

# Does Rumination Mediate the Association of Private Prayer, Stress, and Their Interaction with Depression among Christians? A Cross-Sectional Study

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**Abstract** Mechanisms underlying significant associations between different types of prayer and depression are unknown. Based on the conceptualization of prayer as stress buffering coping style and the Response Style Theory, we proposed that rumination mediates the association of prayer types and stress with depression. This cross-sectional study ( $N = 227$  Christians,  $M_{\text{age}} 41.74$ ,  $SD 14.82$ , age range 18–82 years, 76% female) used path modeling to test whether rumination mediated the associations between prayer types and prayer types by stress interactions with depression. Rumination fully mediated the associations of the colloquial and ritual prayer by stress interactions with depressive symptoms, while meditative and petitionary prayer was directly associated with depressive symptoms. Further, petitionary prayer and the ritual prayer by stress interaction were associated with more and not with less rumination and depressive symptoms, respectively. Summarized, first empirical evidence supports an integration of prayer, stress, and rumination into one model of depression. However, the exact nature of their interplay depends

on the prayer type. If replicated, our findings allow the integration of prayer into cognitive-behavioral treatment of depression in religious and spiritual clients.

**Keywords** Rumination · Prayer types · Stress, depressive symptoms · Cross-sectional

Private prayer (following called prayer) is an important religious and spiritual behavior for many Americans. Over half of American Christians, 68% pray daily and 22% pray weekly or monthly, and 20% of non-religiously affiliated Americans pray daily (Wormald, 2015). Researchers generally found negative associations between frequency of prayer and mental disorders in general (for a review see Spilka & Ladd, 2012) and depression in particular (e.g., Pössel, Winkeljohn Black, Bjerg, Jeppsen, & Wooldridge, 2014). As stressful life events are consistently associated with the development of depression (for a review see Hammen, 2005), the use of prayers as coping strategy for stressful life events may explain these associations (Pargament, 1997). Individuals experience stress when environmental demands—such as major life events—exceed their available resources (Lazarus, 1999). Once an individual makes an appraisal of the stressor, they have created meaning out of the situation and engaged in coping behaviors (Lazarus, 1999). People cope with stress in adaptive and maladaptive ways. Prayer is the most commonly used religious coping strategy for stressful events (Spilka, Hood, Hunsberger, & Gorsuch, 2003). In other words, individuals use prayer to buffer against the negative effects of stress; thus, the association between stressful life events and depressive symptoms should be weakened in individuals who pray (moderation effect).

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A stress buffering effect of prayer on depressive symptoms would be of particular relevance as depression is one of the most common mental disorders (CBHSQ, 2016) causing high costs for the individual and our society (Stewart, Ricci, Chee, Hahn, & Morganstein, 2003). One effective psychotherapeutic treatment of depression is cognitive-behavioral therapy (CBT; Cuijpers et al., 2013) which focuses on the reduction of cognitive variables like rumination, a cognitive style in which individuals focus their attention on and think repetitively about stressors (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). As rumination is triggered by stressors and leads to the development and worsening of depressive symptoms (Nolen-Hoeksema et al.), it mediates the association between stressors and depressive symptoms. Previous research demonstrates that integrating religious and spiritual material into psychotherapy in general (for a meta-analysis see Smith, Bartz, & Richards, 2007) and into CBT (for a review see Rosmarin, Pargament, & Robb, 2010) in particular makes the treatment even more effective when treating religious or spiritual clients who express the desire to address religious and spiritual behaviors in therapy (Post, Puchalski, & Larson, 2000). Thus, identifying the religious and spiritual variables that will most effectively promote change in clients and integrating these variables into psychotherapy is critical to relieve symptoms of depression for religious and spiritual clients.

Given the negative association between prayer and depression (e.g., Pössel et al., 2014) and that prayer is a coping strategy (Pargament, 1997), the identification of possible mediators in the associations of prayer and stress with mental health is critical for clinicians, who can specifically target these mediators in therapy, when appropriate, to promote adaptive coping mechanisms and regulate stress and depressed mood. As discussed in more detail below, it is possible that prayer's positive effect on depression is, at least in part, due to it reducing rumination (mediation effect; James & Wells, 2003; Ridge, Williams, Anderson, & Elford, 2008). Thus, the current study explores whether rumination, an established cognitive process associated with depression (Nolen-Hoeksema et al., 2008), mediates the associations between prayer and stress with depressive symptoms.

## The Role of Prayer

James and Wells (2003)'s cognitive-behavioral conceptual framework proposes that religious practices lead to greater mental health because the religious practices alter one's cognitive attention to internal processes, affecting self-regulation and rumination. Investigation of prayers in individuals diagnosed with HIV identified prayer's

potential to disrupt rumination by shifting one's attention to the present rather than ruminating about the past or future (Ridge et al., 2008). It is likely that prayer's positive effects on depression are, in part, due to this attentional shift and reduction of rumination (mediation effect).

Further, as individuals use prayer as a coping strategy against the negative effects of stress, we expected the effects of stress on depressive symptoms would be weaker when an individual is praying. For example, some have found that prayer reduced the negative effect of stress on mental health (for a review see McCullough & Larson, 1999). However, Krause (2009) found no significant effect of prayer frequency on the association between stressful life events and depressive symptoms. Similarly, Pössel et al. (2014) found main effects of prayer frequency and stress on depressive symptoms, but no significant prayer frequency by stress interaction effect. However, neither Krause (2009) nor Pössel et al. (2014) considered prayer type, and that different types of prayer might interact differently with stress and/or have different effects on rumination and depressive symptoms. For example, not all forms of religious coping are similarly effective and some even have negative effects (for a meta-analysis and a review see Ano & Vasconcelles, 2005; Pargament, Smith, Koenig, & Perez, 1998, respectively). Applied to our current study, certain types of prayer may be more effective in reducing rumination and/or depressive symptoms than others.

## Prayer Types and Rumination

Poloma and Pendleton (1991) created a model describing prayer as prayer frequency, prayer experience (e.g., insight, inspiration), and four prayer types: colloquial, meditative, petitionary, and ritual. Colloquial prayer involves talking to God in one's own words, such as asking God for guidance. In meditative prayer, the prayer feels and listens for God's presence and is engaged in a thoughtful and mindful "personal relationship" with God (pp. 79–80, Poloma & Pendleton). Petitionary prayer involves asking God to fulfill specific material needs for the prayer or friends. Finally, ritual prayer includes reciting memorized prayers or other ritualized activities and therefore does not typically include phrases or thoughts generated by the prayer.

Similar to the different forms of religious coping (Ano & Vasconcelles, 2005; Pargament et al., 1998), certain types of prayer may be more effective in reducing rumination compared to others. However, while multiple studies researched associations between Poloma and Pendleton's types of prayer and measures of mental health (Maltby, Lewis, & Day, 2008; Pössel et al., 2014; Winkeljohn Black, Pössel, Jeppsen, Bjerg, & Wooldridge,

2015), empirical studies supporting the proposed associations between prayer types and rumination are rare. In the long term, a clearer understanding of how and which specific types of prayer relate to rumination would allow an integration of prayer into the Response Style Theory (Nolen-Hoeksema et al., 2008) and therefore therapists could apply prayers as part of CBT in religious or spiritual clients.

### Colloquial Prayer

As colloquial prayer represents talking to God and asking God for guidance, one could conceptualize it as collaborative religious coping (Pargament, Koenig, & Perez, 2000). This coping style is highly effective in reducing the impact of stress (Pargament et al., 1998), and one can see how such collaboration with God assumes the prayer's perception of a positive relationship with God (Kirkpatrick, Shillito, & Kellas, 1999; Krause, 2009) and God-mediated control (Jeppsen, Pössel, Bjerg, Winkeljohn Black, & Wooldridge, 2015). Therefore, colloquial prayer reduces the prayer's rumination because the responsibility for a problem solution is shared between the individual and an all-powerful higher being. A small-to-moderate negative correlation between colloquial prayer and depression supports this hypothesis (Maltby et al., 2008). In addition, Perez et al. (2011) found that rumination fully mediated the relation between thanksgiving (a part of colloquial prayer in Poloma and Pendleton's (1991) typology) and depressive symptoms. Thus, it seems logical to assume a negative relation between colloquial prayers and rumination.

### Meditative Prayer

Similar to other meditative practices, meditative prayer might provide periods of relief from stress during which ruminative thoughts are suspended. This hypothesis is consistent with the well-documented benefits of meditation (e.g., Lykins & Baer, 2009). Neurological responses to meditation include higher levels of brain activation in areas attributed to attention and response inhibition and lower levels of activation in areas attributed to perseverative thoughts and emotions. The authors concluded, "meditation may strengthen the ability to inhibit cognitive and emotional mental processes such as rumination" (p. 11487). Additional research supporting this idea found decreased levels of rumination in participants of mindfulness meditation (Lykins & Baer, 2009).

The similarities between meditative practice and meditative prayer suggest that meditative prayer also is linked to changes in attention and associated positive outcomes. Both techniques involve a calm, passive state of concentration and reflection; it appears as if the only difference

between the two is the attentional target, and praying clients may be more receptive to this type of meditation practice. General meditative practice does not require a particular target of attention, although visual objects, mantras, or the sound of one's breath is often suggested. This prediction would also be consistent with Maltby et al.'s (2008) finding that meditative prayer was associated with fewer depressive symptoms. Summarized, it seems logical that meditative prayer would reduce rumination (Lykins & Baer, 2009).

### Petitionary Prayer

As petitionary prayer is defined as asking God to fulfill material needs (Poloma & Pendleton, 1989), one could conceptualize it as deferring religious coping by asking God to solve their problems (by providing material goods), rather than collaboratively solving the problem (Pargament et al., 2000). As this coping style does not involve any effort on the part of the prayer, it is seen as the worst in terms of effective problem solving (Pargament et al., 1998). This could also mean that prayers using petitionary prayer simply have fewer or no concerns (i.e., ruminations) about the problem. Maltby et al.'s (2008) finding of a null relation between petitionary prayer and depressive symptoms supports this hypothesis. However, so far no empirical research has studied the association between petitionary prayer and rumination.

### Ritual Prayer

Ridge et al. (2008) found that recitation of the Rosary allowed for interruption of rumination. This could be explained by distraction from a stressful life event as proposed by Nolen-Hoeksema et al. (2008) or as a method to create space for a modified awareness of cognitive processes similar to meditation procedures. In addition, Maltby et al. (2008) found ritual prayer to be significantly associated with less depressive symptoms, as one would expect if ritual prayer was associated with decreased rumination. Thus, it seems likely that ritual prayer is associated with decreased rumination.

Overall, the association between prayer, stress, rumination, and depressive symptoms seems to depend on the type of prayer. However, the existing literature on the association between prayer and rumination (Perez et al., 2011) has not yet considered the effects of stress. This is important, as rumination is one (maladaptive) way to cope with stressful events (Nolen-Hoeksema et al., 2008) and subsequently contributes to the development, severity, and duration of depression (Nolen-Hoeksema & Morrow, 1991). In other words, rumination can be conceptualized as mediator between stressful events and depressive

symptoms. Thus, it is possible that rumination does not mediate the associations between the prayer types and depressive symptoms if the prayer is not stressed.

## Current Study

The current study discerned moderation effects of the different prayer types on the association between stress and depressive symptoms and the mediating effects of rumination on the associations of stress and prayer type with depressive symptoms. We proposed negative associations of stress and colloquial, meditative, and ritual prayer with depressive symptoms. Further, we proposed that there would be negative associations of stress and these three prayer types with rumination. Finally, we proposed that rumination would mediate the negative associations of stress and these three prayer types with depressive symptoms. Regarding petitionary prayer, we expected no significant association between petitionary prayer and depressive symptoms. Thus, we predicted no significant association between petitionary prayer and rumination. We also predicted no significant mediation effect.

Depression is a complex construct that is influenced by a multitude of biological, psychological, and social factors (e.g., Abela & Hankin, 2008). Thus, it is unlikely that rumination is the only mechanism underlying associations of stress and prayer type with depressive symptoms. Therefore, we hypothesized that rumination would be only a partial mediator. Furthermore, considering rumination is a response to stress (Nolen-Hoeksema et al., 2008), we proposed that stress would more strongly predict rumination for individuals reporting higher levels of prayers. In other words, we expected that all prayer types but petitionary prayer would moderate the association between stress and rumination (Fig. 1c).

## Method

### Participants

Participants identifying as Christian who reported privately praying at least once in the past year completed self-report measures online about their prayer behaviors and mental health symptoms ( $N = 227$ ). Of the sample, 76% was female, the mean age was 41.74 years ( $SD: 14.82$ , age range 18–82 years), and the sample largely consisted of White/Caucasian participants ( $n = 207$ ; 90.7%), followed by Black/African American ( $n = 9$ ; 4.0%), Asian, Pacific Islander ( $n = 4$ ; 1.8%), Mixed Race/Ethnicity ( $n = 3$ ; 1.3%), and Other ( $n = 4$ ; 1.8%). Twenty-seven percent identified as Non-Denominational ( $n = 62$ ), 18.5%

Methodist ( $n = 42$ ), 15.9% Catholic ( $n = 36$ ), 13.2% Church of Jesus Christ of Latter-Day Saints ( $n = 30$ ), 5.7% Baptist ( $n = 13$ ) and 19.4% Other Christian denominations ( $n = 44$ ).

### Procedure

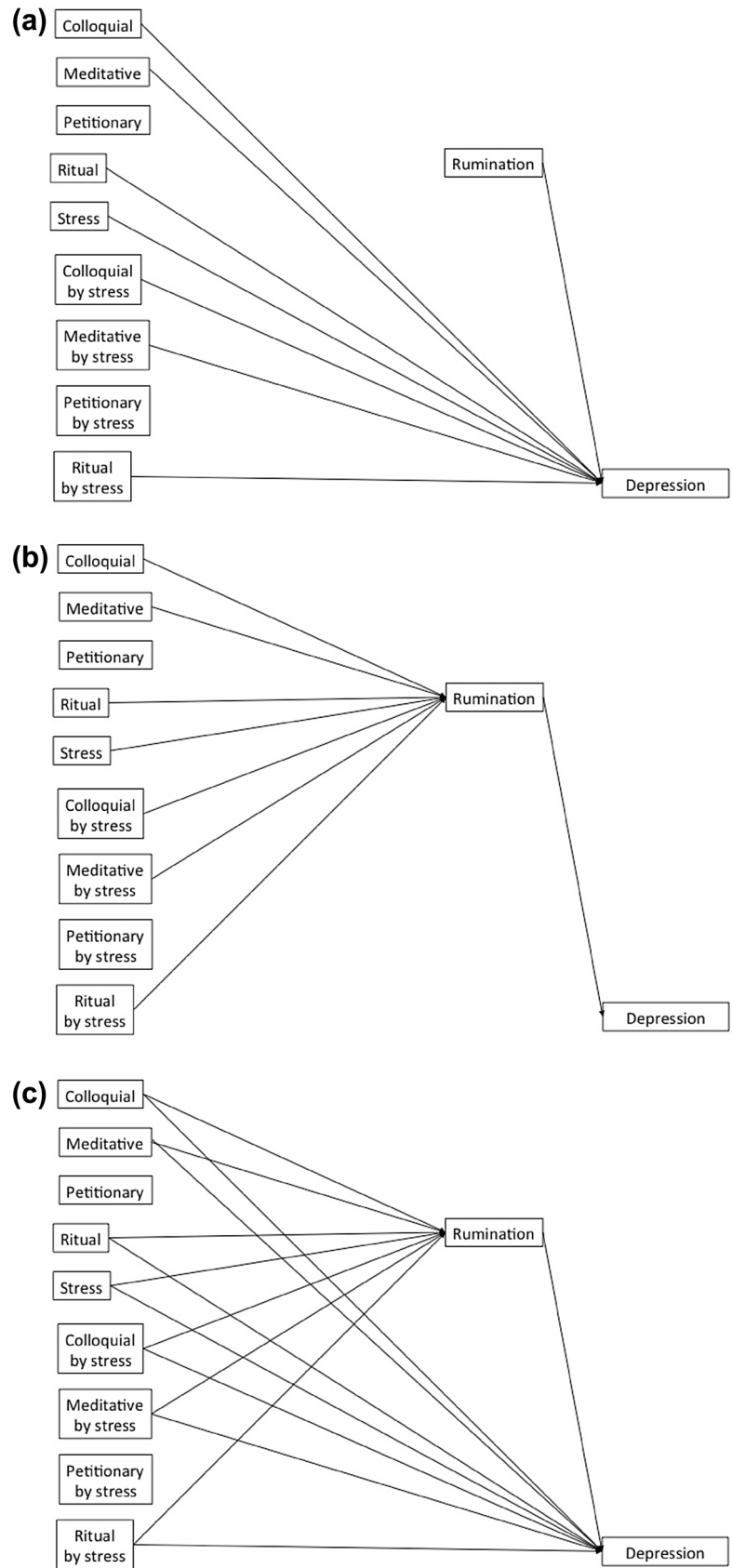
Participants were recruited through announcements posted on Facebook, the website of a Baptist Theological Seminary, a discussion board at a large religiously affiliated western university, email lists relating to the study of religion (e.g., listservs for the American Association for Christian Counseling, American Psychological Association Division 36—Psychology of Religion, Christian Association for Psychological Studies, and Society for Christian Psychology), and undergraduate courses in psychology at two large universities in the USA (one western, one southern). Research on the usage of social network sites in general (for a systematic review see Alshaikh, Ramzan, Rawaf, & Majeed, 2014) and of Facebook in particular (Bhutta, 2012) demonstrates the validity of this recruiting method. All participants completed the measures through Survey Monkey, a web-based survey program. The institutional review board at the university of Louisville approved this study.

## Measures

### Prayer Type

Prayer type was measured with the 15-item, self-report Prayer Types Scale (Poloma & Pendleton, 1989). The scale measured the average frequency of behaviors for the four identified prayer types: colloquial (e.g., “talk to God in your own words”), meditative (e.g., “ask for God to speak and then listen for His answer”), petitionary (e.g., “ask God for material things you may need”), and ritual (e.g., “recite prayers you have memorized”). Participants indicated how often they engage in various prayer behaviors using a 7-point Likert scale (never–several times a day). The items were averaged to form the scale scores—with higher scores indicating more frequent use of that prayer type. The internal consistencies for all four subscales in our sample (Cronbach’s  $\alpha$  for colloquial prayer = .91; meditative prayer = .94; petitionary prayer = .90; ritual prayer = .59) were similar to the internal consistencies found by Breslin, Lewis, and Shevlin (2010). Previously, the low reliability of the ritual prayer item scores has been attributed to the fact that this scale includes only two items and was therefore still judged as acceptable (Breslin et al., 2010). Moreover, the construct validity of the Prayer Types Scale in general and of the ritual prayer scale in particular was

**Fig. 1** Conceptual models of the associations between prayer, stress, rumination, and depressive symptoms that were tested in the present study. **a** Direct effect model; **b** full mediation model; **c** partial mediation model. Correlations between constructs are not pictured for reasons of clarity



supported by a confirmatory factor analysis demonstrating that the four-factor structure fits the data significantly better than a one-factor structure or a four-factor structure with a second-order factor (Breslin et al., 2010).

### Stressful Life Events

The Social Readjustment Rating Scale (SRRS; Holmes & Rahe, 1967) was used to measure stressful life events. Participants indicated which of the 43 life events they experienced in the past 12 months (e.g., change in work hours or conditions, death of spouse, divorce, retirement). Each life event has a corresponding weighted value (Miller & Rahe, 1997). Higher weighted values indicated higher stress levels, and the weighted values of endorsed items were summed to determine the total SRRS score.

### Rumination

The Rumination Response Scale (RRS) of the Response Styles Questionnaire (Nolen-Hoeksema & Morrow, 1991) was used to assess rumination. Participants indicated how often they engage in ruminative thoughts and behaviors on 22 items, on a 4-point Likert scale (never–always; e.g., “When I feel sad, down, or depressed I think ‘Why do I always react this way?’”). The items were averaged to form the scale score; higher scores indicate more frequent use of rumination. The internal consistency for the RRS was acceptable with an  $\alpha = .79$  in our sample, which was slightly lower than the internal consistencies reported in Nolen-Hoeksema and Morrow’s study ( $\alpha = .89$ ).

### Depression

Depressive symptoms were measured using the Depression scale of the Profile of Mood States–Short Form (POMS-SF; Shacham, 1983). Participants answered the 8 items by rating the severity to which they have felt each of the depressive adjectives on a 5-point Likert scale (e.g., unhappy, sad, miserable, etc.; not at all–extremely) over the past 2 weeks. The items were summed to form the scale score; higher scores indicated stronger agreement with the depressive adjectives. The internal consistency of the POMS Depression scale in our sample ( $\alpha = .90$ ) was similar to Shacham’s study.

### Data Analyses

To test the hypotheses, we analyzed three path models, with the full information maximum likelihood (FIML) estimation algorithm using AMOS 21 (Arbuckle, 1999). In the direct effect model, the prayer types and rumination

predicted the POMS Depression scale independently from each other (Fig. 1a). This model represented the current literature, where prayer types (e.g., Maltby et al., 2008; Pössel et al., 2014) and rumination (e.g., Nolen-Hoeksema & Morrow, 1991; Nolen-Hoeksema, Stice, Wade, & Bohon, 2007) are associated with depression as well as that prayer and stress interact when predicting depression (for a review see McCullough & Larson, 1999). In the full mediation model, the prayer types predicted rumination, which predicted the POMS Depression scale without direct associations between prayer types and POMS Depression scale (Fig. 1b). This model represented the theoretical considerations outlined above. Finally, the partial mediation model is identical to the full mediation model in that prayer types predicted rumination and rumination predicted the POMS Depression scale. However, the partial mediation model also had prayer types directly predicting the POMS depression scale (Fig. 1c). This model represented the additional theoretical considerations and empirical findings regarding the complex biological, psychological, and social factors influencing depression (e.g., Abela & Hankin, 2008) discussed above.

Before calculating the path models, we tested the statistical assumptions (normal distribution, multicollinearity) of path models. Neither distribution (Chou & Bentler, 1990; Kline, 2011) nor bivariate multicollinearity (Kline, 2011) was problematic.

We tested goodness of fit of the models with  $\chi^2$ . However, as  $\chi^2$  is known to increase with sample size and degrees of freedom, the root mean squared of the residuals (RMSEA; Steiger & Lind, 1980), comparative fit index (CFI; Bentler, 1990), Tucker-Lewis index (Tucker & Lewis, 1973), and normed fit index (NFI; Bentler & Bonett, 1980) statistics complemented  $\chi^2$ . Statistically nonsignificant values of  $\chi^2$  indicate a good fit of the model to the data. An RMSEA value of .00 indicates a perfect model fit; a value of  $\leq .05$  is conventionally regarded as an indicator of a good model fit; and a value of  $\leq .08$  is seen as acceptable (Hu & Bentler, 1999). CFI, TLI, and NFI values of  $\geq .95$  indicate a good model fit, and values of  $\geq .90$  are regarded as acceptable (Hu & Bentler, 1999). Within the models, standard path coefficients of .10 represent a small effect size, coefficients of .30 represent a medium effect size, and coefficients of .50 represent a large effect size (Kline, 2011).

To compare nested models (direct effect model with partial mediation model, full mediation model with partial mediation model), we calculated  $\chi^2$  difference tests by subtracting the  $\chi^2$  values as well as the *dfs* of the models from each other. When  $\Delta\chi^2$  is significant for  $\Delta df$ , the models are seen as significantly different from each other (Satorra & Bentler, 2001). Further, we calculated  $\Delta CFI$  by subtracting the CFI value of one model from the CFI value

of another model. When  $\Delta\text{CFI}$  of two models is  $> .002$ , the model with higher CFI fits the data significantly better. However, when  $\Delta\text{CFI}$  is  $\leq .002$ , both models fit equally well from a statistical point of view, and the more parsimonious model should be accepted (Meade, Johnson, & Braddy, 2008).

The indirect effects between prayer frequency and the prayer frequency by stress interaction were crucial. In order to test the hypothesized multiple mediators, we calculated 95% bootstrapping confidence intervals (CI) using the bias-corrected percentile method, following Preacher and Hayes' (2008) approach. Based upon Preacher and Hayes, only the indirect effects are needed to determine whether mediation is present. A statistically significant individual mediation effect exists when the confidence interval of the indirect effect does not contain zero. We interpreted the mediation effects using Zhao, Lynch, and Chen's (2010) rules regarding types of mediation and non-mediation.

## Results

Means, standard deviations, and correlations between variables are presented in Table 1. All prayer types correlated positively and significantly with each other. Thus, in all path models, the frequencies of prayer types were allowed to correlate with each other. Unexpectedly, rumination was not correlated with any of the prayer types; however, rumination correlated positively and significantly with stress and depressive symptoms. No prayer type correlated significantly with stress, while meditative and ritual prayer—but not colloquial and petitionary prayer—correlated negatively with depressive symptoms. As expected, stress

and depressive symptoms correlated positively and significantly.

## Determination of the Best Fitting Model

To identify the model that fits the data best, we tested and compared the direct effect model ( $\chi^2$  (25,  $N = 227$ ) = 40.78,  $p = .024$ , RMSEA = .055, CFI = .983, TLI = .956, NFI = .960; Fig. 1a), the full mediation model ( $\chi^2$  (25,  $N = 227$ ) = 47.68,  $p = .004$ , RMSEA = .066, CFI = .976, TLI = .937, NFI = .953; Fig. 1b), and the partial mediation model ( $\chi^2$  (16,  $N = 227$ ) = 22.11,  $p = .140$ , RMSEA = .043, CFI = .994, TLI = .974., NFI = .978; Fig. 1c). Comparing the direct effect model with the partial mediation model revealed that the latter model fits the data better than the former ( $\Delta\chi^2$  (9,  $N = 227$ ) = 18.67,  $p = .028$ ,  $\Delta\text{CFI} = .009$ ). Comparing the full and the partial mediation model demonstrated a better fit of the partial model as well, ( $\Delta\chi^2$  (9,  $N = 227$ ) = 25.57,  $p = .002$ ,  $\Delta\text{CFI} = .018$ ). To make a final determination about the associations between the individual variables in this model, we inspected the individual associations (standardized path coefficients and 95% confidence intervals for all possible individual mediation effects) in the partial mediation model.

## Analyses of Individual Associations in the Best Fitting Model

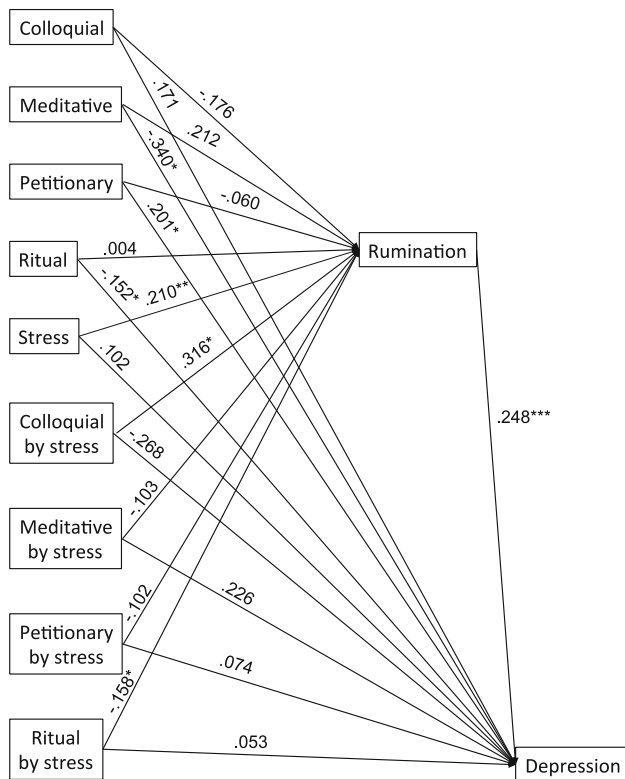
The standardized regression weights of the partial mediation model are presented in Fig. 2. Further, the correlations between the independent variables (prayer types, stress, and their interactions) of this model are presented in

**Table 1** Correlations, means, and standard deviations for depression, stress, prayer type, and rumination

Variable	1	2	3	4	5	6	7
1. Rumination							
2. Colloquial	-.03						
3. Meditative	.01	.89***					
4. Petitionary	-.02	.57***	.54***				
5. Ritual	.01	.50***	.48***	.30***			
6. Stress	.20**	-.07	-.05	.11	-.12		
7. Depression	.24***	-.11	-.14*	.07	-.20**	.20**	
<i>M</i>	23.12	4.05	3.53	2.48	2.09	382.82	13.19
<i>SD</i>	6.07	1.94	1.95	1.50	1.33	251.62	5.85

Depression = POMS depression scale, Stress = Social Readjustment Rating Scale, Colloquial = Frequency of colloquial prayers, Meditative = Frequency of meditative prayers, Petitionary = Frequency of petitionary prayers, Ritual = Frequency of ritual prayers, Rumination = RSQ rumination scale

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



**Fig. 2** Path model of the partial mediation model. Correlations between constructs and error terms are not pictured for reasons of clarity but can be found in Table 2. Standard path coefficient: .10 = small effect size, .30 = medium effect size, .50 = large effect size. \**p* < .05; \*\**p* < .01; \*\*\**p* < .001

Table 2. Consistent with previous empirical findings and our hypotheses, higher levels of rumination were significantly associated with more depressive symptoms (small-to-medium effect size). However, consistent with the correlations presented in Table 1 but contrary to our hypotheses, there were no significant associations between any main effects of prayer type with rumination, even if the associations of colloquial and meditative prayer and rumination were small to medium sized. Meditative (medium-to-large effect size) and ritual prayers (small-to-medium effect size), on the other hand, were negatively associated with depressive symptoms, while petitionary prayer (small-to-medium effect size) was positively associated with depressive symptoms. Colloquial prayer was unrelated to depressive symptoms.

As predicted, the interaction effects of colloquial prayer and ritual prayer by stress on rumination were significant. While the colloquial prayer by stress interaction was of medium effect size and positively associated with rumination, the ritual prayer by stress interaction was of small-to-medium effect size and negatively associated with rumination. We constructed model-implied graphs to examine the nature of the associations of the colloquial

**Table 2** Correlations of prayer types, stress, and their interactions in the partial mediation model

Colloquial—meditative	.885***
Colloquial—petitionary	.567***
Colloquial—ritual	.484***
Colloquial—colloquial by stress	.001
Meditative—petitionary	.533***
Meditative—ritual	.469***
Meditative—meditative by stress	.058**
Petitionary—ritual	.286***
Petitionary—petitionary by stress	-.005
Ritual—ritual by stress	-.154**
Stress—colloquial by stress	-.194**
Stress—meditative by stress	-.141*
Stress—petitionary by stress	-.038
Stress—ritual by stress	-.290***
Colloquial by stress—meditative by stress	.871***
Colloquial by stress—petitionary by stress	.541***
Colloquial by stress—ritual by stress	.500***
Meditative by stress—petitionary by stress	.504***
Meditative by stress—ritual by stress	.469***
Petitionary by stress—ritual by stress	.228***

Depression = POMS depression scale, Stress = Social Readjustment Rating Scale, Colloquial = Frequency of colloquial prayers, Meditative = Frequency of meditative prayers, Petitionary = Frequency of petitionary prayers, Ritual = Frequency of ritual prayers

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001

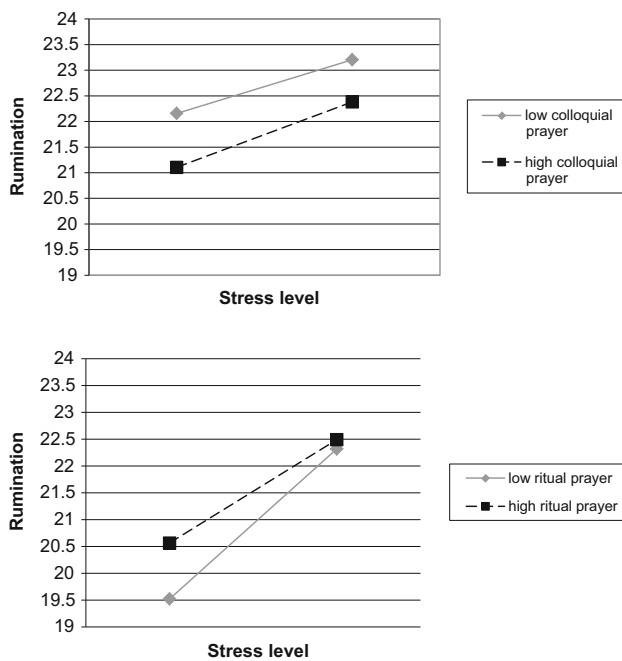
prayer by stress and the ritual prayer by stress interactions with rumination (Fig. 3). The graph regarding the former demonstrates that stress was associated with less rumination in individuals with high and low levels of colloquial prayer and rumination is lower in the latter than the former group. While this finding was as one would expect, ritual prayer had no impact on rumination in highly stressed individuals and even more surprising, in low-stressed individuals higher levels of ritual prayer were associated with more rumination.

Presented in Table 3 are 95% confidence intervals for all possible individual mediation effects in the partial mediation model. Altogether, three of the nine possible individual mediation effects were significant. Rumination fully mediated the associations of the colloquial prayer and ritual prayer by stress interactions with depressive symptoms (Zhao et al., 2010).

### Discussion

The aim of our study was to determine whether and which prayer types moderate the association between stress and depressive symptoms and whether rumination mediates the





**Fig. 3** Model-implied graphs of the standardized colloquial prayer by stress interaction and the ritual prayer by stress interaction effect on rumination

associations of prayer types and stress with depressive symptoms. In the long term, establishing such relations would allow an integration of prayer into the Response Style Theory (Nolen-Hoeksema et al., 2008) and therefore, therapists could apply prayers as part of psychotherapy in general (for a meta-analysis see Smith et al., 2007) and into CBT (for a review see Rosmarin et al., 2010) in religious or spiritual clients who want to address religious and spiritual behaviors in session (Post et al., 2000). Our hypotheses were based on the conceptualization of prayer as stress buffering coping strategy (Pargament, 1997) and the Response Style Theory (Nolen-Hoeksema et al., 2008). More specifically, we proposed that rumination would partially mediate the effects of colloquial, meditative, and ritual prayer, and their interaction with stress, on depressive symptoms and that petitionary prayer and its interaction with stress would be unrelated to depressive symptoms. While some of our hypotheses were confirmed, some interesting findings were not expected and will be discussed.

As expected, higher levels of meditative and ritual prayers were associated with less depressive symptoms; however, higher levels of petitionary prayer were associated with more depressive symptoms. No prayer type was associated with rumination without considering stress. While unexpected, this finding supports our interpretation of prayer as moderator in the association between stress and rumination. Further, colloquial and ritual prayer, but

not meditative prayer, moderated the association between stress and rumination. Colloquial prayer was associated with less rumination in high- and low-stressed individuals. Ritual prayer was not associated with rumination in highly stressed individuals. In low-stressed individuals, higher levels of ritual prayer were associated with more rumination. Finally, rumination fully mediated the associations between the colloquial and ritual prayer by stress interactions and depressive symptoms, indicating that rumination is the primary mechanism underlying these associations.

The finding that rumination fully mediates the associations between the colloquial and ritual prayer by stress interactions and depressive symptoms was unexpected. Considering that depression is influenced by a multitude of biological, psychological, and social factors (e.g., Abela & Hankin, 2008), we concluded that there is likely not one sole mechanism underlying the associations between prayer types and depressive symptoms. However, the only empirical study examining rumination as mediator between colloquial prayer (i.e., thanksgiving) and depressive symptoms identified it as full mediator (Perez et al., 2011). Thus, while unexpected, these findings replicate and expand on a previous empirical study. However, considering rumination did not mediate the association between meditative prayer and depressive symptoms, researchers should examine other potential intrapsychological mediators. For example, theoretical considerations and empirical research point to associations of prayer experience (Maltby et al., 2008; Poloma & Pendleton, 1989; Salsman, Brown, Brechting, & Carlson, 2005), perceived God-mediated control (Jeppsen et al., 2015), perceived relationship with God (Kirkpatrick et al., 1999; Krause, 2009), self-disclosure (Frattaroli, 2006; Winkeljohn Black, Pössel, Jeppsen, Bjerg et al., 2015), and trust-based beliefs (Pössel et al., 2014) with mental health.

We also did not expect petitionary prayer's association with more depressive symptoms and ritual prayer's association with more rumination in low-stressed individuals. Based on the conceptualization of prayer as stress buffering coping strategy (Pargament, 1997) and the Response Style Theory (Nolen-Hoeksema et al., 2008), we assumed that stress and prayer would influence rumination which then influences depressive symptoms. However, it is also possible that depressed individuals use petitionary and ritual pray more often than their non-depressed peers do. For example, individuals living in poverty are twice as likely to experience depression than their peers (30.9% vs. 15.8%; Brown, 2012) and petitionary prayer is defined as asking God to fulfill material needs (Poloma & Pendleton, 1989). Thus, it seems possible that higher levels of both depressive symptoms and petitionary prayer go hand in hand, at least in some individuals. Further, we conceptualized petitionary prayer as deferring religious coping (Pargament

**Table 3** Confidence intervals for all possible mediation effects in the partial mediation model

	Lower confidence limit	Upper confidence limit
Colloquial—rumination—depression	– .829	.213
Meditative—rumination—depression	– .061	.824
Petitionary—rumination—depression	– .445	.149
Ritual—rumination—depression	– .257	.255
Stress—rumination—depression	.070	.680**
Colloquial by stress—rumination—depression	.046	1.314*
Meditative by stress—rumination—depression	– .827	.208
Petitionary by stress—rumination—depression	– .521	.052
Ritual by stress—rumination—depression	– .691	– .016*

Depressive symptoms = POMS depression scale, Stress = Social Readjustment Rating Scale, Colloquial = Frequency of colloquial prayers, Meditative = Frequency of meditative prayers, Petitionary = Frequency of petitionary prayers, Ritual = Frequency of ritual prayers, Rumination = RSQ rumination response scale

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

et al., 2000). This deferring could be a sign of feeling unable to solve the problems or in other words, of hopelessness, a symptom of depression. Thus, again it might be that petitionary prayer and depressive symptoms are positively and not, as predicted, negatively associated.

Another interpretation regarding our finding is that ritual prayer is associated with higher levels of rumination in low-stressed individuals. We based our hypothesis on Ridge et al. (2008) finding that reciting the Rosary interrupts rumination, suggesting some individuals might use ritual prayer specifically to stop rumination. This rationale makes sense only for individuals who already ruminate. Thus, in the current cross-sectional study, this leads to ritual prayer being associated with more rumination.

Finally, meditative prayer does not moderate the association between stress and depressive symptoms, and it is directly, but not through rumination, associated with depressive symptoms. Because knowledge regarding meditative prayer is almost completely lacking, we had to rely exclusively on research on other meditative practices (Lykins & Baer, 2009) to formulate our hypotheses. Thus, it is possible that meditative prayer and other meditative practices appear similar but that they are not, at least not in regard to their associations with stress and rumination. However, this needs to remain speculation until researchers examine meditative prayer in more detail.

Future studies should include multiple time points to allow for the examination of the directionality of associations between prayer types, stress, rumination, and depressive symptoms. Further, additional intrapsychological factors should be included as potential mediators. When doing so, individual symptoms of depression (i.e., hopelessness) should be examined separately and socioeconomic status of the participants should be considered as

well given likely links between socio economic status and petitionary prayer. Separated, meditative prayer deserves more research to examine how much it is similar or unique compared to other meditative practices.

### Limitations

This study had several limitations. First, while consistent with previous studies (Breslin et al., 2010; Poloma & Pendleton, 1989; Winkeljohn Black, Pössel, Jeppsen, Tariq, & Rosmarin, 2015), the ritual prayer subscale scores had low internal consistency, weakening associations between ritual prayer and the other variables in the model (Shadish, Cook, & Campbell, 2002). Second, participation was voluntary, and participants were recruited via the Internet, raising questions concerning sampling bias and generalizability (Dillman, Smyth, & Christian, 2008). Additionally, no information as to how many persons were reached but decided not to participate in the study exists; it is possible that a self-selection bias existed. Therefore, it is unknown what characteristic difference may exist between consenters and non-consenters or how this may affect the results in this study. While part of the sample distribution in this study may be explainable by the finding that women are more likely to pray than men (Wachholtz & Sambamthoori, 2013; Wormald, 2015) and therefore more likely to be included in the analysis sample, future studies should attempt to include more male and ethnic minority participants to increase the generalizability of the findings. Related to this issue, by only including Christian individuals who identify as engaging in prayer, it is unknown how the results will generalize to different contexts. Despite limiting the generalizability of the findings, we made this decision as previous findings demonstrated differential

validity of prayer for different religious groups (i.e., Christians, Jews, and Muslims; Winkeljohn Black, Pössel, Jeppsen, Tariq et al., 2015). Third, one might see the sample size of the present study as limiting the generalizability of the findings as well. Based on the formula introduced by Krejcie and Morgan (1970) and that more than 90% of the Christian American adults engage in prayer at least monthly (Wormald, 2015), the error rate of the findings in the presented study is 6.5% and not the desired 5%.

Fourth, colloquial and meditative prayer correlated highly with each other, which is perhaps an indicator of multicollinearity and one solution is to remove one of these variables. However, we opted not to do so as the purpose of this study was to test the associations between the prayer types proposed by Poloma and Pendleton (1989), rumination, and depressive symptoms. This decision is supported by meaningfully different associations of each of the two prayer types with rumination and depression as well as factor analyses with five different samples that support the independence of the two prayer types (Breslin et al., 2010; Poloma & Pendleton; Winkeljohn Black, Pössel, Jeppsen, Tariq et al., 2015). Finally and as mentioned above, a limitation is the correlational design of the cross-sectional study. No conclusions about directionality of the relations between prayer type, stress, rumination, and depressive symptoms can be drawn. Despite the limitations, the study was intended to be exploratory in nature because not much previous research has tested the associations between prayer type, stress, rumination, and depressive symptoms. Thus, the information gained from the study helps to elucidate previously unknown relationships and will help guide future research in the area.

Fifth, we solely used self-report instruments to measure prayer behavior, stress, and depressive symptoms. This can cause common method variance and lead to an overestimation of the association between several measures that are completed by the same person (e.g., Podsakoff, Mackenzie, Lee, & Podsakoff, 2003). Thus, future research could benefit from the use of interview data to measure depressive symptoms.

## Conclusion

Summarized, rumination fully mediates the associations of the colloquial prayer and ritual prayer by stress interactions with depressive symptoms while meditative and petitionary prayer are directly associated with depressive symptoms. Thus, the current study provides the first empirical evidence supporting the integration of a common religious behavior, like prayer, into the Response Style Theory (Nolen-Hoeksema et al., 2008) a well-established theory

explaining the development and maintenance of depression. However, petitionary prayer and the ritual prayer by stress interaction are associated with more and not with less rumination and depressive symptoms, respectively. Thus, the findings also highlight the complexity of the associations between cognitive variables commonly seen as vulnerabilities of depression and religious behaviors like prayer. If replicated, our findings are clinically relevant because they support the use of colloquial and meditative prayer in therapy to help Christian clients to combat rumination and depressive symptoms. These findings also complement and reinforce ethical guidelines requiring therapists to provide multiculturally responsive care to clients, which includes consideration of spiritual and religious identity (Pargament, 2007).

## Compliance with Ethical Standards

**Conflict of interest** Patrick Pössel, Stephanie Winkeljohn Black and Benjamin D. Jeppsen declare that they have no conflict of interest.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

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