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Use of Daily Phone Diary to study religiosity and mood: Convergent validity

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Abstract

Studies of religious/spiritual behavior frequently rely on self-reported questionnaire data, which is susceptible to bias. The Daily Phone Diary (DPD) was developed to minimize bias in reporting activities and behavior across a 24-hour period. A cross-sectional study of 126 parents of children with cystic fibrosis was used to establish the validity of the DPD to study religious/spiritual behaviors. Longitudinal models were used to determine the odds of improved mood during religious/spiritual activities. Convergent validity was found. Participants had increased odds of improved mood during religious/spiritual activities compared to non-religious/spiritual activities. Associations with gender and religious affiliations were found. The DPD is a valid tool for studying religious/spiritual activities and opens novel avenues for chaplaincy research and the development of chaplaincy interventions incorporating these findings.

Keywords

religiosity; cystic fibrosis; parents; mood; Daily Phone Diary

Having a child with a chronic illness is stressful for the family (Herzer et al., 2010), members of which may draw on various coping responses (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). Religion and spirituality are effective coping strategies for some patients and family members (Cotton, Grossoehme, & McGrady, 2012; Grossoehme, Ragsdale, Wooldridge, Cotton, & Seid, 2010; Pargament, 1997). The stress-buffering effects of religion and spirituality has been proposed as one of several potential mechanisms by which these behaviors may affect health outcomes (Oman & Thoresen, 2005). Parents of children with CF and other chronic diseases use religion and spirituality to cope with their experiences (Dollahite, Marks, & Olson, 1998; Grossoehme, Ragsdale,

Wooldridge, Cotton, & Seid, 2010). The use of religious and or spiritual beliefs or practices to decrease stress may also contribute to improved mood states. Mahoney and colleagues have shown that family members often participate in religious or spiritual activities as a group activity to cope with stress (Mahoney, Pendleton, & Ihrke, 2006). Religious behaviors have also been associated with less distressed marriages among parents of children who have cystic fibrosis (Grossoehme, Szczesniak, Dodd, & Opiari-Arrigan, 2014).

A relationship between religion and emotion has long been noted. Silberman describes three ways in which religion influences emotions (Emmons, 2005). First, religion makes claims about the appropriateness of certain emotions. Second, religious beliefs may dispose a person towards particular emotions as well as influence one's emotional well-being. Third, religious practices create opportunities to powerfully experience intimacy with the Divine. Many people use religion to cope with illness (Pargament, 1997), and religious coping affects health outcomes. Engaging in some types of religious coping lead to improved mental health outcomes (Gall, Kristjansson, Charbonneau, & Florack, 2009; Koenig, Pargament, & Nielsen, 1998; Yangarber-Hicks, 2004). Engaging in other types of religious coping is associated with poorer mental health outcomes (Bickel et al., 1998; Exline, Park, Smyth, & Carey, 2011; Krause, 2006; Mohr, Brandt, Borrás, Gilliéron, & Huguelet, 2006). Much work has been done on the relationship between religion and psychopathology, most notably regarding religion and spirituality and depressive symptoms. A meta-analytic study by Smith and colleagues of 147 studies showed an inverse relationship between religious involvement and depression that was not moderated by a person's age, gender, or ethnicity (Miller & Kelley, 2005). Krause (Krause, 2010) noted a bimodal onset of depressive symptoms in early and late adulthood, and explored the possibility that meaning in life was a missing element in religion-mood research. He found that church-based social support bolstered older adults' sense of meaning in life, and that persons with a sense of meaning were less likely to have depressive symptoms. Although approximately 16% of adults will have a diagnosis of depression once in their lifetime and there is an 8.7% incidence of depressive symptoms at any one time (Strine et al., 2015), some of which may have a spiritual dimension, there is also a strong association between daily spiritual experiences and psychological well-being (Yonker, Schnabelrauch, & DeHaan, 2012), and between daily spiritual experiences and better mental health status (Rippentrop, Altmaier, Chen, Found, & Keffala, 2005). Common everyday spiritual experiences have been shown to buffer the effects of stress on negative affect while exerting a direct effect on positive affect (Whitehead & Bergeman, 2011).

Examining the ways in which religious or spiritual behaviors affect health outcomes requires overcoming several obstacles. The first is the absence of a uniform definition of these terms. Hill and colleagues, in an attempt to generate consensus, proposed the following definitions, which were utilized in this study. Spirituality is defined as those, "feelings, thoughts, experiences, and behaviors that arise from a search for the sacred." Using that definition as its base, religion is more narrowly defined as the, "means and methods (e.g., rituals or prescribed behaviors) of the search receive validation and support from within an identifiable group of people" (Hill et al., 2000). Religiosity refers, even more narrowly, to "involvement in religious activities, such as prayer" (Saroglou, 2002).

The second obstacle is the multi-dimensional nature of religion and spirituality. Religion and spirituality encompass a number of aspects—behavior and belief—as well as social, cognitive and developmental aspects. Conceptualizing religion and spirituality is important. Single-item measures, typically of religious affiliation, have little variance (McCullough & Larson, 1999) and are simplistic (Masters et al., 2009). The Fetzer Institute and the National Institute on Aging sponsored the development of a multi-dimensional means to address this issue, leading to the development of measures across twelve domains (Fetzer/National Institute on Aging, 1999).

The third obstacle is rigorous measurement of these behaviors. Most often, studies of religious/spiritual behavior have relied on self-reported data on various questionnaires, which have several limitations (Hill, 2005). Questionnaires may not capture the multidimensional nature of religious/spiritual behaviors because they generally utilize only closed-ended items. They may also be written at a higher reading level than the general population, making them more difficult to complete and interpret. Finally, self-report measures may elicit more socially desirable responding.

The Daily Phone Diary (DPD) was developed as an unobtrusive measure of events and behaviors that people engage in on a daily basis (Quittner et al., 1998). It provides an ecological momentary assessment (EMA) of all activities, companions and mood ratings over a 24-hour period. The DPD is administered by phone, taking about 15 minutes to assess a 24-hour period and asks about all activities lasting 5 minutes or longer in the previous 24 hours, “blinding” the respondent to the behavior of interest that is the focus of the analyses. Telephone interviews are preferable to in-person interviews for topics are sensitive in nature, such as adherence to recommended therapies or religious and spiritual matters (Midanik, Greenfield, & Rogers, 2001). The DPD has established psychometric properties (Quittner, et al., 1998; Quittner & Opiari, 1994), although it has not been used to study religious/spiritual behaviors.

Given the role of religious/spiritual beliefs and experiences on depression and stress, the aim of this study was to determine whether the DPD is a valid measure of religious/spiritual behaviors reported by parent caregivers of children who have cystic fibrosis. Cystic fibrosis is a useful exemplar because of its life-shortening nature, the prevalence of depressive symptoms and the relationship between depressive symptoms and poorer child health outcomes (Quittner et al., 2014). If the DPD is indeed a valid measure for religious/spiritual behaviors, it would be a useful tool for describing family spiritual/religious behaviors and their effects on psychological functioning. The hypotheses were that the DPD would demonstrate convergent validity, and that engaging in a religious/spirituality activities would be associated with improved mood reported throughout the day.

Methods

Participants

Data used in these analyses were collected in the course of a larger study focused on parental adherence to their child’s prescribed treatments (Grossoehme et al., 2015). This two-site study was approved by the institutional review boards at both hospitals. We recruited

caregivers of children with CF ages 13 years and younger who were followed at accredited CF Centers. The pediatric, academic medical centers were in the Midwest (Site 1) and the South (Site 2), drawing on patients from 7 US states. A total of 142 caregivers were enrolled (42% participation rate; Site 1 n=83 and Site 2 n=59) in two phases of the study: the first was an online collection of measures (described below) using the Research Electronic Data Capture (REDCap) database and the second was data collection using the DPD by phone. Of those enrolled, 130 (N = 73, Site 1 and N = 57, Site 2) completed at least 1 of the 3 scheduled DPD interviews within three weeks of completing the online questionnaires.

Procedures

Caregivers at both sites were informed of the study in a letter from their child's pulmonologist or a phone call from a member of the research team, followed by an outpatient clinic encounter to answer any questions or concerns, opt out, or obtain consent. Both parents were given an opportunity to participate if they wanted to. Caregivers were given a URL address to complete the study measures, separately, in REDCap using their own computers if the initial measures were not completed during the child's clinic visit. REDCap is a web-based application designed to securely capture data and export it to statistical packages for analysis (Harris et al., 2009). At the time of enrollment, participants agreed to receive a follow-up contact if they had not completed their measures online within a month. Follow-up contacts were made to remind parents, provide the URL address again in case it was misplaced, and to resolve any systems issues.

Measures

Symptoms of depression—The Center for Epidemiologic Studies Depression scale (CES-D) is a 20-item scale used to measure depressive symptoms in community samples (Radloff, 1977). Respondents indicate the frequency of feelings such as, "I talked less than usual" and "I had crying spells" on a scale ranging from 0-3. Internal consistency, measured as Cronbach's alpha, is strong (0.78). In accordance with published thresholds, participants who scored below 16 were classified as "not depressed" and participants who scored at or above 16 were classified as "depressed."

Religiosity—The Duke University Religiosity Index (DUREL) is a five-item scale that measures three constructs: organizational, non-organizational, and intrinsic religiosity (Koenig, Parkerson, & Meador, 1997). The organizational religiosity item is, "How often do you attend church or other religious meetings?" Nonorganizational religiosity is measured with the item, "How often do you spend time in private religious activities, such as prayer, meditation, or Bible study?" Three items measure intrinsic religiosity; an example is, "I try hard to carry my religion over into all other dealings in life." Cronbach's alpha for this scale was 0.84.

Spiritual coping—Spiritual coping was measured using the Brief R-COPE (Pargament, Koenig, & Perez, 2000). This widely-used 18-item scale measures spiritual coping styles (Pargament, 1999). There are three subscales for positive spiritual coping, negative spiritual coping, and spiritual coping for control. The terms "positive" and "negative" refer to the associations that certain spiritual coping styles have with health outcomes, with positive

track time across each daily diary. To examine duration of improved mood, a separate index variable was created to measure the time since religious/spiritual activity (in hours) for each individual participant and religious/spiritual activity within the same DPD day. Participants' multiple activities were represented via multiple corresponding time series.

Comparison of religious, spiritual, and control activities—To determine whether parents had increased odds of improved mood while performing religious/spiritual activities, compared to control activities, ordinal multinomial logistic regressions were calculated using generalized estimating equations, with adjustment for longitudinal correlation, imbalance in the number of control and religious/spiritual activities, and parent dyad effects (Park & Lee, 2002) with mood level as the outcome. Mood ratings of 3-5 were collapsed into “positive mood” due to the absence of mood ratings above 3 for religious/spiritual activities, which violate the proportional odds assumption of the model. The resulting mood variable in each model consisted of three levels, where a higher rating indicated better mood. Each parent could have multiple religious/spiritual activities on each day. Covariates initially included in the model were: parent gender, education level and religious affiliation, and CES-D and DUREL scores. An interaction term for parent gender and religious/spiritual activity was included to assess the moderating effect of parent gender on the relationship between religious/spiritual activity and mood. A final model was developed, retaining only the statistically significant interaction and lower level terms ($P < 0.1$), through backward elimination.

Comparison of instrumental and recreational activities—To examine whether participants had increased odds of describing religious/spiritual activities as instrumental vs. recreational, logistic regressions were conducted using the previously described estimation procedures, adjustments, and model selection.

Sustaining/improving mood after religious/spiritual and control activities—Sustained or improved mood change after completing religious/spiritual activities was examined using a mixed effects, logistic regression with similar correlation structure. Improved mood at a given time was defined as the current mood rating being higher than the mood rating immediately preceding it. A binary outcome variable was created to indicate better or worse mood by comparing the mood level from the previous religious/spiritual activity within a DPD day. In this model, mood ratings were not collapsed. Time since religious/spiritual activity for each individual and his or her religious/spiritual activity was included as a covariate in the model and calculated as the time difference in hours since previous religious/spiritual activity until the next religious/spiritual activity within 24-hour period, or until the end of the day if no additional religious/spiritual activities occurred. A cubic polynomial was selected after fitting a logistic regression to represent the shape of probability of improved mood over time. The estimated probability or odds ratio (OR) and 95% confidence interval (CI), along with corresponding effect sizes expressed as Cohen's d (Borenstein, Hedges, Higgins, & Rothstein, 2009), are reported for each effect of interest from the longitudinal models. All analyses were implemented using SAS 9.3 (SAS Institute, Cary, NC).

Results

Preliminary analysis

A total of 126 participants, 71 from Site 1 (56%) and 55 from Site 2 (44%) completed the DPDs, with 95 parents reporting at least one religious/spiritual activity (75%). A total of 540 religious/spiritual activities were reported across all diaries; 218 (40%) were individual activities, 316 (59%) were group activities and three (1%) were complementary-alternative medicine activities. A list of activity codes is included as an appendix. The mean and median frequency and duration of individual and group spiritual activities is presented in Table 1. These results did not significantly differ by religious affiliation or depression status. There was limited concordance between religious/spiritual activities on the DPD and the use of spiritual coping measured by the Brief R-COPE (see Table 2). Passive Deferring spiritual coping was positively correlated with the duration of individual spiritual activities. The use of positive spiritual coping as measured by the Brief R-COPE was significantly correlated with the frequency of participating in group spiritual activities. There was a non-significant relationship between the use of negative spiritual coping and either frequency or duration of individual or group spiritual activities.

As hypothesized, there was evidence that the DPD has convergent validity. Convergent validity was operationalized as the extent of concordance between religious/spiritual activities on the DPD activity and religiosity as measured by the DUREL items of non-organizational and organizational religiosity. We found a positive, moderate correlation between both the frequency and duration of time spent in individual religious/spiritual activities on the DPD with these religious variables, including the total DUREL score; there was a trend towards significance with organizational religiosity (see Table 2). There was a positive, moderate correlation between the frequency and duration of time spent in group religious/spiritual activities and organizational religiosity.

Comparison of religious/spiritual and control activities

The final longitudinal model checking the odds of improved mood with covariate adjustment is shown in Table 3. Parents had an increased probability of having an improved mood during religious/spiritual activities compared to control activities (OR: 2.09, 95% CI: 1.45 to 3.02, Cohen's $d=0.41$). Mothers exhibited greater improvements in mood during religious/spiritual vs. control activities than fathers, although the impact of these religious activities was positive for both. Religious affiliation was retained in the model. Parents with Protestant and Roman Catholic affiliations had greater odds of improved mood than those with non-denominational Christian affiliations (OR: 2.24, 95% CI: 1.38 to 3.62 and OR: 2.16, 95% CI: 1.35 to 3.45, respectively, Cohen's $d=0.44$ and 0.42, respectively).

Comparison of instrumental and recreational activities

Religious/spiritual activities were more likely to be categorized as instrumental vs. recreational based on the results of the longitudinal models for each type of religious/spiritual activity; the probabilities that participants regarded religious/spiritual activities as instrumental were 0.71 (95% CI: 0.65 to 0.76), 0.72 (95% CI: 0.63 to 0.79) and 0.71 (95% CI: 0.64 to 0.77) for all, individual and group religious/spiritual activities. The odds ratios of

participants categorizing religious/spiritual activities as instrumental after adjusting for covariates are shown in Table 4 for all and group religious/spiritual activities. Those with Roman Catholic, non-denominational Christian, and other religious affiliations were less likely to endorse these activities as instrumental when compared to Protestant affiliations with odds ratios of 0.17 (95% CI: 0.06 to 0.49), 0.14 (95% CI: 0.06 to 0.32) and 0.26 (95% CI: 0.10 to 0.65), respectively. Corresponding effect sizes were 0.97, 1.08 and 0.75. In the final model, no covariate effects were retained for individual religious/spiritual activities. The final model for group religious/spiritual activities included adjustment for religious affiliation, education level, and DUREL score. Religious affiliations demonstrated a similar pattern across all religious/spiritual activities; All other affiliations were less likely than Protestant to label group religious/spiritual activities as instrumental with separate odds ratios of 0.10 (95% CI: 0.02 to 0.50), 0.13 (95% CI: 0.03 to 0.47) and 0.11 (95% CI: 0.03 to 0.42) with corresponding effect sizes of 1.24, 1.14, and 1.20.

In terms of education, compared to a graduate degree, participants with high school up through college degree were less likely to consider group religious/spiritual activities as instrumental vs. recreational, with odds ratios of 0.17 (95% CI: 0.055 to 0.56), 0.10 (95% CI: 0.039 to 0.36) and 0.24 (95% CI: 0.093 to 0.64) respectively. Cohen's *d* values were -0.98 , -1.27 and -0.79 , respectively. The odds of treating group religious/spiritual activities as instrumental would decrease 11% for each one unit increase in DUREL scores, with an odds ratio of 0.89 (95% CI: 0.80 to 1.00).

Sustaining/improving mood after religious/spiritual and control activities

The estimated probability of improved mood after completing a religious/spiritual activity was relatively high (> 0.80) for most of the remaining 24-hour following the activity (see Figure 1). An estimated probability for each post-religious/spiritual activity mood rating was analyzed. As expected and shown by the number of gray points in the plot, the number of observations decreased as the time since the initial religious/spiritual activity increases. The first inflection point in the probability curve occurred around 6 hours after the religious/spiritual activity was completed, creating a local minimum. The estimated probability increased slightly to 0.90, then trailed downward toward the end of the 24-hour period.

Discussion

This study provided strong evidence that the DPD is a valid measure of religious and spiritual activities in parents of children with CF. Evidence of convergent validity was obtained and further, positive effects of religious/spiritual behaviors were documented. A benefit of improving one's mood may accrue, and be sustainable for at least one hour after the spiritual activity. The analyses also show that engaging in a spiritual activity is likely to be regarded as instrumental rather than a recreational activity. These findings are important for chaplaincy for several reasons.

First, we have shown that the DPD is a valid tool for use in research about religion and spirituality—a topic important to the practice of chaplaincy. The DPD requires some training to use, and is then a straightforward tool which chaplains can use in their own studies. Secondary data analysis of DPD data from other investigators' studies which include

religious and spiritual activities may also be done. Chaplains may encourage collaborators to customize the activity codes to include the breadth of religious/spiritual behaviors permitting a more fine-grained analysis than the seven default activity codes for religious and spiritual behaviors. An important advantage of using the DPD over direct questions is that it minimizes the pressure which some respondents may feel to provide socially desirable answers (Midanik, Greenfield, & Rogers, 2001), especially to persons with greater perceived power such as a chaplain. As Oman and Thoresen argue, there is a need to move beyond questionnaire data to learn about the role of religion, spirituality and health, and this is especially true of religious and spiritual behaviors (Oman & Thoresen, 2005). Validity of the DPD opens a novel avenue for chaplaincy research. As the number and quality of studies on which chaplains are principal or co-investigators and participation in religious or spiritual activities is a variable hypothesized to relate to health outcomes, the need for valid tools such as the DPD increases.

The mood increases following religious/spiritual activities that were found in this study contribute to existing knowledge on the relationships between religion, spirituality, and health outcomes. Although these findings do not necessarily imply a causal effect, the results suggest that chaplains may be able to promote improved mood states by utilizing religious or spiritual interventions in their clinical encounters, or by encouraging the development and use of such activities by patients, families, or staff outside of those encounters. The improved mood was not a brief phenomenon which decreased rapidly after the activity; rather, it persisted over time, suggesting that the benefit remained between 6 and 24 hours afterwards, despite parents' participation in other, non-religious/spiritual activities.

Persons who engaged in religious/spiritual activities understood them to be instrumental rather than recreational. This suggests that engaging in such activities was not an optional extra part of life, but a necessary component which was expected to provide them something other than pleasure or relaxation. The increased odds of Protestants viewing religious/spiritual activities as instrumental may reflect beliefs inculcated from within their faith tradition. The results suggest that persons who are Protestant may understand engaging in religious/spiritual activities as "being a good Christian"

This study has the following limitations. First, DPD is a form of self-report data collection, which is open to reporting bias. Participants were informed that the focus of the study was their adherence to their child's cystic fibrosis treatments; it is unlikely that they would self-censor on the topic of religious or spiritual behaviors. The DPD itself seeks to minimize the related construct of recall bias by inquiring about all activities lasting more than five minutes rather than only the behaviors of interest. Second, participants were those affiliated with two cystic fibrosis centers in US regions with higher religious participation than others (Newport, 2010). It is possible that these participants reported more religious/spiritual activities than a nationwide sample would. Third, the sample size, while adequate for analyses, is relatively small, with 95 participants reporting a religious/spiritual activity. Fourth, the list of activity codes may not adequately capture the breadth of religious/spiritual activities. Fifth, participants were primarily Christian, and the experience of engaging in religious/spiritual activities may differ between Christianity and other faith traditions. Nevertheless, important conclusions may be drawn. Future research directions should lead to

increased understanding of the religious/spiritual activities related to improved mood; feasibility/acceptability studies of chaplain interventions related to mood; and extending the present study to different populations, including adults with chronic disease. As professional chaplaincy seeks to move beyond simple Rogerian non-directive listening and towards more outcome-oriented interventive care (Perry, 2012; VandeCreek & Lucas, 2001), inquiry about a change in spiritual activities may be a question of clinical relevance to chaplains. The loss of religious/spiritual beliefs and practices has been theorized as one way to operationalize spiritual struggle (Fitchett & Risk, 2009). The present study does not contradict that hypothesis. The non-significant relationship between experiencing spiritual struggle (operationalized as the use of negative religious/spiritual coping styles as measured by the Brief R-COPE) and participation in spiritual activities suggests exploration of this area in the future. Inquiry about a decrease in religious/spiritual activities may be questions clinical chaplains may integrate into encounters early in the relationship as a means of identifying persons with spiritual struggle.

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Appendix

Daily Phone Diary Spiritual Activity Codes

Level 1	Level 2	Level 3	Activity
1	0	0	Spiritual Activities
1	1	0	Individual spiritual activities
1	1	1	Praying
1	1	2	Reading devotional materials
1	1	3	Watching religious programming on tv or internet
1	1	4	Sacrament/other ritual (confession, healing)
1	1	5	Visit cemetery by one's self
1	1	6	Talk with religious leader about spiritual issue(s)
1	1	7	Talk with lay person about spiritual issue(s)
1	1	8	Drive to/from spiritual activity
1	1	9	Other individual spiritual activity
1	2	0	Group spiritual activities
1	2	1	Family prayer (incl. grace at meals)
1	2	2	Attend public worship
1	2	3	Drive to/from or drop off youth group for child
1	2	4	Drive to/from or drop off group spiritual activity (for self or family)
1	2	5	Attend bible study
1	2	6	Attend Sunday school/church school/Hebrew

Level 1	Level 2	Level 3	Activity
			school/religious school
1	2	7	Attend wedding, baptism, funeral, bat mitzvah, festival, etc.
1	2	8	Watching religious programming on tv or internet
1	2	9	Participate in 12-step recovery program (meeting or call sponsor)
1	2	10	Attend social hour related to worship (coffee hour, breakfast)
1	2	11	Visit cemetery with others
1	2	12	Attend small group activity at place of worship
1	2	13	Other group spiritual activity
1	2	14	Reading religious/spiritual literature
1	3	0	Mind body spirit modalities
1	3	1	Drive to/from mind body spirit modality
1	3	2	Yoga
1	3	3	Massage
1	3	4	Chiropractic
1	3	5	Art therapy
1	3	6	Music therapy
1	3	7	Aroma therapy (incl. candles)
1	3	8	Acupuncture/acupressure
1	3	9	Healing touch/reiki
1	3	10	Other mind body spirit modality
1	3	11	Writing (journal, diary, creative, poetry, etc.)
1	3	12	Meditating

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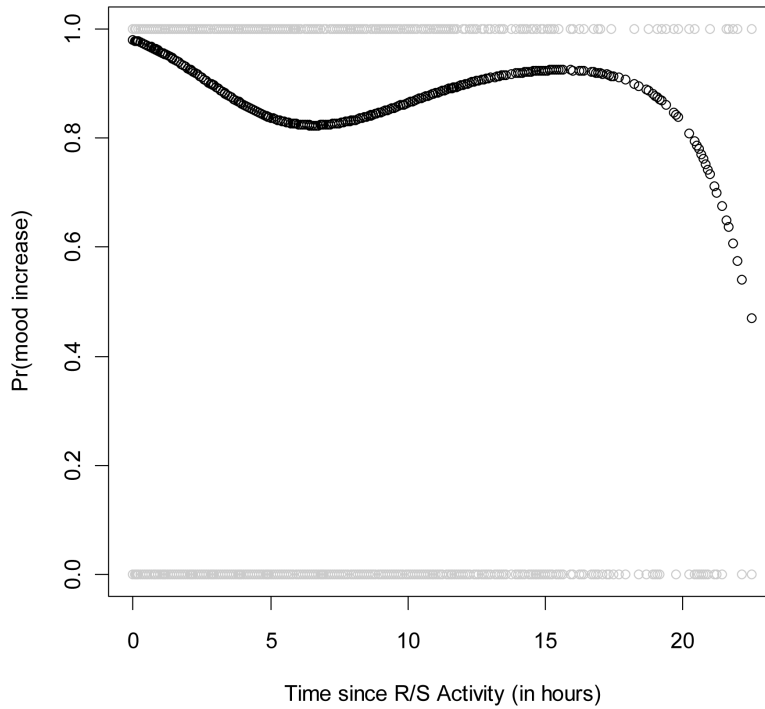


Figure 1. Probability of Improved Mood with Time Since Spiritual Activity*

*Estimated probability of improved mood over time since initiating religious/spiritual activity (black curve with points). The mood at a given time is compared to the mood observed during the religious/spiritual activity. The x-axis represents the hours since the activity. Gray points that equal zero on the plot correspond to worse mood after the activity; gray points that equal 1 correspond to a level of mood that is the same or higher than the mood during the activity.

Table 1

Daily frequency and duration of religious/spiritual activities*

		N	Mean (SD)	Median (Range)
Individual spiritual activities	Frequency	74	1.46 (0.91)	1 (1-1.67)
	Duration (min)		21.51 (28.81)	10 (5-28.33)
Group spiritual activities	Frequency	77	1.81 (1.10)	1.5 (1-2)
	Duration (min)		49.48 (71.04)	13.33 (5-73.33)

* Daily value per participant and activity type (individual or group) is based on aggregate calculation (see Methods)

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Table 2

Concordance between Daily Phone Diary, DUREL, and religious coping scale items (Spearman correlation coefficient)

DPD religious/spiritual activity	Religiosity	Non-organizational religiosity	Organizational religiosity	Positive spiritual coping	Passive Deferring spiritual coping
individual (frequency)	0.29 [*]	0.31 ^{**}	0.22 ^t	0.09	0.009
individual (duration)	0.37 ^{**}	0.33 ^{**}	0.22 ^t	0.12	0.25 [*]
Group (frequency)	0.30 ^{**}	0.095	0.38 ^{**}	0.25 [*]	-0.037
Group (duration)	0.18	-0.02	0.31 ^{**}	0.17	0.016

^{**}
p<0.01;

^{*}
p<0.05,

^t
p<0.10

Table 3

Odds of improved mood during religious/spiritual activity, adjusted for confounders

	OR*	95% CI	P Value
Activity			
Religious/Spiritual	2.09	1.45 to 3.02	<.0001
Control	1		
Parent Gender			
Female	0.81	0.48 to 1.38	0.042
Male	1		
Activity × Parent Gender			0.041
Female, Religious/Spiritual vs. Control	3.32	2.61 to 4.21	<0.0001
Male, Religious/Spiritual vs. Control	2.09	1.45 to 3.02	<0.0001
Religious Affiliation			0.0015
Protestant	2.24**	1.38 to 3.62	0.001
Roman Catholic	2.16**	1.35 to 3.45	0.0013
Other	0.69	0.43 to 1.11	0.12
Non-denominational Christian	1		

* Each odds ratio refers to a comparison between each category and reference level of the covariate (denoted by OR = 1) with respect to mood level. An OR > 1 (< 1) corresponds to participants having higher (lower) odds of improved mood when comparing a given category to the reference level. Model includes covariance terms (see Methods).

** P < .05.

Table 4

Odds of describing religious/spiritual activity as instrumental compared to recreational, adjusted for confounders

Religious/spiritual activities		All OR* (95% CI)	Group OR* (95% CI)
Religious Affiliation			
	Roman Catholic	0.17** (0.06, 0.49)	0.10** (0.02, 0.50)
	NDC [^]	0.14** (0.06, 0.32)	0.13** (0.03, 0.47)
	Other	0.26** (0.10, 0.65)	0.11** (0.03, 0.42)
	Protestant	1	1
Education Level			
	High school		0.17** (0.055, 0.56)
	Some college		0.10** (0.039, 0.36)
	College graduate		0.24** (0.093, 0.64)
	Graduate school		1
Religiosity			0.89 [†] (0.80, 1.00)

* Each odds ratio refers to a comparison between each category and reference level of the covariate (denoted by OR = 1) with respect to describing religious/spiritual activity as instrumental compared to recreational. An OR > 1 (< 1) corresponds to participants having higher (lower) odds describing religious/spiritual activity as instrumental compared to recreational when comparing a given category to the reference level. For continuous variable, OR indicated odds ratio with covariate increasing one unit. Model includes covariance terms (see Methods).

** P < .05;

[†] P < 0.10.

[^] NDC denotes Non-denominational Christian.

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