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The Dynamics of Prayer in Daily Life and Implications for Well-Being

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Abstract

Prayer is an important aspect of many people's daily lives, yet little is known about relationships between prayer and daily experiences and well-being in ecologically valid settings. In three studies, participants ($N = 350$) completed questionnaires once a day for two weeks (4,437 daily reports) regarding the events they experienced each day, their emotions, well-being, and the prominence of the four types of prayer constituting the ACTS taxonomy (adoration, confession, thanksgiving, and supplication). Thanksgiving and adoration were more prominent in prayers on days when positive events were reported and well-being was high (relative to individuals' own average reports of positive events and well-being). In contrast, supplication was more prominent on days when negative events were reported and well-being was low. Relationships between daily events, states of well-being, and prayers of confession were mixed. Lagged analyses indicated that present-day supplication, thanksgiving, and adoration negatively predicted well-being the following day. These lagged effects were weaker among people who prayed more frequently. Finally, each prayer type was predicted by distinct, non-religious emotional states—supplication by envy, thanksgiving by gratitude, confession by guilt, and adoration by awe. By moving beyond cross-sectional and experimental paradigms, we have provided insights about the dynamic nature of prayer through repeated measurement in naturalistic contexts. The content of individuals' prayers reflects their daily experiences and has consequences for their well-being.

Keywords

prayer; well-being; daily diary; emotions; ecological validity

According to the recent polls from the Pew Research Center (Pew Forum on Religion & Public Life, 2014) and the Baylor Religion Survey (Baylor University, 2021), between 44% - 55% of Americans pray on a daily basis. Even though participation in organized religion has declined in recent years, a substantial number of people who do not affiliate with any

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religion still pray on occasion. In fact, Americans are more likely to pray than they are to engage in any other religious activity (Wuthnow, 2008).

Americans are not unique in this regard. Approximately 50% of people worldwide pray at least a few times per week (EVS/WVS, 2020). William James recognized the importance of prayer in many individuals' lives, calling it the "very soul and essence of religion" (James, 1961). Contemporary scholars likewise identify prayer as a central feature of religion (Spilka & Ladd, 2012). In recent years, the topic of prayer has received considerable attention in the US public press, particularly in the wake of school shootings and during presidential debates and political discussions.

Yet, little is known about the types of daily events and experiences that may influence prayer content and how prayer may influence fluctuating states of well-being. This is particularly surprising given that prayers may reflect current events of daily life (Lambert et al., 2011). The goal of the present research was to examine, using naturalistic daily diary methods, the dynamic processes that link prayer to daily events, affective states, and well-being. In the following sections, we review studies of the relation between prayer content and well-being, review candidate antecedents and consequences of prayer content, argue for a daily diary approach, and present our theory-derived hypotheses.

Studies of Prayer Content

Most research has focused on overall prayer frequency, without attention to specific aspects or content of prayer. These studies have used cross-sectional methods, with participants reporting on a single occasion about their use of prayer. In some studies, participants have been asked to estimate how frequently they pray and to evaluate their well-being (Masters & Spielmans, 2007). Many of these studies have found that those who pray more frequently experience higher levels of well-being than those who pray less frequently. For example, in populations of Australian adults (Francis & Kaldor, 2002), Israeli Jewish adults (Levin, 2013), Muslims (Munir et al., 2012), and cancer patients (Gene Meraviglia, 2004), prayer frequency was positively related to happiness and psychological well-being. Other studies have found non-significant or negative relationships between prayer frequency and well-being (see McCullough & Larson, 1999, for a review). A meta-analysis by Masters and Spielmans (2007) found no significant relationship between prayer frequency and well-being. They argued that more differentiated prayer measures could be used to understand the relationships between prayer and well-being in greater detail.

To understand individual differences in prayer beyond frequency, some researchers have categorized prayer content using different taxonomies. Poloma and Pendleton (1991) created one of the first widely used taxonomies by defining four types of prayer: colloquial, petitional, ritual, and meditative/contemplative. Poloma and Gallup (1991) used similar names for the same basic distinctions: conversational, supplication, recitations, and meditation. These prayer types were adapted from earlier theoretical taxonomies proposed by Heiler (1966) and Pratt (1930). Petitional and ritualistic prayers have been found to be positively related to negative affect, whereas colloquial and meditative prayers have been found to be positively related to life satisfaction, happiness, and existential well-being

(Poloma & Pendleton, 1991). Similarly, McKinney and McKinney (1999) measured four types of prayer common in many denominations of Christianity that can be represented by the acronym ACTS—adoration, confession, thanksgiving, and supplication.

Researchers gradually added new dimensions to these taxonomies, such as reception and obligatory prayer (Laird et al., 2004; Whittington & Scher, 2010). For instance, the Multidimensional Prayer Inventory measures five types of prayer: adoration, confession, thanksgiving, supplication, and reception (Laird et al., 2004). In one study, confession and supplication were negatively related to well-being, whereas adoration, thanksgiving, and reception were positively related to well-being (Whittington & Scher, 2010).

A few other taxonomies or methods of categorizing prayer content are worth noting. For example, a 29-item measure has been designed to measure prayers that are directed inward (self-connection), outward (human-human connection), and upward (human-divine connections) (Ladd & Spilka, 2006). Other researchers have taken a qualitative approach—for example, conducting interviews to identify the content of people’s prayers (Dein & Littlewood, 2008; Lambert et al., 2011; McKinney & McKinney, 1999). These studies have documented various topics people tend to pray about, such as a connection with God, family, and love.

To measure the content of people’s prayers in daily life, we followed a tradition common in daily diary research by adapting an existing person-level measure for daily administration (see Nezlek, 2012, for a discussion of this technique). To do so, we needed to create a parsimonious measure that captured distinct aspects of prayer based on an existing taxonomy. We based our daily prayer questions on the Multidimensional Prayer Inventory because several existing prayer taxonomies include these prayer types in some combination (Heiler, 1966; McKinney & McKinney, 1999; Poloma & Gallup, 1991; Poloma & Pendleton, 1991; Pratt, 1930). To be concise, we included the four core prayer types assessed with the acronym ACTS (adoration, confession, thanksgiving, supplication). Adoration is defined as worshipping God without reference to external circumstances; confession is the admission of harmful, sinful, or negative actions along with a petition for forgiveness; thanksgiving is the expression of gratitude to God for external circumstances; and supplication is making requests to God for external life circumstances that relate to the individual or others.

Although it is sensible to adapt daily questions from person-level measures, it is important to test the psychometric properties of the daily versions of the scales. A person-level measure that captures several distinct constructs may capture only one or two constructs at the daily level, or vice versa (Zumbo et al., 2017). Understanding how many distinct factors a set of questions assess is necessary before considering how the daily questions relate to other variables. Therefore, the first goal of our study was to examine the factor structure of the adapted daily prayer questionnaire.

Antecedents and Consequences of Prayer

Moving beyond distinctions between factor structures of prayer content at between-person and within-person levels of analysis, our study aimed to address a few key processes. First, we examined the antecedents (i.e., the types of daily events, feelings, and states of well-being) that influence specific prayer content. Second, we considered the consequences of prayer on well-being on the following day through lagged analyses. Third, to understand the mechanism explaining the lagged relationships from prayer to well-being, we examined the moderating effects of individual differences in prayer frequency. To guide our hypotheses, we relied on past theory and research which has hinted at the importance of day-to-day variability in prayer, although findings to date have not been confirmed with rigorous daily diary methods. See Figure 1 for a conceptual depiction of the proposed antecedents and consequences of prayer.

First, certain types of daily events and affective states may influence whether people pray and what they pray about. For instance, prayer tends to occur in response to severe negative events or when other forms of coping do not work in response to chronic negative events (Bearon & Koenig, 1990; McCullough & Larson, 1999). Even among non-religious individuals, people tend to pray in times of need and are likely to petition or ask for things in supplicatory prayer (Murray et al., 2004). It is also believed that prayers can help people deal with uncontrollable negative events (Masters & Spielmans, 2007). In contrast, certain types of positive events might lead people to express thanksgiving to God because gratitude has been identified as a central feature of prayer (Lambert et al., 2011) and gratitude often occurs in response to positive acts by a benefactor (Roberts, 2004). We therefore hypothesized that more positively oriented types of prayer (i.e., thanksgiving and adoration) would be caused by the occurrence of daily positive events, whereas more negatively oriented types of prayer (i.e., supplication and confession) would be caused by the presence of negative events.

In addition to daily events, certain states of well-being might influence the content of prayer. Elevated levels of well-being may lead people to feel a closer connection to a divine being, making them more likely to pray (Ellison, 1991; Ellison et al., 2001). For example, in the Book of Psalms in the Old Testament, the psalmists frequently express thanksgiving and adoration to God in response to feelings of joy and happiness. They also make requests of God and confess their sins in response to feelings of distress, agony, and sadness (Bonhoeffer, 1974). According to attachment models of religion, prayer can provide a safe haven in response to feelings of stress and anxiety (Byrd & Boe, 2001; Kirkpatrick, 1992). That is, negative affective states could lead people to pray as a means to feel more closely connected to God (Granqvist, 2005).

A limitation of many of these studies is that prayer has been conceptualized as a uni-dimensional construct. It is possible that certain types of well-being states may cause people to engage in different types of prayers. Cross-sectional research has shown that certain types of prayer such as thanksgiving relate positively to satisfaction with life, self-esteem, optimism, and marital satisfaction, whereas other prayer types such as confession relate

negatively to self-esteem and optimism (Fincham & May, 2021; Whittington & Scher, 2010).

In addition, we consulted research on non-religious experiences that might be relevant to prayer. Adoration has been associated with greater purpose in life and indirectly with satisfaction with life (Schindler, 2014). Secrecy, which may be related to the act of confession, has been negatively related to well-being (Slepian et al., 2017), and confiding secrets may help alleviate the negative effects of secrecy (Slepian & Moulton-Tetlock, 2019). The processes involved in secrecy may be related to confession, but there may be important differences between these phenomena as well. We hypothesized that positive well-being states would predict greater levels of thanksgiving and adoration in prayer, and negative well-being states would predict greater levels of supplication and confession.

Although it is important to consider the effects of states of well-being on prayer content, we contend it is also worthwhile to study the effects of distinct emotional states on prayer content. Our rationale is that prayer may reflect a variety of emotional experiences across different religions (Corwin & Brown, 2019). We hypothesized that daily states of envy would predict greater levels of supplication in prayer as people may ask God or a divine being to provide them with what they feel they lack compared to others. Additionally, we expected daily feelings of gratitude to predict expressions of thanksgiving to God in prayer. Moreover, feelings of guilt during the day may lead people to confess sin in their prayers. Finally, we hypothesized that feelings of awe, which are characterized by perceptions of vastness and greatness, will elicit prayers of adoration.

Finally, it is possible that prayer influences well-being (Newman & Graham, 2018). Some research suggests that prayer buffers the effects of stress and can act as a coping mechanism that indirectly promotes well-being by diminishing negative affect (Ellison et al., 2001; Hollywell & Walker, 2009; Masters et al., 2022; Masters & Spielmans, 2007; Spilka & Ladd, 2012). From a cognitive-behavioral perspective, prayer provides a means of appraising life events and making sense of them (James & Wells, 2003; Maltby et al., 2008). Specific types of prayer may help people manage their emotions and self-control, ultimately improving their well-being (Sharp, 2010). For instance, ritualistic prayers in a local temple among Hindus helped reduce experimentally induced anxiety (Lang et al., 2020).

On the other hand, there are reasons to expect that prayer can negatively influence well-being. Prayer may lead to external attributions, it may make unpleasant experiences more salient, and it may create unfulfilled expectations. In the area of ritualistic behaviors which often include prayer, researchers have proposed an ironic effect such that rituals may alleviate anxiety immediately following the ritual, but they may lead to negative consequences later because they may lead to more bothersome intrusive thoughts (Boyer & Liénard, 2006). Thus, prayer may lead to greater anxiety and stress. In light of these diverging findings, we examined the consequences of prayer by testing competing predictions.

Advantages of Daily Diary Methods

Most of the research on prayer has used cross-sectional or experimental methods. Although valuable, cross-sectional studies and experiments are limited in important ways. Experimental manipulations may require participants to pray in ways that are not typical for them, and as a result, such studies have limited ecological validity (Diener et al., 2021). Questionnaires that assess individual differences in prayer typically rely on extended recall, which is fraught with biases and influenced by heuristics (Bradburn et al., 1987; Schwarz, 2012). Additionally, single assessments of prayer address between-person differences to the neglect of within-person processes. Between-person and within-person levels of analysis are statistically orthogonal and may involve different psychological processes (Affleck et al., 1999; Nezlek, 2001). A method that addresses the limitations of single-assessment studies is the daily diary technique, in which participants provide end-of-day reports over the course of several days or weeks (Nezlek, 2012). This method accommodates analysis of within-person processes, minimizes recollection biases and forgetting that occur with long-term recollection (Newman & Stone, 2019; Shiffman et al., 2008), and is ecologically valid (Brunswik, 1956). In short, daily diary methods allow researchers to study “life as it is lived” (Bolger et al., 2003).

To our knowledge, daily diaries have been used to study prayer in only one study (DeWall et al., 2014, Study 1). In this study, participants reported their prayer frequency and alcohol consumption three times each week over the course of 25 days. Lagged analyses showed that prayer on one occasion predicted lower alcohol consumption on the next occasion. The within-person relationship between prayer and alcohol consumption highlights one strength of diary methods as they address a question that other methods cannot. Although the use of a single item prayer frequency measure in a diary context was appropriate for the purpose of that particular study, it did not capture distinct aspects of the content of people’s prayers.

Overview of Present Studies

In the present research, we conducted studies in which participants completed end-of-day reports about their prayers, daily events, and well-being for two weeks. We measured prayer content within the context of the ACTS taxonomy (adoration, confession, thanksgiving, and supplication), a taxonomy that is widely used in studying prayer within Christian traditions (Laird et al., 2004; Whittington & Scher, 2010). Additionally, we measured daily states of awe, guilt, gratitude, and envy to examine whether prayers of adoration, confession, thanksgiving, and supplication correspond to these discrete, non-religious emotional states, a possibility that has not been considered in prior research. Our goal was to understand the dynamics of prayer in daily life. We began by examining whether the factor structure of daily prayer differs at between-person and within-person levels of analysis. We then examined within-person processes linking daily prayer to daily events, well-being, and discrete emotional states.

Method

Transparency and Openness

The data, materials, and analyses are available at OSF (<https://osf.io/3vbybm/>). The data were analyzed with HLM version 6 (Raudenbush, et al., 2011). We collected data from as many participants as possible within the constraints of the pool of available participants. Our total sample exceeded the recommended sample sizes to conduct the analyses of interest (Maas & Hox, 2005; Nezlek, 2012). Moreover, post-hoc power analyses were conducted by running simulations with 5,000 iterations in Mplus based on the parameter estimates obtained in various multilevel models. For instance, we selected two of the smaller effects that were statistically significant (within-person relationships between negative deactivated affect and supplication and between negative deactivated affect and thanksgiving). Following recommendations by Bolger et al. (2012) and Arend and Schäfer (2019), we extracted the residual variance, the variance of the level 1 predictor, the fixed effects for the intercept and slope, the variance of the level 2 outcome variable, the variance of the slope, and the covariance between the intercept and slope. Using these values and an estimated sample size of 350 clusters with an average of 12 responses per cluster, we ran a simulation with 5000 iterations. These analyses indicated that we achieved between .95 and .97 power for effects of size $r = .15$.

We recognize post-hoc power analyses may provide limited information beyond the inferential statistics we report below. An alternative approach of sensitivity analyses is also limited in several ways. It is worth noting that power analyses in multilevel modeling are more complex than power analyses conducted with the general linear model (Bolger et al., 2012). As noted above, multilevel power analyses require many estimates beyond a single estimate of one effect size. Sensitivity analyses would require estimates of each of these parameters, which would yield redundant information with the inferential statistics. In sum, we attempted to collect data from as many participants as possible, and power analyses (although potentially flawed in some ways) indicated we achieved a reasonable sample size to examine our hypotheses.

Overview

We conducted three daily diary studies. Because the procedures from Studies 1 and 2 were nearly identical, we describe them together. Study 3 was conducted with a separate sample to address some of the limitations of Studies 1 and 2. Studies 1 and 2 were not preregistered, but Study 3 was preregistered at [aspredicted.org](https://aspredicted.org/sc3dz.pdf) (<https://aspredicted.org/sc3dz.pdf>). The analyses described in the Results section were conducted on the combined data set from all three diary studies because the results were similar across studies. Moreover, as noted by Fabrigar and Wegener (2016), the combined results describe the robust effects that replicate across multiple studies. We focus on these results as opposed to describing the results of each individual study. Nevertheless, results from each individual study are presented in Supplemental Materials. Studies 1 and 2 were approved by Protection of Human Subjects Committee at The College of William and Mary under protocol number PHSC-9838-dbnewman. Study 3 was approved by the Institutional Review Board at the University of Southern California under the protocol number UP-15-00479.

Studies 1 and 2

Participants and Procedure—Studies 1 and 2 were conducted during two consecutive semesters at the same university. A total of 270 undergraduate students from a public university located in the eastern part of the United States participated in the studies for course credit. Fourteen students participated both semesters, and their responses from the second semester were deleted. Two students answered an instructed response item incorrectly; their data were not included in the analyses. Participants were recruited based on responses to questions from an initial survey distributed at the beginning of the semester regarding race, willingness to participate in additional studies for payment, and prayer frequency (0 = *never*, 1 = *less than once a year*, 2 = *about once or twice a year*, 3 = *several times a year*, 4 = *about once a month*, 5 = *2–3 times a month*, 6 = *nearly every week*, 7 = *every week*, 8 = *several times a week*, 9 = *once a day*, 10 = *several times a day*).

To ensure adequate within-person variability, we oversampled people who prayed frequently. Our goal was to recruit enough people who prayed with high, moderate, and low frequencies to provide a basis to examine the relationships of interest. High frequency of prayer was defined as praying at least once a day; moderate frequency, at least once a week; and low frequency, less than once a week. After all participants from the university's research participation pool completed an initial questionnaire that included a question about their prayer frequency, we invited students to participate based on their answer to this question. We attempted to recruit a third of the participants from each prayer frequency category.

Of the final sample, 84 (33.07%) participants prayed with high frequency, 54 (21.26%) prayed with moderate frequency, and 116 (45.67%) prayed with low frequency. Asians and Asian Americans were oversampled in each prayer frequency category; 196 (77.17%) white and 58 (22.83%) Asian or Asian Americans participated in the study¹. 94 (37.01%) identified as Methodist, Baptist, Presbyterian, Episcopalian, Lutheran, or other protestant; 63 (24.80%) as Catholic; 4 (1.57%) as Jewish; 1 (0.39%) as Eastern Orthodox; 2 (0.79%) as Muslim; 2 (0.79%) as Hindu; 11 (4.33%) as Buddhist; 51 (20.08%) as Atheist or Agnostic; and 26 (10.24%) as other.

Participants attended an information session and completed a single background questionnaire prior to the beginning of the daily diary portion of the study. The background questionnaire contained person-level measures that were completed once. Next, over the course of two weeks, participants received emails with links to daily questionnaires each evening at 9:00 PM and were instructed to complete daily questionnaires at the end of their day just before going to bed. A reminder email was sent at 7:00 AM the following morning to participants who had not completed the daily report the prior evening.

In total, 3,422 entries were collected. Entries that were incomplete, were completed after noon the following day, or were duplicate entries by the same participant on the same day were deleted from the final data set. Additionally, as recommended by Meade and Craig

¹Data were collected as part of a larger data collection project. For the purpose of another project, only white and Asian/Asian American participants were recruited. Most analyses (88%) were not moderated by race. Significant moderation analyses showed that the within-person relationships between prayer and well-being were weaker among Asian and Asian American participants than among white participants.

(2012), entries were deleted if the participant incorrectly answered an instructed response item (e.g., “Please select the choice ‘disagree’ for this question”) or entered the same numeric response for all items on a page. In total, 254 participants ($M_{\text{age}} = 18.54$, $SD = 1.55$, 66.9% female) completed 3,288 daily reports (134 entries or 3.92% were eliminated) that were used for final analyses. The average number of completed responses was 12.94 ($SD = 1.47$, median = 13, minimum = 5) out of a possible 14. Additional analyses of some of these data that were unrelated to the present study have been published previously (Newman, Nezlek, et al., 2018; Newman, Schug, et al., 2018; Newman & Nezlek, 2019, 2022; Nezlek et al., 2017, 2018).

Person-Level Measures

Prayer.: As part of the person-level measures that were completed just once, participants completed an abbreviated version of the Multidimensional Prayer Inventory (Laird et al., 2004) that included the prayer types of supplication, thanksgiving, confession, and adoration. We excluded reception as this type has not been included in many prayer taxonomies. Although numerous taxonomies of prayers have been proposed, the MPI captures four of the basic prayer types that have been included in several other taxonomies (e.g., Poloma & Pendleton, 1991; Whittington & Scher, 2010).

Due to the demanding nature of an intensive repeated measures design at the daily level, we wanted to reduce the total demand on our participants. Accordingly, we limited our person-level measure of prayer to the four types of prayer that were measured each day. The abbreviated version of the MPI contained three items per prayer type. Participants responded using an 8-point frequency scale regarding the past month (1 = *never...*, 8 = *all of the time*). Cronbach’s alpha for each prayer type ranged from .94 to .96.

Daily Measures

Daily events.: Participants were presented with a list of 36 positive and negative events that occur in everyday life, spanning social and achievement domains. Participants were asked to respond to each item on a 5-point scale (0 = *did not occur*, 1 = *occurred and not important...*, 4 = *occurred and extremely important*). The daily event items were compiled from the Daily Event Schedule (Butler et al., 1994), the Objective/Subjective Event Checklist (Seidlitz & Diener, 1993), and other items from a diary study by Gable et al. (2000). We calculated composite scores by taking the mean rating for all positive events and the mean rating for all negative events. Composite scores that combine frequency and importance tend to have less heterogeneity of variances than frequency scores (e.g., Nezlek & Plesko, 2001).

Prayer.: The Multidimensional Prayer Inventory (Laird et al., 2004) items were adapted for use in daily diaries to assess prayers of supplication, thanksgiving, confession, and adoration. Similar to the daily events, both the occurrence of each prayer type and the centrality of the prayer were captured by asking the participant to respond to each item on a 5-point scale (0 = *did not occur*, 1 = *occurred and not central to my prayer(s)...*, 4 = *occurred and extremely central to my prayer(s)*). Items were preceded by the phrase, “In my prayer(s) today...” Supplication was measured with the following statements: “I

made specific requests”, “I made various requests of God”, and “I asked for assistance with my daily problems”. Thanksgiving was measured with the following statements: “I offered thanks for specific things”, “I expressed my appreciation for my circumstances”, and “I thanked God for things occurring in my life”. Confession was measured with the following statements: “I admitted inappropriate thoughts, feelings, and behaviors”, “I confessed things that I had done wrong”, and “I acknowledged faults and misbehavior”. Adoration was measured with the following statements: “I worshipped God”, “I praised God”, and “I devoted time to honoring the positive qualities of God”.

Well-being and specific emotions.: Daily affect was measured with a circumplex model that distinguishes valence (positive or negative) and arousal (activated or deactivated). Positive activated affect (PA) was measured with enthusiastic, happy, and excited; positive deactivated affect (PD) was measured with calm, peaceful, relaxed, and contented; negative activated affect (NA) was measured with stressed, tense, and nervous; negative deactivated affect (ND) was measured with depressed, disappointed, and sad². Participants were asked to rate on a 7-point scale how strongly they felt each affective state that day (1 = *did not feel this way at all*, 4 = *felt this way moderately*, 7 = *felt this way very strongly*; Nezlek, 2005; Nezlek & Kuppens, 2008).

Daily states of envy, gratitude, guilt, and awe were assessed using the same response scales as affect. Envy was assessed by the items “jealous” and “envious”; gratitude, by “grateful” and “thankful” (Thrash, Elliot, et al., 2010); guilt, by “repentant,” “blameworthy,” and “guilty” (Izard, 1977); and awe, by “full of awe” and “full of wonder” (Thrash, Maruskin, et al., 2010). Following Oishi et al. (2007), daily satisfaction with life was measured with two items: “How was today” (1 = *terrible*, 7 = *excellent*) and “How satisfied were you with your life today?” (1 = *very dissatisfied*, 7 = *very satisfied*). Based on Kashdan and Nezlek (2012), daily presence of meaning in life was assessed using the items, “How meaningful did you feel your life was today?” and “How much did you feel your life had purpose today?” Responses were recorded on a 7-point scale (1 = *not at all*, 7 = *very much*). Daily self-esteem was assessed with four items that were adapted from the trait measure (e.g., “Today, I felt that I had many good qualities”) and were recorded on a 7-point scale (1 = *very uncharacteristic of me*, 7 = *very characteristic of me*), similar to Nezlek (2005).

Study 3

Participants and Procedure—Study 3 was conducted with a less restricted sample of participants. Undergraduate students from a large, private university located in the western part of the United States received research credit for their participation, but they were not selected based on prayer frequency or race. Prior to completing any questionnaires, they watched an instructional video to learn about the study. The procedures were otherwise the same as in Studies 1 – 2.

The participants completed 1,246 daily reports. Entries that were duplicate cases, had an incorrect answer to an instructed response question, were completed in less than two

²A few additional items were included to measure affect. We decided to use these specific items because they had good reliabilities and were included in each of the three studies. Details are provided in the Supplemental Materials.

minutes, or were completed after 10:00 AM the following morning were removed from analyses. Additionally, five participants who completed fewer than five valid daily reports were excluded. In total, 96 participants ($M_{\text{age}} = 20.17$, $SD = 1.91$, 76.0% female) completed 1,149 daily reports (97 or 7.78% reports were eliminated), similar to the level of compliance from Studies 1 and 2. (Before eliminating the five participants who completed fewer than 5 valid entries, 88 entries or 7.06% were eliminated, a similar percentage as the final level of compliance.)

On average, participants completed 11.97 ($SD = 2.32$; minimum = 5; median = 13) of the 14 possible daily questionnaires. Participants' race/ethnicity was as follows: 30 (31.25%) White, 7 (7.29%) Black, 12 (12.50%) Hispanic/Latino, 51 (53.13%) Asian, and 6 (6.25%) other. Eighteen (18.75%) identified as Methodist, Baptist, Presbyterian, Episcopalian, Lutheran, or other protestant; 15 (15.63%) as Catholic; 2 (2.08%) as Jewish; 2 (2.08%) as Muslim; 1 (1.04%) as Hindu; 4 (4.17%) as Buddhist; 29 (30.21%) as Atheist or Agnostic; and 24 (25.00%) as other.

Measures—The measures were identical to those from Studies 1 and 2 except for the daily events and daily life satisfaction. We used a set of 26 daily events that were similar but not exactly the same as those used in Studies 1 and 2. The 26 daily events were similarly oriented around social and achievement events, and composite scores for positive and negative events were calculated in the same manner as in Studies 1 and 2 (see Newman et al., 2020). Instead of the two items to measure daily life satisfaction, we used one item, “How satisfied were you with your life today?” with responses recorded on a 7-point scale (1 = *not at all*, 7 = *very satisfied*).

Results

Our analyses of the three studies treated as a single sample yielded five key insights into the dynamics of prayer³. We begin with analyses that investigate how prayer should be conceptualized at the between- and within-person levels of analysis. Next, we provide descriptive statistics that document the frequency of each prayer type and how much prayer content varies from one day to the next. These foundational analyses provide the framework to investigate the more substantively interesting questions that follow. We then examined relationships between daily events, daily states of well-being, daily emotional states, and daily prayer content. Lagged analyses were conducted to examine the effect of prayer content on well-being the following day. Finally, we examined how individual differences in prayer frequency moderated the lagged effects between prayer content and well-being. The models used to examine each question are presented in each section.

Determining the Between-Person and Within-Person Factor Structures of Prayer

First, we sought to understand how prayer should be conceptualized at within- and between-person levels of analysis. Determining whether the four prayer contents (measured with

³We conducted three diary studies and preregistered our analyses at aspredicted.org (https://aspredicted.org/189_8SX) prior to running the third study. We decided to drop the preregistered mediation analyses as these were later deemed superfluous and not central to the paper. One additional set of moderation analyses was not preregistered but was run to help explain the lagged analyses.

three items each) form distinct factors is needed before relationships between prayer and other measures can be examined. We found that the factor structure of the four prayer contents differed at the between-person and within-person levels of analysis.

Factor analysis of 12 person-level report items—three each concerning supplication, thanksgiving, confession, and adoration—yielded one factor rather than four. The first six eigenvalues were 8.80, .94, .71, .56, .23, and .16. Standardized loadings of the 12 items on the first factor were all greater than .71. These findings indicate that people can be characterized by the centrality of prayer generally but not by the specific content of their prayers. For instance, those people who express thanksgiving in their prayers also tend to express supplication, confession, and adoration. This fact was also reflected in the strong correlations between each of the four prayer types ($r_s > .69$). In Supplemental Materials, we present the correlations between all prayer types and well-being variables simply to demonstrate consistencies between our data and previous research (Whittington & Scher, 2010).

We also conducted a factor analysis after removing participants who did not pray at all during the two-week diary study and found similar results ($N = 241$). The first six eigenvalues were 7.45, 1.26, 1.10, .80, .36, and .22. Although an argument could be made for either two or three factors given these eigenvalues, the standardized loadings did not map cleanly onto theoretically meaningful factors. We present additional details in the Supplemental Materials.

Turning from person-level report to daily report, a multilevel exploratory factor analysis with geomin rotation of the twelve daily prayer questions yielded four within-person factors⁴. The first six eigenvalues were 5.77, 1.93, 1.51, .94, .32, and .30. Although chi-square was statistically significant ($\chi^2(48) = 228.40, p < .001$), fit indexes of the four-factor model were excellent (RMSEA = .029, CFI = .996, SRMR_{within} = .005), and all factor loadings were greater than .73. These findings indicate that, in contrast to the between-person findings, the four prayer types can be differentiated at the within-person level of analysis. That is, particular individuals' patterns of peaks and troughs in prayer content across days were different for the four prayer contents. For instance, people may express thanksgiving in their prayers on one day and confession on the next.

Means and Variances of Prayer Measures

Second, at a descriptive level, supplication and thanksgiving were the most prominent types of prayer in the daily lives of our participants, followed by adoration and confession (see Table 1). The means of the four prayer types were obtained from unconditional multilevel models in which days were nested within persons. No predictors were entered at either level, and the intercept was allowed to vary randomly. We used the program HLM for the analyses (Raudenbush, Bryk, & Congdon, 2011). These models also revealed that roughly two-thirds of the variance in the prayer variables occurred between individuals and one-third

⁴Within-person eigenvalues with and without participants who never prayed were the same. The eigenvalues of the between-person level from the multilevel EFA of daily items were similar to the eigenvalues from the single assessment, person-level EFA (9.92, .93, .74, .22, .06, .05), suggesting a one factor solution was optimal.

within individuals. Thus, although most of the variation in prayer content occurred between individuals, the amount of within-person variation suggested that the examination of within-person relationships would be worthwhile.

To calculate reliabilities of the daily measures, we relied on recommendations by Nezlek (2017). We created three-level models in which items were nested within days, and days were nested within persons. The intercept of the null models provides an estimate of the true variance divided by total variation, i.e., the reliability of the items of a measure. According to the guidelines suggested by Shrout (1998), all measures had at least moderate reliability, except for self-esteem, which at .58 was close to the minimum of .60 for moderate reliability.

Antecedents of Prayer Content

The third key finding was that each daily prayer type was significantly related to daily events, well-being states, and discrete emotions. In separate multilevel models, the predictors were centered around each individual's mean, and each prayer type was entered as the outcome variable (Enders & Tofighi, 2007)⁵. As recommended by Nezlek (2012), error terms for coefficients were deleted from the models if they were not significant at $p < .15$.

The models were specified as follows:

Model 1a

$$\begin{aligned} \text{Day level: } & y_{ij} (\text{prayer variable}) = \beta_{0j} + \beta_{1j} (\text{positive daily events}) + \beta_{2j} (\text{negative daily events}) + r_{ij} \\ \text{Person level: } & \beta_{0j} = \gamma_{00} + u_{0j} \\ & \beta_{1j} = \gamma_{10} + u_{1j} \\ & \beta_{2j} = \gamma_{20} + u_{2j} \end{aligned}$$

Model 1b

$$\begin{aligned} \text{Day level: } & y_{ij} (\text{prayer variable}) = \beta_{0j} + \beta_{1j} (\text{well-being}) + r_{ij} \\ \text{Person level: } & \beta_{0j} = \gamma_{00} + u_{0j} \\ & \beta_{1j} = \gamma_{10} + u_{1j} \end{aligned}$$

Model 1c

$$\begin{aligned} \text{Day level: } & y_{ij} (\text{prayer variable}) = \beta_{0j} + \beta_{1j} (\text{discrete emotion}) + r_{ij} \\ \text{Person level: } & \beta_{0j} = \gamma_{00} + u_{0j} \\ & \beta_{1j} = \gamma_{10} + u_{1j} \end{aligned}$$

Results from Model 1a showed that positive events were positively related to thanksgiving, $b = .17$, $t = 4.58$, $p < .001$, confession, $b = .06$, $t = 2.35$, $p = .019$, and adoration, $b = .12$, $t = 3.80$, $p < .001$. In contrast, negative events were positively related supplication, $b = .13$, $t = 2.81$, $p = .005$, and were negatively related to thanksgiving, $b = -.11$, $t = 2.24$, $p = .026$.

⁵In Supplemental Tables 7–8, we provide the results from models that include all well-being variables or all discrete emotions together in the same model. These analyses address questions that are not central to the questions we deemed theoretically relevant, but the results are provided to interested readers.

The general pattern of results from Model 1b showed that positively valenced well-being measures (e.g., self-esteem) were positively related to thanksgiving and adoration and were negatively related to supplication, and the reverse pattern emerged for the negatively valenced well-being measures. The well-being measures did not consistently predict confession (see Table 2 and Figure 2).

Stated plainly, people were more likely to express thanksgiving and adoration, and less likely to express supplication, when the day was going well than when it was not. The results of the analyses of confession were mixed; confession increased as positive events increased and self-esteem decreased. Notably, the pattern of results for meaning in life differed from that of the other positive well-being measures. Daily states of meaning in life were positively related to each prayer type.

Results from Model 1c revealed relationships between discrete emotions and types of prayer. Envy was positively related to supplication, $b = .05$, $t = 2.77$, $p = .006$, $r_w^{(1v)} = .11$; gratitude was positively related to thanksgiving, $b = .15$, $t = 9.39$, $p < .001$, $r_w^{(1v)} = .34$; guilt was positively related to confession, $b = .12$, $t = 6.89$, $p < .001$, $r_w^{(1v)} = .35$; and awe was positively related to adoration, $b = .09$, $t = 6.44$, $p < .001$, $r_w^{(1v)} = .27$. Thus, not only did prayers reflect the general valence of the day, they also reflected the discrete emotional experiences of the day. We note that there were some significant within-person correlations between non-matching pairs of discrete emotions and types of prayer (e.g., gratitude and awe; see Supplemental Table 6). In analyses that included each discrete emotion as predictors in the same model, the results generally supported our hypotheses, though there were some additional significant relationships between non-matching pairs (e.g., guilt and supplication; see Supplemental Table 8).

Consequences of Prayer Content

Next, we examined possible causal relationships between prayer and well-being. Although firm conclusions about causality require experimental manipulation, lagged analyses provide a basis for inferring causality from longitudinal data (West & Hepworth, 1991). We examined the lagged effect of prayer on well-being the following day, as well as the lagged effect of well-being on prayer the following day. In these models, we controlled for the outcome measure on the previous day. As in prior models, the level 1 predictors were centered around each individual's mean. Random effects were included for the intercepts and slopes unless the significance test of the variances exceeded .15. The models were as follows:

Model 2a:

$$\text{Day level: } y_{ij}(\text{well-being day } n) = \beta_{0j} + \beta_{1j}(\text{well-being day } n - 1) + \beta_{2j}(\text{prayer day } n - 1) + r_{ij}$$

$$\text{Person level: } \beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + u_{1j}$$

$$\beta_{2j} = \gamma_{20} + u_{2j}$$

Model 2b:

$$\text{Day level: } y_{ij}(\text{prayer day } n) = \beta_{0j} + \beta_{1j}(\text{well-being day } n - 1) + \beta_{2j}(\text{prayer day } n - 1) + r_{ij}$$

Person level: $\beta_{0j} = \gamma_{00} + u_{0j}$

$$\beta_{1j} = \gamma_{10} + u_{1j}$$

$$\beta_{2j} = \gamma_{20} + u_{2j}$$

Coefficients from Models 2a and 2b are presented in Table 3 and shown in Figure 3. Supplication had a negative effect on well-being the following day. In contrast to the positive same-day relationships, thanksgiving and adoration also had negative effects on well-being the following day. These effects were most apparent for self-esteem, negative activated affect, and positive deactivated affect. Additionally, meaning in life and self-esteem on day_{n-1} predicted less confession on day_n .

Consequences of Prayer Content Moderated by Prayer Frequency

Finally, to gain a better understanding of the mechanism guiding the negative lagged effects of prayer on well-being, we examined the moderating effect of individual differences of prayer frequency. Consistent with McCullough (1995), we theorized that the negative lagged effects may be attenuated among people who pray regularly. To address this possibility, we created a dichotomous prayer frequency variable (1 = prayed every day, 0 = did not pray every day) due to the skewed distribution. We entered this variable uncentered at the person level in the lagged analyses in Model 2a.

As expected, some of the negative effects of prayer on well-being were attenuated or even reversed among people who prayed consistently. Among people who prayed infrequently, the negative effects of prayer on well-being were accentuated. For example, the negative lagged relationship between thanksgiving and negative activated affect was moderated by prayer frequency, $b = -.16$, $t = 2.19$, $p = .028$, such that the relationship was negative ($-.08$) among those who prayed every day but was positive ($.08$) among those who did not pray every day. Similarly, the negative lagged relationships between thanksgiving and self-esteem, $b = .16$, $t = 3.19$, $p = .002$, and between adoration and self-esteem, $b = .14$, $t = 2.77$, $p = .006$, were moderated by prayer frequency in similar ways. The complete results for all lagged relationships are presented in Supplemental Table 12.

Discussion

The present set of studies advances our understanding of the day-to-day dynamics of prayer, which has been described as the soul or essence of religion (James, 1961; Spilka & Ladd, 2012). Using daily diary methods, we gained insights not possible through experimental and cross-sectional survey methods. We expand on each of these insights, followed by some of the theoretical and practical implications of our results.

As others have argued at a theoretical level, we found that prayer is a multifaceted construct, consisting of different themes or topics (Ladd & Spilka, 2002; Laird et al., 2004). However, the multifactor structure was documented only at the within-person level of analysis, not at the between-person level. This suggests that the four prayer contents tend to characterize the prayers of the same individuals, but the four types do not necessarily occur on the same days for these individuals. Past reports of a multifaceted structure concerned the between-person level of analysis, and therefore, they appear to be inconsistent with our findings; however,

these studies did not report eigenvalues or other information needed to evaluate the claim of a multifaceted structure (Laird et al., 2004; Whittington & Scher, 2010).

Measuring within-person variation of the four prayer categories proved to be valuable, as prayer content varied as a function of daily events and states of well-being. Broadly speaking, thanksgiving and adoration featured prominently in people's prayers when the day was going well and when they reported greater well-being, whereas supplication featured prominently when the day was not going well. This pattern suggests that prayer functions as a means to reflect on and relive certain daily experiences (Sharp, 2010). One noteworthy finding was that positive events were positively related to confession. Although future research is needed to explore this relationship, we suspect that people may feel comfortable confessing sins only if their daily situations are positive enough to offset the negative effects of confronting their transgressions.

An additional interesting pattern concerns the relationships between daily meaning in life and each of the four prayer types. Similar to the other well-being indicators, meaning in life was positively related to thanksgiving and adoration on the same day. Moreover, unlike the other well-being measures, meaning in life was also positively related to supplication and confession, whereas the other well-being measures were either negatively or not significantly related to supplication and confession. This suggests that meaningful aspects (as opposed to satisfying aspects) of the day may prompt people to make particular requests in their prayers or to confess their sins. These meaningful aspects of the day may not be positive in a hedonic sense. For example, receiving worrying news about a friend or loved one might be associated with lower satisfaction but higher meaning as this is an important event of the day. The importance and significance of this event might cause them to express supplication for their friend in prayer. This interpretation is consistent with the notion that certain negative experiences may be interpreted as meaningful and contributes to the body of research that has pointed to distinct correlates between hedonic and eudaimonic well-being (Newman et al., 2019; Ryan & Deci, 2001; Tov & Lee, 2016).

We found further that particular prayer content covaried with particular discrete emotions: envy with supplication, gratitude with thanksgiving, guilt with confession, and awe with adoration. To our knowledge, this is the first evidence that specific prayer content reflects specific, non-religious emotional states. We acknowledge that other discrete emotions may also be relevant to prayer. For instance, sadness, fear, anxiety, and anger may be relevant to specific forms of supplicatory prayer. We also note that some emotion-prayer associations emerged that we had not hypothesized (e.g., guilt and supplication). This suggests that certain emotional experiences, such as guilt and awe, might behave in complex manners by influencing multiple aspects of prayer. Examining the interrelations among these emotions and incorporating a mixed emotion approach that captures dynamic processes could be valuable in future research on prayer (see Gruehn et al., 2013, and Moore and Martin, 2022, for discussions). Nevertheless, these findings imply that the specific content of prayer can be influenced by discrete emotional states experienced during the course of the day.

Moving beyond within-person associations on the same day, we found that supplication predicted greater feelings of stress and lower feelings of peacefulness and calm on the

following day. These findings suggest that prayers of supplication may not function well as a means to cope with stress as suggested by previous studies (e.g., Pargament & Park, 1995). Rather, supplication may lead to poorer coping (Lawson et al., 1990; Rippentrop et al., 2005) or may simply emphasize the negative aspects of the day and prolong the salience of these negative aspects.

More surprising, thanksgiving and adoration also had negative effects on well-being the following day, although some of these negative effects were attenuated or reversed among people who prayed every day. These findings suggest that among people who pray infrequently, expressing thanksgiving and adoration may be harmful to their well-being. Given that thanksgiving and adoration reflect the positive events of the day, thanksgiving and adoration may create unrealistic expectations of positive experiences on the following day (Taylor et al., 1999). Another possibility is that individuals who pray infrequently tend to pray on those days when circumstances are expected to get worse, in which case the documented lagged effect may not be causal.

In contrast, among people who pray consistently every day, the lagged effects of thanksgiving and adoration may not be detrimental and may be somewhat beneficial. It is possible that the specific content of prayers of thanksgiving and adoration among people who pray every day may differ from those who pray less consistently. Thus, the mechanisms and processes involved in explaining the lagged relationships from prayer to well-being may depend on certain personal characteristics of those who pray. These issues provide fruitful avenues for future research.

Implications

The present results have theoretical and methodological implications for research in social and personality psychology defined more broadly. The measurement of prayer in ecologically valid contexts and the examination of within-person relationships shed light on the processes that were distinct from results from cross-sectional studies and experiments (Ladd & Spilka, 2013). This adds to a body of literature that emphasizes the distinctions between unique levels of analysis (Nezlek, 2001). For example, in a recent daily diary study, Newman, Nezlek, et al. (2018) found a negative between-person relationship between person-level measures of presence and search for meaning in life. In contrast, they found a positive within-person relationship between daily states of searching for meaning and daily states of presence of meaning.

Along the same lines, results from several daily diary and EMA studies of nostalgia showed that daily states of nostalgia were negatively related to well-being, in contrast to much of the experimental literature which has found predominantly positive effects of experimentally induced nostalgia (Newman et al., 2020). As yet another example, people tend to engage in thoughts about significant secrets in daily life as opposed to suppressing these thoughts, a pattern that is inconsistent with the patterns found in laboratory experiments (Slepian et al., 2020). These examples of how results from daily life contrast with results from other methods emphasize the importance of measuring prayer in daily life.

Although findings from daily life may sometimes differ from results from other methods, the insights from daily diaries can be useful in designing intervention studies. For instance, we found that people tend to express thanksgiving and adoration when the day is going well and supplication when the day is not going well. Interventions that attempt to remind people to engage in particular forms of prayer could benefit from knowing the context of their day. EMA methods could be combined with experimental approaches (e.g., just-in-time interventions; Nahum-Shani et al., 2015) to nudge people to engage in particular forms of prayer at specific times of the day.

Finally, our results have implications for how researchers should think about measuring individual differences. Some researchers have proposed a method of aggregating daily or momentary states to characterize individuals (Fleeson, 2001). This approach is useful in the sense that a range of situational contexts are taken into account, in contrast to single assessments which are influenced by recall biases and heuristics (Newman et al., 2021). In the present studies, this would entail aggregating daily reports of each prayer type as person-level variables. We do not recommend such an approach however, because our multilevel factor analysis showed only one factor at the between-person level. This means that an aggregation of daily prayer reports is only warranted as a single factor, such as prayer frequency. Such issues should be considered more broadly in personality psychology as daily or momentary states are aggregated to form measures of individual differences.

Limitations and Future Directions

A few limitations are worth noting. First, similar to much of the research on religious experiences, our sample consisted mostly of American undergraduate students. Among the religious participants, most identified as Christian. Our findings might not generalize to other religious groups, and content of prayers may relate to daily events and well-being in different ways depending on people's faith (Poloma & Gallup, 1991; Whittington & Scher, 2010). For example, daily obligatory prayers by Muslims may not be influenced by daily events as strongly as daily, non-obligatory prayer is among Christians. This could lead to different effects on well-being at a later point in time.

Alternatively, the effects of prayer on well-being among Muslims may resemble the effects among Christians. Muslims often pray to prevent illness and mental health issues (Joshnloo, 2013). This could potentially impair well-being by setting overly optimistic expectations. In Hinduism, many prayers are expressed as mantras or chants that resemble adoration to God (Young & Sarin, 2014). Focusing on attributes of God as opposed to current worries and stress could be beneficial for their well-being. Additionally, when Hindus engage in petitionary prayer, they may choose their deity to match their needs, which could instill a sense of security and optimism which could foster well-being to a greater extent than prayers among other religions. These hypotheses are speculative, and future research is clearly needed to examine differences in daily prayers across religions.

In addition to the limited number of religious groups, our sample was limited to young adults. Older adults pray more frequently than younger adults (Levin & Taylor, 1997). Moreover, data from the Pew Research Center show that among people who pray on a daily basis, older adults are more likely to feel spiritual peace and well-being, which suggests the

content of their prayers may differ as people get older. The effects of prayer on well-being could be more beneficial among older adults than younger adults. Samples with greater demographic diversity would be necessary to determine the generalizability of our findings.

Second, end-of-day questionnaires do not provide a fine-grained temporal sequence of daily events, prayers, and emotions that occur within the course of the day. Ecological Momentary Assessment methods with multiple assessments per day can address these limitations in future studies (Newman & Stone, 2019; Shiffman et al., 2008). These studies could also address questions about the specific situations in which people pray, such as their physical location and presence of others.

In future studies, it could be beneficial to measure people's conversations with other people as a baseline of comparison. Some researchers theorize that prayer is a conversation with a divine being (James, 1961; Levine, 2008). A comparison between the effect of prayer on well-being with the effect of conversations with friends on well-being could be informative. Additionally, it may be worthwhile to consider different categorizations of prayer, such as inward, upward, and outward prayers (Ladd & Spilka, 2002). Granted, they may overlap with some of the categories from the ACTS taxonomy that we used. Nevertheless, this could be a useful avenue for future research.

Conclusion

Prayer is a fundamental component of religious life, yet little is known about how prayer unfolds in daily life. We bridged an important gap in the literature by measuring a multifaceted construct in naturalistic contexts. The specific content of people's prayers varied as a function of the types of events and specific emotions and states of well-being they experienced during the day. Moreover, among individuals who did not pray consistently each day, most aspects of prayer had a negative influence on well-being the following day. Thus, prayer is a complex construct that reflects not only the nature of the day but may also influence how people feel and react in the future.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Data and materials are available at <https://osf.io/3vbym/>.

References

- Affleck G, Zautra A, Tennen H, & Armeli S (1999). Multilevel daily process designs for consulting and clinical psychology: A preface for the perplexed. *Journal of Consulting and Clinical Psychology, 67*(5), 746–754. 10.1037/0022-006X.67.5.746 [PubMed: 10535241]
- Arend MG, & Schäfer T (2019). Statistical power in two-level models: A tutorial based on Monte Carlo simulation. *Psychological Methods, 24*(1), 1–19. 10.1037/met0000195 [PubMed: 30265048]

- Bearon LB, & Koenig HG (1990). Religious cognitions and use of prayer in health and illness. *The Gerontologist*, 30(2), 249–253. 10.1093/geront/30.2.249 [PubMed: 2347508]
- Bolger N, Davis A, & Rafaeli E (2003). Diary methods: Capturing life as it is lived. *Annual Review of Psychology*, 54(1), 579–616. 10.1146/annurev.psych.54.101601.145030
- Bolger N, Stadler G, & Laurenceau J-P (2012). Power analysis for intensive longitudinal studies. In *Handbook of research methods for studying daily life* (pp. 285–301). The Guilford Press.
- Bonhoeffer D (1974). *Psalms: The prayer book of the Bible*. Augsburg Books.
- Boyer P, & Liénard P (2006). Why ritualized behavior? Precaution systems and action parsing in developmental, pathological and cultural rituals. *Behavioral and Brain Sciences*, 29(6), 595–613. 10.1017/S0140525X06009332 [PubMed: 17918647]
- Bradburn NM, Rips LJ, & Shevell SK (1987). Answering autobiographical questions: The impact of memory and inference on surveys. *Science*, 236(4798), 157–161. 10.1126/science.3563494 [PubMed: 3563494]
- Brunswik E (1956). *Perception and the Representative Design of Psychological Experiments*. University of California Press.
- Butler AC, Hokanson JE, & Flynn HA (1994). A comparison of self-esteem lability and low trait self-esteem as vulnerability factors for depression. *Journal of Personality and Social Psychology*, 66(1), 166–177. 10.1037/0022-3514.66.1.166 [PubMed: 8126646]
- Byrd KR, & Boe A (2001). The correspondence between attachment dimensions and prayer in college students. *International Journal for the Psychology of Religion*, 11(1), 9–24. 10.1207/S15327582IJPR1101_02
- Corwin AI, & Brown TW (2019). Emotion in the language of prayer. In Pritzker SE, Fenigsen J, & Wilce JM (Eds.), *The Routledge Handbook of Language and Emotion* (pp. 325–343). Routledge.
- DeWall CN, Pond RS Jr., Carter EC, McCullough ME, Lambert NM, Fincham FD, & Nezelek JB (2014). Explaining the relationship between religiousness and substance use: Self-control matters. *Journal of Personality and Social Psychology*, 107(2), 339–351. 10.1037/a0036853 [PubMed: 25090132]
- Diener E, Northcott R, Zyphur MJ, & West SG. (2022). Beyond experiments. *Perspectives on Psychological Science*, 17(4), 1101–1119 [PubMed: 35201911]
- Ellison CG (1991). Religious involvement and subjective well-being. *Journal of Health and Social Behavior*, 32(1), 80–99. 10.2307/2136801 [PubMed: 2007763]
- Ellison CG, Boardman JD, Williams DR, & Jackson JS (2001). Religious involvement, stress, and mental health: Findings from the 1995 Detroit area study. *Social Forces*, 80(1), 215–249. 10.1353/sof.2001.0063
- Enders CK, & Tofghi D (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods*, 12(2), 121–138. [PubMed: 17563168]
- Fabrigar LR, & Wegener DT (2016). Conceptualizing and evaluating the replication of research results. *Journal of Experimental Social Psychology*, 66, 68–80. 10.1016/j.jesp.2015.07.009
- Fincham FD, & May RW (2021). Generalized gratitude and prayers of gratitude in marriage. *The Journal of Positive Psychology*, 16(2), 282–287. 10.1080/17439760.2020.1716053
- Fleeson W (2001). Toward a structure- and process-integrated view of personality: Traits as density distributions of states. *Journal of Personality and Social Psychology*, 80(6), 1011–1027. 10.1037/0022-3514.80.6.1011 [PubMed: 11414368]
- Francis LJ, & Kaldor P (2002). The relationship between psychological well-being and Christian faith and practice in an Australian population sample. *Journal for the Scientific Study of Religion*, 41(1), 179–184. 10.1111/1468-5906.00109
- Gable SL, Reis HT, & Elliot AJ (2000). Behavioral activation and inhibition in everyday life. *Journal of Personality and Social Psychology*, 78(6), 1135–1149. 10.1037/0022-3514.78.6.1135 [PubMed: 10870914]
- Gene Meraviglia M (2004). The effects of spirituality on well-being of people with lung cancer. *Oncology Nursing Forum*, 31(1), 89–94. 10.1188/04.ONF.89-94 [PubMed: 14722592]
- Granqvist P (2005). Building a bridge between attachment and religious coping: Tests of moderators and mediators. *Mental Health, Religion & Culture*, 8(1), 35–47. 10.1080/13674670410001666598

- Grühn D, Lumley MA, Diehl M, & Labouvie-Vief G (2013). Time-based indicators of emotional complexity: Interrelations and correlates. *Emotion*, 13(2), 226–237. [PubMed: 23163712]
- Heiler F (1966). *Prayer: A study in the history and psychology of religion*. Oneworld Publications.
- Hollywell C, & Walker J (2009). Private prayer as a suitable intervention for hospitalised patients: A critical review of the literature. *Journal of Clinical Nursing*, 18(5), 637–651. 10.1111/j.1365-2702.2008.02510.x [PubMed: 19077024]
- Hox JJ (2002). *Multilevel analyses: Techniques and applications*. Erlbaum.
- Izard CE (1977). *Human emotions*. Plenum Press.
- James A, & Wells A (2003). Religion and mental health: Towards a cognitive-behavioural framework. *British Journal of Health Psychology*, 8(3), 359–376. 10.1348/135910703322370905 [PubMed: 14606978]
- James W (1961). *The varieties of religious experience*. Macmillan.
- Joshanloo M (2013). A comparison of western and Islamic conceptions of happiness. *Journal of Happiness Studies*, 14(6), 1857–1874. 10.1007/s10902-012-9406-7
- Kashdan TB, & Nezlek JB (2012). Whether, when, and how is spirituality related to well-being? Moving beyond single occasion questionnaires to understanding daily process. *Personality and Social Psychology Bulletin*. <http://psp.sagepub.com/content/early/2012/07/30/0146167212454549.abstract>
- Kirkpatrick LA (1992). An attachment-theory approach to the psychology of religion. *International Journal for the Psychology of Religion*, 2(1), 3–28. 10.1207/s15327582ijpr0201_2
- Kreft IG, & de Leeuw J (1998). *Introducing multilevel modeling*. Sage.
- Ladd KL, & Spilka B (2002). Inward, outward, and upward: Cognitive aspects of prayer. *Journal for the Scientific Study of Religion*, 41(3), 475–484. 10.1111/1468-5906.00131
- Ladd KL, & Spilka B (2006). Inward, outward, upward prayer: Scale reliability and validation. *Journal for the Scientific Study of Religion*, 45(2), 233–251. 10.1111/j.1468-5906.2006.00303.x
- Ladd KL, & Spilka B (2013). Prayer: A review of the empirical literature. In *APA handbook of psychology, religion, and spirituality (Vol 1): Context, theory, and research* (pp. 293–310). American Psychological Association. 10.1037/14045-016
- Laird SP, Snyder CR, Rapoff MA, & Green S (2004). Measuring private prayer: Development, validation, and clinical application of the multidimensional prayer inventory. *International Journal for the Psychology of Religion*, 14(4), 251–272. 10.1207/s15327582ijpr1404_2
- Lambert NM, Fincham FD, & Graham SM (2011). Understanding the layperson's perception of prayer: A prototype analysis of prayer. *Psychology of Religion and Spirituality*, 3(1), 55–65. 10.1037/a0021596
- Lang M, Krátký J, & Xygalatas D (2020). The role of ritual behaviour in anxiety reduction: An investigation of Marathi religious practices in Mauritius. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 375(1805), 20190431. 10.1098/rstb.2019.0431
- Lawson K, Reesor KA, Keefe FJ, & Turner JA (1990). Dimensions of pain-related cognitive coping: Cross-validation of the factor structure of the Coping Strategy Questionnaire. *Pain*, 43(2), 195–204. 10.1016/0304-3959(90)91073-R [PubMed: 2087331]
- Levin J (2013). Religion and happiness among Israeli Jews: Findings from the ISSP religion III survey. *Journal of Happiness Studies*, 1–19. 10.1007/s10902-013-9437-8
- Levin JS, & Taylor RJ (1997). Age differences in patterns and correlates of the frequency of prayer. *The Gerontologist*, 37(1), 75–88. 10.1093/geront/37.1.75 [PubMed: 9046709]
- Levine M (2008). Prayer as coping: A psychological analysis. *Journal of Health Care Chaplaincy*, 15(2), 80–98. 10.1080/08854720903113424 [PubMed: 19994608]
- Maas CJM, & Hox JJ (2005). Sufficient sample sizes for multilevel modeling. *Methodology*, 1(3), 86–92. 10.1027/1614-2241.1.3.86
- Maltby J, Lewis CA, & Day L (2008). Prayer and subjective well-being: The application of a cognitive-behavioural framework. *Mental Health, Religion & Culture*, 11(1), 119–129. 10.1080/13674670701485722

- Masters KS, Emerson IV RW, & Hooker SA (2022). Effects of devotional prayer and secular meditation on cardiovascular response to a faith challenge among Christians. *Psychology of Religion and Spirituality*, 14(2), 251–259. 10.1037/re10000369
- Masters KS, & Spielmans GI (2007). Prayer and health: Review, meta-analysis, and research agenda. *Journal of Behavioral Medicine*, 30(4), 329–338. 10.1007/s10865-007-9106-7 [PubMed: 17487575]
- McCullough ME (1995). Prayer and health: Conceptual issues, research review, and research agenda. *Journal of Psychology and Theology*, 23(1), 15–29. 10.1177/009164719502300102
- McCullough ME, & Larson DB (1999a). Prayer. In *Integrating spirituality into treatment: Resources for practitioners* (pp. 85–110). American Psychological Association.
- McCullough ME, & Larson DB (1999b). Prayer. In Miller WR (Ed.), *Integrating spirituality into treatment: Resources for practitioners* (pp. 85–110). American Psychological Association. 10.1037/10327-005
- McKinney J, & McKinney K (1999). Prayer in the lives of late adolescents. *Journal of Adolescence*, 22, 279–290. 10.1006/jado.1999.0216 [PubMed: 10089125]
- McKinney JP, & McKinney KG (1999). Prayer in the lives of late adolescents. *Journal of Adolescence*, 22(2), 279–290. 10.1006/jado.1999.0216 [PubMed: 10089125]
- Meade AW, & Craig SB (2012). Identifying careless responses in survey data. *Psychological Methods*, 17(3), 437–455. 10.1037/a0028085 [PubMed: 22506584]
- Moore MM, & Martin EA (2022). Taking stock and moving forward: A personalized perspective on mixed emotions. *Perspectives on Psychological Science*, 17(5), 1258–1275. 10.1177/17456916211054785 [PubMed: 35559728]
- Munir F, Awan A, Hamdani H, & Nisar S (2012). The impact of worship on individual's well-being. *Journal of Advanced Research in Law and Economics*, III(2), 21–30.
- Murray SA, Kendall M, Boyd K, Worth A, & Benton TF (2004). Exploring the spiritual needs of people dying of lung cancer or heart failure: A prospective qualitative interview study of patients and their careers. *Palliative Medicine*, 18(1), 39–45. 10.1191/0269216304pm837oa [PubMed: 14982206]
- Nahum-Shani I, Hekler EB, & Spruijt-Metz D (2015). Building health behavior models to guide the development of just-in-time adaptive interventions: A pragmatic framework. *Health Psychology*, 34(Suppl), 1209–1219. 10.1037/hea0000306
- Newman DB, & Graham J (2018). Religion and well-being. In Diener E, Oishi S, & Tay L (Eds.), *Handbook of well-being*. Noba Scholar.
- Newman DB, & Nezlek JB (2019). Private self-consciousness in daily life: Relationships between rumination and reflection and well-being, and meaning in daily life. *Personality and Individual Differences*, 136, 184–189. 10.1016/j.paid.2017.06.039
- Newman DB, & Nezlek JB (2022). The influence of daily events on emotion regulation and well-being in daily life. *Personality and Social Psychology Bulletin*, 48(1), 19–33. 10.1177/0146167220980882 [PubMed: 33504280]
- Newman DB, Nezlek JB, & Thrash TM (2018). The dynamics of searching for meaning and presence of meaning in daily life. *Journal of Personality*, 86(3), 368–379. 10.1111/jopy.12321 [PubMed: 28423186]
- Newman DB, Sachs ME, Stone AA, & Schwarz N (2020). Nostalgia and well-being in daily life: An ecological validity perspective. *Journal of Personality and Social Psychology*, 118(2), 325–347. 10.1037/pspp0000236 [PubMed: 30667254]
- Newman DB, Schug J, Yuki M, Yamada J, & Nezlek JB (2018). The negative consequences of maximizing in friendship selection. *Journal of Personality and Social Psychology*, 114(5), 804–824. 10.1037/pspp0000141 [PubMed: 28240940]
- Newman DB, Schwarz N, Graham J, & Stone AA (2019). Conservatives report greater meaning in life than liberals. *Social Psychological and Personality Science*, 10(4), 494–503. 10.1177/1948550618768241 [PubMed: 31565182]
- Newman DB, Schwarz N, & Stone AA (2021). Global reports of well-being overestimate aggregated daily states of well-being. *The Journal of Positive Psychology*, 16(3), 407–416. 10.1080/17439760.2020.1725608 [PubMed: 34025746]

- Newman DB, & Stone AA (2019). Understanding daily life with Ecological Momentary Assessment. In Frank K, Herr PM, & Schwarz, Norbert(Eds.), *Handbook of research methods in consumer psychology* (pp. 259–275). Routledge.
- Nezlek JB (2001). Multilevel random coefficient analyses of event- and interval-contingent data in social and personality psychology research. *Personality and Social Psychology Bulletin*, 27(7), 771–785. 10.1177/0146167201277001
- Nezlek JB (2005). Distinguishing affective and non-affective reactions to daily events. *Journal of Personality*, 73(6), 1539–1568. 10.1111/j.1467-6494.2005.00358.x [PubMed: 16274445]
- Nezlek JB (2012). *Diary methods for social and personality psychology*. SAGE.
- Nezlek JB (2017). A practical guide to understanding reliability in studies of within-person variability. *Journal of Research in Personality*, 69, 149–155. 10.1016/j.jrp.2016.06.020
- Nezlek JB, Forestell CA, & Newman DB (2018). Relationships between vegetarian dietary habits and daily well-being. *Ecology of Food and Nutrition*, 57(5), 425–438. 10.1080/03670244.2018.1536657 [PubMed: 30346834]
- Nezlek JB, & Kuppens P (2008). Regulating positive and negative emotions in daily life. *Journal of Personality*, 76(3), 561–579. 10.1111/j.1467-6494.2008.00496.x [PubMed: 18399953]
- Nezlek JB, Newman DB, & Thrash TM (2017). A daily diary study of relationships between feelings of gratitude and well-being. *The Journal of Positive Psychology*, 12(4), 323–332. 10.1080/17439760.2016.1198923
- Oishi S, Diener E, Choi D-W, Kim-Prieto C, & Choi I (2007). The dynamics of daily events and well-being across cultures: When less is more. *Journal of Personality and Social Psychology*, 93(4), 685–698. 10.1037/0022-3514.93.4.685 [PubMed: 17892339]
- Pargament KI, & Park CL (1995). Merely a defense? The variety of religious means and ends. *Journal of Social Issues*, 51(2), 13–32. 10.1111/j.1540-4560.1995.tb01321.x
- Poloma MM, & Gallup G (1991). *Varieties of prayer: A survey report*. Trinity Press International.
- Poloma MM, & Pendleton BF (1991). The effects of prayer and prayer experiences on measures of general well-being. *Journal of Psychology and Theology*, 19(1), 71–83.
- Poloma M, & Pendleton B (1991). The effects of prayer and prayer experiences on measures of general well-being. *Journal of Psychology and Theology*, 19(1), 71–83. 10.1177/009164719101900107
- Pratt JB (1930). *The religious consciousness*. MacMillan.
- Raudenbush SW, & Bryk AS (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd.). Sage.
- Rights JD, & Sterba SK (2019). Quantifying explained variance in multilevel models: An integrative framework for defining R-squared measures. *Psychological Methods*, 24(3), 309–338. 10.1037/met0000184 [PubMed: 29999378]
- Rippentrop AE, Altmaier EM, Chen JJ, Found EM, & Keffala VJ (2005). The relationship between religion/spirituality and physical health, mental health, and pain in a chronic pain population. *Pain*, 116(3), 311–321. 10.1016/j.pain.2005.05.008 [PubMed: 15979795]
- Roberts RC (2004). The blessings of gratitude: A conceptual analysis. In Emmons RA & McCullough ME (Eds.), *The Psychology of Gratitude* (pp. 58–80). Oxford University Press, USA.
- Ryan RM, & Deci EL (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, 52(1), 141–166. 10.1146/annurev.psych.52.1.141
- Schindler I (2014). Relations of admiration and adoration with other emotions and well-being. *Psychology of Well-Being*, 4(1), 14. 10.1186/s13612-014-0014-7 [PubMed: 26568908]
- Schwarz N (2012). Why researchers should think “real-time”: A cognitive rationale. In *Handbook of Research Methods for Studying Daily Life* (p. 27). Guilford Press.
- Seidlitz L, & Diener E (1993). Memory for positive versus negative life events: Theories for the differences between happy and unhappy persons. *Journal of Personality and Social Psychology*, 64(4), 654–663. 10.1037/0022-3514.64.4.654 [PubMed: 8473982]
- Sharp S (2010). How does prayer help manage emotions? *Social Psychology Quarterly*, 73(4), 417–437. 10.1177/0190272510389129

- Shiffman S, Stone AA, & Hufford MR (2008). Ecological Momentary Assessment. *Annual Review of Clinical Psychology*, 4(1), 1–32. 10.1146/annurev.clinpsy.3.022806.091415
- Shrout PE (1998). Measurement reliability and agreement in psychiatry. *Statistical Methods in Medical Research*, 7(3), 301–317. 10.1177/096228029800700306 [PubMed: 9803527]
- Slepian ML, Chun JS, & Mason MF (2017). The experience of secrecy. *Journal of Personality and Social Psychology*, 113(1), 1–33. 10.1037/pspa0000085 [PubMed: 28481618]
- Slepian ML, Greenaway KH, & Masicampo EJ (2020). Thinking through secrets: Rethinking the role of thought suppression in secrecy. *Personality and Social Psychology Bulletin*, 46(10), 1411–1427. 10.1177/0146167219895017 [PubMed: 32107972]
- Slepian ML, & Moulton-Tetlock E (2019). Confiding secrets and well-being. *Social Psychological and Personality Science*, 10(4), 472–484. 10.1177/1948550618765069
- Spilka B, & Ladd KL (2012). *The psychology of prayer: A scientific approach*. Guilford Press.
- Stone AA, Kessler RC, & Haythomthwatte JA (1991). Measuring daily events and experiences: Decisions for the researcher. *Journal of Personality*, 59(3), 575–607. 10.1111/j.1467-6494.1991.tb00260.x [PubMed: 1960643]
- Taylor EJ, Outlaw FH, Bernardo TR, & Roy A (1999). Spiritual conflicts associated with praying about cancer. *Psycho-Oncology*, 8(5), 386–394. 10.1002/(SICI)1099-1611(199909/10)8:5<386::AID-PON407>3.0.CO;2-C [PubMed: 10559798]
- Thrash TM (2021). The creation and curation of all things worthy: Inspiration as vital force in persons and cultures. *Advances in Motivation Science*, 8, 181–244. doi: 10.1016/bs.adms.2020.01.002
- Thrash TM, Elliot AJ, Maruskin LA, & Cassidy SE (2010). Inspiration and the promotion of well-being: Tests of causality and mediation. *Journal of Personality and Social Psychology*, 98(3), 488–506. 10.1037/a0017906 [PubMed: 20175626]
- Thrash TM, Maruskin LA, Cassidy SE, Fryer JW, & Ryan RM (2010). Mediating between the muse and the masses: Inspiration and the actualization of creative ideas. *Journal of Personality and Social Psychology*, 98(3), 469–487. 10.1037/a0017907 [PubMed: 20175625]
- Tov W, & Lee HW (2016). A closer look at the hedonics of everyday meaning and satisfaction. *Journal of Personality and Social Psychology*, 111(4), 585–609. 10.1037/pspp0000081 [PubMed: 26619303]
- West SG, & Hepworth JT (1991). Statistical issues in the study of temporal data: Daily experiences. *Journal of Personality*, 59(3), 609–662. 10.1111/j.1467-6494.1991.tb00261.x [PubMed: 1960644]
- Whittington BL, & Scher SJ (2010). Prayer and subjective well-being: An examination of six different types of prayer. *International Journal for the Psychology of Religion*, 20(1), 59–68. 10.1080/10508610903146316
- Wuthnow R (2008). Prayer, cognition, and culture. *Poetics*, 36(5), 333–337. 10.1016/j.poetic.2008.06.002
- Young MJ, & Sarin R (2014). Fostering meaning, social connection, and well-being through Hindu beliefs and practices. In Kim-Prieto C (Ed.), *Religion and spirituality across cultures* (pp. 87–100). Springer Science + Business Media. 10.1007/978-94-017-8950-9_5
- Zumbo BD, Liu Y, Wu AD, Forer B, & Shear BR (2017). National and international educational achievement testing: A case of multi-level validation framed by the ecological model of item responding. In Zumbo BD & Hubley AM (Eds.), *Understanding and Investigating Response Processes in Validation Research* (pp. 341–361). Springer International Publishing. 10.1007/978-3-319-56129-5_18

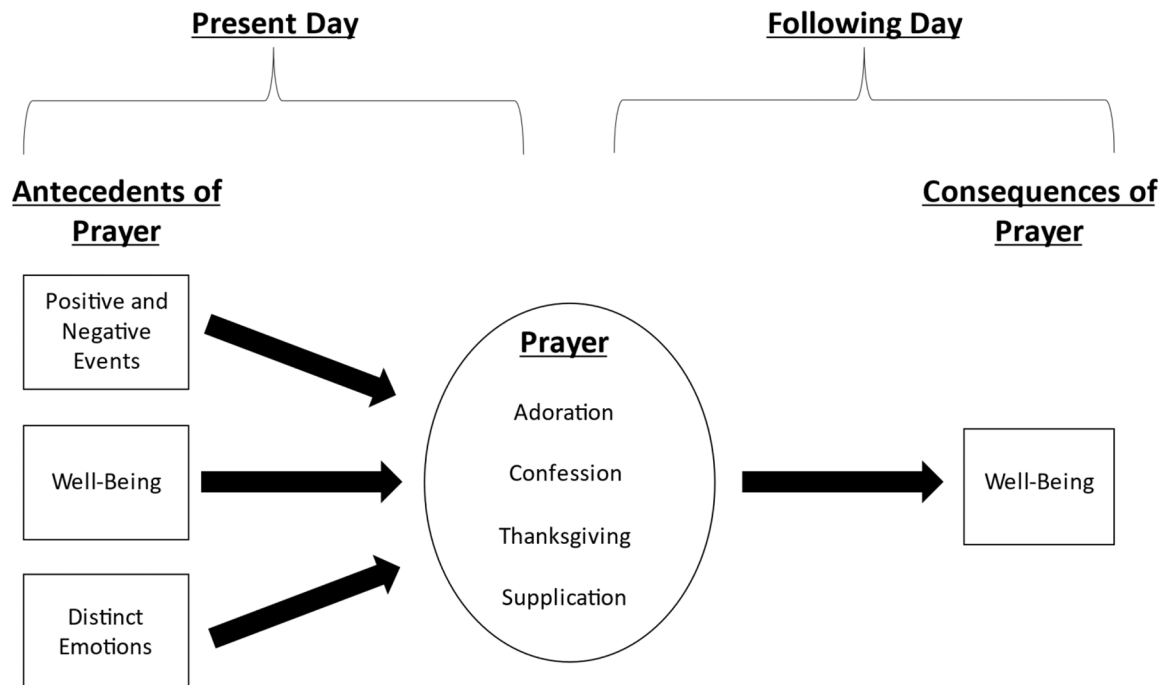


Figure 1. Conceptual representation of our proposed model. Antecedents of prayer types include positive and negative events, states of well-being and distinct emotions. The consequences of prayer types on well-being the following day was tested with lagged analyses.

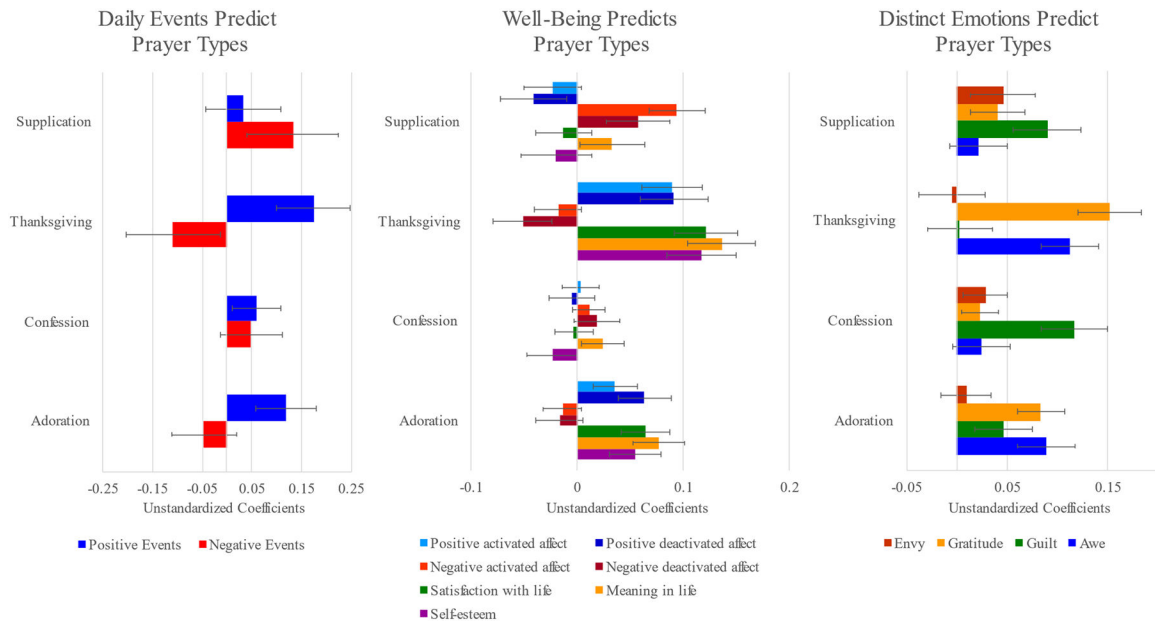


Figure 2. Daily events, states of well-being, and distinct emotions predict supplication, thanksgiving, confession, and adoration. Error bars represent one standard deviation above and below the unstandardized coefficients.

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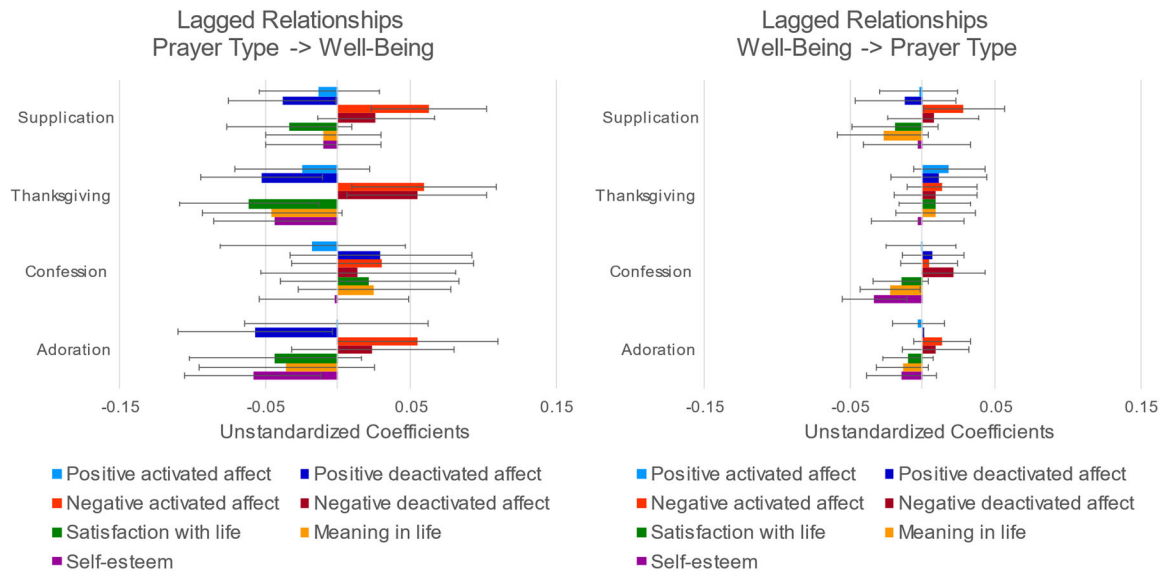


Figure 3. Lagged relationships between each prayer type and states of well-being. Error bars represent one standard deviation above and below the unstandardized coefficients.

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Table 1.

Descriptive statistics of daily variables.

Daily Measure	Variance				Reliability
	Intercept	Within	Between	ICC	
<u>Daily events</u>					
Positive events	1.07	.18	.21	.54	
Negative events	.50	.11	.12	.53	
<u>Prayer types</u>					
Supplication	1.02	.76	1.47	.66	.89
Thanksgiving	1.05	.73	1.56	.68	.92
Confession	.44	.34	.59	.64	.88
Adoration	.74	.43	1.13	.72	.86
<u>Well-being</u>					
Positive activated affect	4.09	1.32	1.09	.45	.72
Positive deactivated affect	3.72	.98	.94	.49	.74
Negative activated affect	3.40	1.46	1.00	.41	.60
Negative deactivated affect	2.33	1.16	.87	.43	.67
Satisfaction with life	4.78	1.30	.77	.37	.81
Meaning in life	4.08	1.18	1.66	.59	.86
Self-esteem	5.18	.94	1.00	.51	.58
<u>Specific emotions</u>					
Envy	1.89	.85	.93	.52	.78
Gratitude	3.95	1.47	2.25	.61	.82
Guilt	1.96	.78	.93	.54	.70
Awe	2.41	1.12	1.58	.59	.73

Note: Reliability statistics were not calculated for single item measures or for daily events. As suggested by Stone et al. (1991), we did not expect daily events to be internally consistent.

Table 2.

Daily well-being predicts each prayer type in separate models.

Well-being	Supplication			Thanksgiving			Confession			Adoration						
	<i>b</i>	<i>t</i>	<i>p</i>	<i>r_w^(flv)</i>	<i>b</i>	<i>t</i>	<i>p</i>	<i>r_w^(flv)</i>	<i>b</i>	<i>t</i>	<i>p</i>	<i>r_w^(flv)</i>				
PA	-.02	1.72	.086	.15	.09	6.17	<.001	.23	.00	0.36	.717	.14	.04	3.36	.001	.17
PD	-.04	2.61	.009	.15	.09	5.52	<.001	.21	-.01	-0.50	.617	.16	.06	4.98	<.001	.20
NA	.09	7.01	<.001	.21	-.02	-1.57	.116	.07	.01	1.40	.163	.08	-.01	-1.51	.13	.11
ND	.06	3.82	<.001	.14	-.05	-3.63	<.001	.15	.02	1.72	.086	.19	-.02	-1.49	.137	.15
SWL	-.01	0.98	.327	.13	.12	8.07	<.001	.26	-.00	-0.36	.723	.15	.06	5.43	<.001	.24
ML	.03	2.09	.038	.19	.14	8.24	<.001	.28	.02	2.29	.023	.19	.08	6.22	<.001	.24
SE	-.02	1.17	.241	.14	.12	7.07	<.001	.21	-.02	-2.03	.043	.18	.06	4.42	<.001	.17

Note: PA = positive activate affect, PD = positive deactivated affect, NA = negative activated affect, ND = negative deactivated affect, SWL = satisfaction with life, ML = meaning in life, SE = self-esteem. HLM provides unstandardized coefficients. Effect sizes, $r_w^{(flv)}$, were calculated following recommendations by Rights and Sterba (2019). The $r_w^{(flv)}$ statistic is defined as the square root of the proportion of variance explained by within-person predictors via fixed slopes and random slope variation/covariation. This is similar to a measure of the square root of the proportion reduction in variance, akin to a correlation (Hox, 2002; Kreft & de Leeuw, 1998; Raudenbush & Bryk, 2002).

Table 3.

Lagged relationships between prayer types and well-being.

Well-being	Supplication			Thanksgiving			Confession			Adoration					
	Lag from Supplication	Lag to Supplication	Lag from Thanksgiving	Lag to Thanksgiving	Lag from Confession	Lag to Confession	Lag from Adoration	Lag to Adoration	Lag from Adoration	Lag to Adoration	Lag from Adoration	Lag to Adoration			
	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>			
PA	.01	.62	-.00	-.20	-.02	-1.02	.02	1.44	.02	-.55	.00	-.14	-.03	-.00	-.31
PD	-.04	2.05*	-.01	-.67	-.05	-2.46*	.01	.69	.03	.92	.01	.64	-.06	-.00	.05
NA	.06	3.08**	.03	1.98*	.06	2.35*	.01	1.13	.03	.96	.00	.46	.06	.01	1.32
ND	.03	1.27	.01	0.47	0.05	2.23*	.01	.63	.01	.40	.02	1.94 ^a	.02	.01	0.80
SWL	-.03	1.50	-.02	-1.26	-.06	-2.49*	.01	.67	.02	.69	-.01	-1.53	-.04	-.01	-1.09
ML	-.01	-0.51	-.03	-1.71 ^a	-.05	-1.86 ^a	.01	.62	.02	.93	-.02	-2.10*	-.04	-.01	-1.49
SE	-.01	0.51	-.00	-0.19	-.04	-1.98*	-.00	-.20	-.00	-.10	-.03	-2.87**	-.06	-.01	-1.20

Note: PA = positive activate affect, PD = positive deactivated affect, NA = negative activated affect, ND = negative deactivated affect, SWL = satisfaction with life, ML = meaning in life, SE = self-esteem.

^a <.10.

* *p* <.05.

** *p* <.01.

*** *p* <.001.

Exact p-values are presented in Supplemental Materials.