuses on constructs for which differential predictions for individual health outcomes – for example, if one chose to investigate

whether the negative effects of religious fundamentalism on self-control extend through to a negative impact on health behavior (Weatherly & Plumm, 2012) while simultaneously modeling the known positive effects of religiosity on health behavior – then such work should likely employ a multivariate approach.

The last and perhaps most important limitation of the current study is the fact that neither of the models presented herein allow for a rigorous test of causal inference. An attempt to introduce causality into the daily diary model was made using the manipulation of religious salience, but as mentioned, that manipulation was ineffective, reducing the model to what is essentially a fancy correlational design. While this situation is not ideal for any work that seeks to be a definitive declaration of a certain phenomenon, one might argue that the work at hand represents more of an initial foray into new territory for the mediating constructs, making a correlational design more of an acceptable choice (Myers & Hansen, 2002). Now that there is evidence suggesting that the relationships exist in the manner proposed, other designs capable of testing causality should be employed.

4.2 Future Directions

For future work following on from this study, the question of causality is of primary importance. While the pathways posited treat social support, reliance on others, and self-control as downstream mediators of the religiosity-health link, meaning that religiosity causes changes in the levels of those three constructs, which in turn cause

changes in health behaviors, one could just as easily suppose in the face of the current findings that changes in reliance on others (or in either of the other mediators) causes changes in religiosity, which then leads to changes in health behavior. In that scenario, religiosity would be the mediator, which would still be consistent with findings of increased health for those who are more religiously adherent (Kinney et al., 2003; Koenig et al., 1997; M. McCullough, 2001; Strawbridge et al., 1997). Utilizing experimental methods is recommended; employing an efficacious manipulation of levels of religiosity would be the most direct path to confirming that the pathways seen in Figure 3 are indeed causal. Given that manipulating a person's level of religiosity might be difficult or even unethical in some circumstances, manipulating any one or all three of the mediators could be a viable path to determining the flow of causality.

As interesting and useful as the current study is in advancing the state of our understanding of the interrelations among religiosity, self-control, social support, reliance on others, and health behaviors, the fact remains that the mediators studied are only *partial* mediators. Although its predictive power is reduced in the presence of the three mediators discussed here, religiosity still significantly predicts health behavior in the presence of these explanatory variables. Others exist to be found and studied. Indeed, given the centrality of religious beliefs for those who are religiously adherent, and its predictive power on a wide range of behaviors (Craigie, Larson, & Liu, 1990; Larson et al., 1990; Levin & Vanderpool, 1987), it seems almost facile to expect that a

small number of mechanisms might be sufficient to explain the effect of religiosity on health. An open-ended linguistic study in which religious participants were asked about why they try to be healthy and how they do it might reveal other commonalities that could serve as additional mediating structures in the religiosity-health relationship.

Also, more work needs to be done to parse out the mechanism by which the reliance on others affects health behavior. The current study did not ask participants to specify who they were thinking of or looking to during a self-control crisis, only whether they did. Thinking of exemplars can be helpful (Hofmann et al., 2012), but certain other people – whether present or thought of – can hamper our efforts (Fitzsimons & Finkel, 2011; vanDellen & Hoyle, 2010). Who, then, are religious individuals relying on that helps them be healthier from day to day (if, indeed, the flow of causality runs from religiosity to reliance on others)? Is it God and how they view deity? Is it thoughts of their religious community? A deeper look at this phenomenon is needed.

In sum, the findings from this study lead to the conclusion that self-control, social support, and reliance on others operate independently as partial mediators of the relationship between religiosity and health behaviors. In a time when religious adherence is often looked at with skepticism and disdain, it behooves those interested in improving the health and well-being of society to hold religiosity forth as one possible avenue toward improved health and to explore the mechanisms by which that process

functions. This study is bent toward that aim, and hopefully it will inspire other investigations in the future.

Appendix A

Selected SAS code and output for intake session mediation model

*multiple mediation model from intake data;

```
libname dissert 'C:\Users\Cameron\Google Drive\Hoyle lab\dissertation';
```

```
data start;
```

```
set dissert.intakemerge;
```

```
run;
```

```
proc print data = start (obs=50);
```

```
run;
```

*need to create agg health variable. Sum all vars? Neg vars need neg sign. Calc sleep

vars as deviation from 8 hrs;

*should vars have equal weight? Maybe I should make multiple health domain variables

in addition to total;

*Eat var, sleep var, exer var (use leisure vars as neg addition to sum), alc var, stress var;

*weight all health vars by stress? Stress multiplies other neg health effects, so high stress

combined with;

*low health risk is equal in negative effect to low stress with higher health risk;


```

data start;

set start;

EatHealthScore = (FF_Intake_Tot * -1) + FruitVeg_Intake_Tot + (Treats_Intake_Tot * -1);

*to integrate leisure vars with exer vars, I'm taking total leisure as a percentage of 24
hours and reducing summed exer vars by that percentage;

MoveHealthScore = ((LeisureComp_Intake + LeisureTV_Intake + LeisureSit_Intake)/24) *
(CVexer_Intake_Tot + Weights_Intake_Tot + WorkPlay_Intake_Tot);

*sleep total taken as deviation from 8 hrs multiplied by sleep quality and how rested
they are (with quality and rest ;

*reverse-scored for those below 8 hrs so worse sleep quality and rest leads to more
extreme negative scores);

if (SleepAll_Avg - 8) < 0
    then SleepHealthScore = (SleepAll_Avg - 8) * (6-SleepQual) * (6-SleepRest);

if (SleepAll_Avg - 8) >= 0
    then SleepHealthScore = ((SleepAll_Avg - 8)+1) * SleepQual * SleepRest;

run;

proc means data = start;

```

```

var EatHealthScore MoveHealthScore SleepHealthScore Alc_Intake_Tot
PStress_Intake_Tot;

run;

```

```

/*          N      Mean      StdDev      Min      Max
-----
EatHealthScore   508 -0.7303150  11.5131391 -53.0000000  33.0000000
MoveHealthScore  499  1.9563293   1.8420075   0          12.2500000
SleepHealthScore 503 -2.7270662  20.3955249 -82.1428571  80.0000000
Alc_Intake_Tot   508  5.3858268   9.1291822   0          56.0000000
PStress_Intake_Tot 508 25.8228346  7.7858486  10.0000000  50.0000000

```

```
*/
```

```
*-----;
```

*seems reasonable to give eating, moving, and sleeping equal weight in an overall health score; so need to rescale these 3 to have the same range;

*alc intake seems like it ought to have less weight (half as much?) than any of these others; it also needs to be reverse scored - more drinking is a lower score;

*stress should be a multiplier;

```
*-----;
```

*rescale health variables;

```

data start2;

set start;

zEatHealth = EatHealthScore;

zMoveHealth = MoveHealthScore;

zSleepHealth = SleepHealthScore;

run;

proc standard data = start2 mean=0 std=1 out=zstart;

var zEatHealth zMoveHealth zSleepHealth;

run;

proc means data=zstart;

run;

data zstart;

set zstart;

TotalHealth = (zEatHealth + zMoveHealth + zSleepHealth + ((Alc_Intake_Tot/10)*-1)) *

(PStress_Intake_Tot - 9);

run;

```

```
%process (data=newrun, vars = IntRel_meancent SocSupp_meancent SC_meancent  
RelyOthers_meancent TotalHealth, y=TotalHealth, x=IntRel_meancent,  
m=SocSupp_meancent SC_meancent RelyOthers_meancent, boot=10000, total=1,  
contrast=1, model=4);
```

***** PROCESS Procedure for SAS Release 2.13 *****

Written by Andrew F. Hayes, Ph.D. <http://www.afhayes.com>

Documentation available in Hayes (2013). www.guilford.com/p/hayes3

Model and Variables

Model = 4

Y = TOTALHEALTH

X = RELIG_MEANCENT

M1 = SOCSUPP_MEANCENT

M2 = SC_MEANCENT

M3 = RELYOTHERS_MEANCENT

Sample size:

495

Outcome: SOCSUPP_MEANCENT

Model Summary

R	R-sq	MSE	F	df1	df2	p
0.0581	0.0034	328.7544	1.6697	1.0000	493.0000	0.1969

Model

	coeff	se	t	p	LLCI	ULCI
Constant	0.0716	0.8150	-0.0879	0.9300	-1.6728	1.5296
RELIG_MEANCENT	-0.2132	0.1650	-1.2922	0.1969	-0.5373	0.1110

Outcome: SC_MEANCENT

Model Summary

R	R-sq	MSE	F	df1	df2	p
0.1020	0.0104	0.5488	5.1807	1.0000	493.0000	0.0233

Model

	coeff	se	t	p	LLCI	ULCI
Constant	0.0056	0.0333	0.1675	0.8671	-0.0598	0.0710
RELIG_MEANCENT	0.0153	0.0067	2.2761	0.0233	0.0021	0.0286

Outcome: RELYOTHERS_MEANCENT

Model Summary

R	R-sq	MSE	F	df1	df2	p
0.2181	0.0476	166.3203	39.4722	1.0000	493.0000	0.0008

Model

	coeff	se	t	p	LLCI	ULCI
Constant	-0.1218	0.6910	-0.1763	0.8601	-1.4794	1.2358
RELIG_MEANCENT	0.5786	0.1399	4.7118	0.0008	0.3038	0.8535

Outcome: TOTALHEALTH

Model Summary

R	R-sq	MSE	F	df1	df2	p
0.3692	0.1363	1442.6077	15.8865	4.0000	490.0000	0.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	-8.2006	1.7073	-4.8033	0.0000	-11.5551	-4.8461
SOCSUPP_MEANCENT	0.0765	0.1018	0.7518	0.4525	-0.1234	0.2765
SC_MEANCENT	8.3925	2.4865	3.3752	0.0008	3.5070	13.2781
RELYOTHERS_MEANCENT	0.4749	0.1117	1.9742	0.0347	0.2245	0.7146
RELIG_MEANCENT	1.4827	0.3679	5.2044	0.0000	0.8598	2.2056

***** TOTAL EFFECT MODEL *****

Outcome: TOTALHEALTH

Model Summary

R	R-sq	MSE	F	df1	df2	p
0.2950	0.0870	1468.1275	46.9934	1.0000	493.0000	0.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	-8.1587	1.7222	-4.7373	0.0000	-11.5425	-4.7749
RELIG_MEANCENT	2.3898	0.3486	6.8552	0.0000	1.7049	3.0748

***** TOTAL, DIRECT AND INDIRECT EFFECTS *****

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
2.3898	0.3486	6.8552	0.0000	1.7049	3.0748

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
1.4827	0.3679	5.2044	0.0000	0.8598	2.2056

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
TOTAL	0.1571	0.1326	-0.0904	0.4303
SOCSUPP_MEANCENT	-0.0163	0.0290	-0.1218	0.0155
SC_MEANCENT	0.1287	0.0696	0.0246	0.3070

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RELYOTHERS_MEANCENT	0.0553	0.1175	-0.1829	0.2798
(C1)	-0.1451	0.0832	-0.3736	-0.0255
(C2)	-0.0110	0.1220	-0.2627	0.2203
(C3)	0.1341	0.1383	-0.1251	0.4192

Specific indirect effect contrast definitions

	COL1	COL2	COL3
(C1)	SOCSUPP_MEANCENT	minus	SC_MEANCENT
(C2)	SOCSUPP_MEANCENT	minus	RELYOTHERS_MEANCENT
(C3)	SC_MEANCENT	minus	RELYOTHERS_MEANCENT

***** ANALYSIS NOTES AND WARNINGS *****

**Number of bootstrap
samples for bias
corrected bootstrap
confidence intervals:**

10000

**Level of confidence
for all confidence
intervals in output:**

95.0000

**NOTE: Some cases
were deleted due
to missing data.
The number of such
cases was:**

14

Selected MPlus code and output for moderated multilevel mediation using daily data

TITLE: 1-1-1 model with Religious Saliency as moderator

DATA: FILE IS "C:\Users\sdh7\Desktop\multmedwmod_nonames.dat";

VARIABLE: NAMES ARE ID Stress_Expect Day Cond Eat_Agg Move_Agg AlcDrinks

Sit_Agg SC_Import SC_Success SC_WithOthers SC_OthersAround SC_ThinkOther

SC_ThoughtDomain SC_ThinkHelp SC_ThinkHarm FamConnect FamTalk

WorkConnect WorkTalk FriendsConnect FriendsTalk GodConnect GodTalk

CongregTalk Sleep_Agg HealthAgg DayRelig DaySocSupp DayRelyOth DaySC

rel_meanscent SocSup_meanscent SC_meanscent rel_grpmc rel_gmc soc_grpmc

soc_gmc sc_grpmc sc_gmc Rely_meanscent;

USEVARIABLES ARE ID HealthAgg DayRelyOth SocSup_meanscent SC_meanscent

rel_grpmc soc_grpmc sc_grpmc Rely_meanscent;

CATEGORICAL ARE DayRelyOth;

MISSING ARE all (-9999);

CLUSTER IS ID;

WITHIN = rel_grpmc;

ANALYSIS: TYPE = TWOLEVEL RANDOM;

ALGORITHM=INTEGRATION;

INTEGRATION=MONTECARLO(5000);

STARTS = 100 10;

MODEL:

%WITHIN%

s_rel2sc | sc_grpmc ON rel_grpmc; !create random slopes for all paths

s_sc2HI | HealthAgg ON sc_grpmc;

s_rel2so | soc_grpmc ON rel_grpmc;

s_so2HI | HealthAgg ON soc_grpmc;

s_rel2ro | DayRelyOth ON rel_grpmc;

s_ro2HI | HealthAgg ON DayRelyOth;

s_rel2HI | HealthAgg ON rel_grpmc;

!s_rel2sc ON Cond; !moderator effect of condition on 3 mediator slopes

!s_rel2so ON Cond;

!s_rel2ro ON Cond;

%BETWEEN%

s_rel2sc s_sc2HI s_rel2so s_so2HI s_rel2ro s_ro2HI s_rel2HI

SocSup_meanscent Rely_meanscent SC_meanscent HealthAgg; !estimate L2 residual

variances

[s_rel2sc](s1); !calculating means of random slopes

[s_sc2HI](s2);

[s_rel2so](s3);

[s_so2HI](s4);

[s_rel2ro](s5);

[s_ro2HI](s6);

[s_rel2HI](sdir);

s_rel2sc WITH s_rel2HI SC_meanscent HealthAgg; !estimating L2 covariances for slopes

s_sc2HI WITH s_rel2HI SC_meanscent HealthAgg;

s_rel2so WITH s_rel2HI SocSup_meanscent HealthAgg;

s_so2HI WITH s_rel2HI SocSup_meanscent HealthAgg;

s_rel2ro WITH s_rel2HI Rely_meanscent HealthAgg;

s_ro2HI WITH s_rel2HI Rely_meanscent HealthAgg;

s_rel2HI WITH SC_meanscent SocSup_meanscent Rely_meanscent HealthAgg; !cov for

slope of direct effect

HealthAgg WITH SC_meanscent SocSup_meanscent Rely_meanscent; !covariances of

outcome and mediators

s_rel2sc WITH s_sc2HI (covpatha); !estimate and name cov for SC mediator path

```
s_rel2so WITH s_so2H1 (covpathb);
```

```
s_rel2ro WITH s_ro2H1 (covpathc);
```

```
MODEL CONSTRAINT:
```

```
NEW(indpatha indpathb indpathc); ! name the indirect effects
```

```
indpatha = s1*s2 + covpatha;
```

```
indpathb = s3*s4 + covpathb;
```

```
indpathc = s5*s6 + covpathc;
```

```
OUTPUT: TECH1 TECH8 CINTERVAL;
```

Appendix B

Intake Session Measures

Health

Food Consumption

Please indicate which of the following meals/snacks you usually eat fast food or restaurant food. If you don't have habitual times for eating out, estimate how many times per week you usually eat out and place that number of check marks across the board using the times you are *most likely* to eat out.

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Breakfast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Morning snack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lunch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Afternoon snack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dinner/Supper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Late snack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please indicate which of the following meals/snacks usually include a serving of fruits or vegetables. Again, if you don't have habitual days and times in which you eat fruits and veggies, please estimate how many servings of both you eat per day and place that number of checks in each day's column using the times you are most likely to eat them.

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Breakfast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Morning snack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lunch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Afternoon snack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dinner/Supper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Late snack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please indicate which of the following meals/snacks usually include a sugary or high-fat treat (things like cookies, cake, chips, or soda). Again, if you don't have habitual days and times in which you eat treats, please estimate how many treats you tend to eat per day and place that number of checks in each day's column using the times you are most likely to eat them.

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Breakfast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Morning snack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lunch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Afternoon snack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dinner/Supper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Late snack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Exercise

Please indicate which days you usually engage in the following activities. If you don't have habitual times that you do these things, please estimate how many times per week you do them and place that number of checks in the days' boxes in which you are most likely to do them.

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Cardiovascular exercise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Weightlifting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Physically strenuous
work/play

Sleep

What time do you usually fall asleep?

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
8 PM or earlier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9:00 PM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10:00 PM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11:00 PM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12:00 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1:00 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2:00 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 AM or later	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What time do you usually wake up?

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
5 AM or earlier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 PM or later	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How well would you say you usually sleep? Not at all well ----- Very well

How rested do you feel after a full night's sleep? Not at all rested ----- Very well rested

Alcohol Consumption

How many drinks do you usually have on each of the following days? (Note: 1 drink is a 12-oz. beer, a regular 5-oz glass of wine, a single shot of hard liquor, or one mixed drink.)

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
number of drinks	___	___	___	___	___	___	___

Other

How many hours a day do you spend in the following activities?

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
using a computer							
for recreation	___	___	___	___	___	___	___
watching TV	___	___	___	___	___	___	___
reading or relaxing	___	___	___	___	___	___	___

Perceived Stress Scale

(Item responses range from 0-never to 4-very often)

1. In the last month, how often have you been upset because of something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control the important things in your life?
3. In the last month, how often have you felt nervous and “stressed”?
4. In the last month, how often have you felt confident about your ability to handle your personal problems?
5. In the last month, how often have you felt that things were going your way?
6. In the last month, how often have you found that you could not cope with all the things that you had to do?
7. In the last month, how often have you been able to control irritations in your life?
8. In the last month, how often have you felt that you were on top of things?
9. In the last month, how often have you been angered because of things that were outside of your control?

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Trait Self-Control Scale

Below is a list of statements about behavioral tendencies. Please read each statement and indicate how often your own behavior reflects that tendency by using the scale below.

hardly ever 1 2 3 4 5 nearly always

1. I am able to resist temptations.
2. I waste a lot of time before getting down to work. (R)
3. I have trouble resisting my cravings. (R)
4. I delay as long as possible before starting something I expect to be unpleasant.(R)
5. I am able to keep doing what I think I should do, even when other people would stop.
6. I can deny myself something I want but don't need.
7. I waste time on things that don't really matter, rather than working on things that do. (R)
8. When I commit to doing something difficult, I see it through to the end.
9. My bad habits cause problems for me. (R)
10. I just can't seem to get going, even when I have much to do. (R)
11. Not much can stop me from honoring a commitment to better myself.
12. When I want something that is bad for me, I go after it anyway. (R)
13. Even when the list of things to do is long, it is easy for me to get started.
14. I find it hard to continue doing something I don't want to do. (R)
15. I am able to control how I react to impulses.
16. I get started on new projects right away.
17. After I have started a challenging task, I find it easy to stick with it.
18. If I want to do something I know I shouldn't, I won't do it.
19. I do nothing despite having plenty to do. (R)
20. I find it easy to keep with good behavior.

Revised Intrinsic/Extrinsic Religiosity Scale

(Item responses range on 5-point scale from Strongly Disagree to Strongly Agree)

1. I enjoy reading about my religion.
2. I go to church because it helps me to make friends.

3. It doesn't much matter what I believe so long as I am good.
4. It is important to me to spend time in private thought and prayer.
5. I have often had a strong sense of God's presence.
6. I pray mainly to gain relief and protection.
7. I try hard to live all my life according to my religious beliefs.
8. What religion offers me most is comfort in times of trouble and sorrow.
9. Prayer is for peace and happiness.
10. Although I am religious, I don't let it affect my daily life.
11. I go to church mostly to spend time with my friends.
12. My whole approach to life is based on my religion.
13. I go to church mainly because I enjoy seeing people I know there.
14. Although I believe in my religion, many other things are more important in life.

Perceived Social Support

(modified; the items below, from the Friends subscale, will be repeated for family, work group, and religious group)

Directions: The statements which follow refer to feelings and experiences which occur to most people at one time or another in their relationships with friends. For the first 20 statements there are three possible answers: Yes, No, Don't know. Please circle the answer you choose for each item.

1. My friends give me the moral support I need.
2. Most other people are closer to their friends than I am.
3. My friends enjoy hearing about what I think.
4. Certain friends come to me when they have problems or need advice.
5. I rely on my friends for emotional support.
6. If I felt that one or more of my friends were upset with me, I'd just keep it to myself.
7. I feel that I'm on the fringe in my circle of friends.
8. There is a friend I could go to if I were just feeling down, without feeling funny about it later.
9. My friends and I are very open about what we think about things.
10. My friends are sensitive to my personal needs.

11. My friends come to me for emotional support.
12. My friends are good at helping me solve problems.
13. I have a deep sharing relationship with a number of friends.
14. My friends get good ideas about how to do things or make things from me.
15. When I confide in friends, it makes me feel uncomfortable.
16. My friends seek me out for companionship.
17. I think that my friends feel that I'm good at helping them solve problems.
18. I don't have a relationship with a friend that is as intimate as other people's relationships with friends.
19. I've recently gotten a good idea about how to do something from a friend.
20. I wish my friends were much different.
21. How many people can you count as friends? _____
22. How close do you feel to your group of friends? Very Close ---- Not At All Close
23. Please think of your closest friend. How close are you to this friend?
Very Close ----- Not At All Close
25. How good is this friend at self-control? Very Good ----- Very Poor

Trait Reliance on Others

Item responses range from Strongly Agree to Strongly Disagree.

1. I would like my friends and I to be very involved in each other's goal pursuits.
2. I would like to help the important people in my life with all of their essential goals.
3. It is important to me to have personal goals that are completely separate from my friends and family.
4. It wouldn't upset me if the people most important to me weren't interested in an important goal of mine.
5. I believe that friends and family try to be too involved with each other's personal goals.
6. I enjoy having my own personal goal pursuits that I don't share with others.
7. I would be excited if my friends or family expressed interest in sharing one of my important goals.
8. I would like to rely on others more for help with my goals.
9. I wish my friends and family would rely on me more for help with their goals.
10. I would like to be there for my friends and family for all of their important goals.
11. I am happy that I rely on friends and family to help with my goals.
12. At times I think I want to be more involved in my friends' and family's everyday goals than they want me to be.

13. At times I think I want other people to be more involved in my everyday goals than they want to be.
14. Sometimes I feel tired by having to help other people with their goals.
15. I feel energized when I feel I've been crucial to someone else's success.
16. I think my friends and family would be more successful if they relied on me more for help.
17. At times my focus on my own goals makes me too tired/busy to help with anybody else's goals.

Daily Measures

Health

Food Intake

	Break- fast	Morning Snack	Lunch	Afternoon Snack	Dinner	Late Snack
I ate fast food or restaurant food for this meal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I ate fruit with this meal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I ate vegetables with this meal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I ate a sweet or high-fat treat with this meal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I ate too much at this meal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I ate this meal with other people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Exercise

Please write how many minutes you engaged in each of these activities today.

Cardiovascular exercise _____

Weightlifting _____

Physically active work or play _____

Alcohol

Please tell us how many drinks you had today. (Note: 1 drink is a 12-oz. beer, a regular 5-oz glass of wine, a single shot of hard liquor, or one mixed drink.)

Number of drinks _____

Other

Please write how many minutes you engaged in each of these activities today.

Using a smartphone or tablet for recreation _____

Using a computer for recreation _____

Watching TV _____

Reading or other sitting relaxation activity _____

Self-Control/Reliance on Others

Please think back through your day today. We want you to remember a moment when you felt like you had to use self-control either to make yourself do something hard or to keep yourself from doing something tempting. If you remember more than one that happened, please pick the one that was hardest to deal with.

Please tell us in one or two sentences what the situation was. _____

How important at the moment was controlling your behavior/response?

Not at all Important ----- Very Important

How successful were you at controlling your behavior/response?

Totally successful ----- Not at all Successful

Was anyone with you when this happened? Yes/No

If not, were there other people around? (e.g., cashier, other customers, library patrons, etc.) Yes/No

Did you think of anyone or have anyone come to mind during this experience?
Yes/No

If so, how do you know the person/people you thought of?

Family

Friend(s)

Work

Church/worship group

Other

Was thinking of this person/people helpful to you in controlling your behavior/response?

Very helpful ----- Not at all helpful

Was thinking of this person/people harmful to you in terms of controlling your behavior?

Very harmful ----- Not at all harmful

Daily Social Support/Religiosity

1. How connected did you feel to your family today?
2. Did you talk to any family members today? Yes/No
3. Did you think about your family when they weren't around? Yes/No
4. Did you talk to anyone else about your family or any family issues today? Yes/No
5. How connected did you feel to your work today?
6. Did you talk to any of your co-workers? Yes/No
7. Did you spend time outside of work thinking about your work? Yes/No
8. Did you discuss your work or any workplace issues with anyone today? Yes/No
9. How connected did you feel to your friends today?
10. Did you talk to any of your friends today? Yes/No
11. Did you think about your friends when they weren't around? Yes/No
12. Did you talk to anyone else about your friends or any issues you have with your friends? Yes/No
13. How connected did you feel to God today?
14. Did you pray today? Yes/No
15. Did you spend time thinking about God or your religion today? Yes/No
16. Did you attend any religious meetings or activities today? Yes/No
17. Did you talk to anyone from your religious group today? (family counts) Yes/No
18. Did you talk about religion with anyone today? Yes/No
19. Did you read scripture or watch any religious videos today? Yes/No

Morning measure/manipulation

How many hours of sleep did you get last night? _____

Control condition:

Please close your eyes and spend a couple of minutes thinking about your day today. Think about what you need to do, your relationship with the people you plan to interact with, and how you feel about things. Do not click the "next" button until you've spent a few minutes reflecting this way.

Religious salience induction:

Please close your eyes and spend a couple of minutes thinking about God and your religion. Think about the people you go to church with, your relationship with them, your relationship with God, and what things you need to do today to feel spiritually fulfilled. Do not click the “next” button until you’ve spent a few minutes reflecting this way.

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Biography

Cameron Hopkin was born in Fort Worth, Texas on July 7, 1979, and currently resides in Utah. He attended Brigham Young University and California State University, Northridge as an undergraduate, gaining Bachelor of Arts degrees in Psychology and Communication Studies with a cum laude graduation. Thereafter he attended Duke University, where he gained his Master of Arts in Social Psychology in 2012 and will complete his Ph.D. in the same field in 2015. Together with Dr. Rick H. Hoyle and Dr. Kaitlin Toner he published “Intellectual humility and reactions to opinions about religious beliefs” in the *Journal of Psychology and Theology* in 2014, and in 2015 he published “Maximizing the yield of small samples in prevention research” in *Prevention Science* with Dr. Rick H. Hoyle and Dr. Nisha C. Gottfredson. He is a student member of the Society for Personality and Social Psychology and a student affiliate of the American Psychological Association. He was a recipient of the J.B. Duke Fellowship and the Transdisciplinary Prevention Research Center Graduate Fellowship at Duke University, and was also offered the Sulzberger-Levitan Graduate Fellowship.