

# Factor Structure of the Brief Multidimensional Measure of Religiousness/Spirituality in US and Indian Samples with Traumatic Brain Injury

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Published online: 26 December 2015  
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**Abstract** The aim of this paper was to determine the factor structure of the Brief Multidimensional Measure of Religiousness/Spirituality (BMMRS) based on a sample of individuals from diverse cultures (i.e., USA, India), ethnicities (i.e., Caucasian, African-American, South Asian), and religions (i.e., Christian, Muslim, Hindu). A total of 109 individuals with traumatic brain injury (TBI) were included. Participants completed the BMMRS as part of a broader study on spirituality, religion, prosocial behaviors, and neuropsychological function. A principal components factor analysis with varimax rotation and Kaiser normalization identified a six-factor solution accounting for 72 % of the variance in scores. Five of the factors were deemed to be interpretable and were labeled based on face validity as: (1) Positive Spirituality/Religious Practices; (2) Positive Congregational Support; (3) Negative Spirituality/Negative Congregational Support; (4) Organizational Religion; and (5) Forgiveness. The results were generally consistent with previous studies, suggesting the existence of universal religious, spiritual, and congregational support factors across different cultures and faith traditions. For health outcomes research, it is suggested that the BMMRS factors may be best conceptualized as measuring the following general domains: (a) *emotional* connectedness with a higher power (i.e., spirituality, positive/negative); (b) culturally based *behavioral* practices (i.e., religion); and (c) *social support* (i.e., positive/negative). The results indicate that factor relationships may differ among spiritual, religious, and congregational support variables according to culture and/or religious tradition.

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**Keywords** Spirituality · Religion · Brief Multidimensional Measure of Religiousness/Spirituality · Factor analysis

## Introduction

Over the past several decades, there has been increasing interest in differentiating between specific dimensions of religious behaviors and spiritual experiences, and particularly as they relate to health outcomes. The need to identify universal religious and spiritual constructs is particularly important as meta-analytic reviews have suggested that the manner in which researchers define religiosity is often associated with differences in conclusions about the strength of correlations between religiosity and health outcomes (Hackney and Sanders 2003). In order to improve religion and health outcomes research, additional factor analytic research is needed to identify theoretically sound and statistically distinct religious and spiritual constructs, and particularly research that incorporates culturally and religiously diverse samples.

One measure of religiosity/spirituality that has been of particular interest in the health outcomes research is the Brief Multidimensional Measure of Religiousness/Spirituality (BMMRS; Fetzer 1999), which was one of the first measures that attempted to distinguish between distinct religious and spiritual constructs. Specifically, three subscales were proposed as primary measures of religiousness (i.e., *Private Religious Practices, Organizational Religiousness, and Religious Support*), four subscales were proposed as primary measures of spirituality (i.e., *Daily Spiritual Experiences, Meaning, Values/Beliefs, and Forgiveness*), and one subscale combined both religious and spiritual dimensions (i.e., *Religious and Spiritual Coping*).

Several factor analytic studies of the BMMRS have been completed to date to identify empirically (versus theoretically) derived religious and spiritual constructs, with the vast majority of studies completed with Christian populations in the USA (Idler et al. 2003; Johnstone et al. 2009; Neff 2006; Piedmont et al. 2007; Stewart and Koeske 2006). In general, these studies have consistently indicated that religious and spiritual constructs are distinct, with “religious” constructs associated with ritually based behaviors and practices (e.g., prayer, service attendance) and “spiritual” constructs associated with emotionally based experiences/beliefs (e.g., connection with a higher power). However, the factor analytic studies to date have generally not supported the originally proposed BMMRS religious and spiritual dimensions. For example, studies have indicated that Private Religious Practices and Organizational Religiousness may be best conceptualized as one general religious factor (Cappana et al. 2013; Idler et al. 2003; Johnstone et al. 2009; Piedmont et al. 2007; Stewart and Koeske 2006). In addition, contrary to initially proposed dimensions, studies have consistently identified positive and negative aspects of spirituality distinguishing beliefs in a loving, supportive God versus a punishing, and abandoning God (Cappana et al. 2013; Idler et al. 2003; Johnstone et al. 2009; Piedmont et al. 2007; Stewart and Koeske 2006). Different studies have also inconsistently identified other specific BMMRS spiritual subscales, including Forgiveness (Idler et al. 2003; Johnstone et al. 2009; Neff 2006), Meaning (Neff 2006; Stewart and Koeske 2006), and Commitment, Belief, and Daily Spiritual Experiences (Idler et al. 2003). While several studies have supported the existence of the Religious Support construct (i.e., social support offered via affiliation with a religious congregation), notably even this construct has been identified in

terms of Positive and Negative Congregational support in two different studies (Idler et al. 2003; Johnstone et al. 2009).

## **BMMRS, Culture, and Faith Traditions**

Although the BMMRS has been primarily studied with US Christian populations, it is being increasingly studied with different cultures (Bodling et al. 2013; Mokuau et al. 2001) and faith traditions (Johnstone et al. 2012). However, a review of the literature indicates that relatively few factor analytic studies of the BMMRS using non-US populations have been conducted and none with faith traditions other than Christianity. Specifically, a factor analysis of the BMMRS conducted with 180 primarily Christian Irish college students indicated a four-factor solution, with individual factors labeled as Spiritual Coping, Spiritual Beliefs, Religious Practices, and Spiritual Connectedness (Bodling et al. 2013). In addition, a recent factor analysis of a sample of 819 apparently healthy Italian adults identified a three-factor solution which the authors labeled as Spirituality, Religiousness, and Negative Religious Coping (Cappana et al. 2013). In essence, these results were generally consistent with those from the USA that demonstrated that religious and spiritual dimensions are relatively distinct constructs, while also confirming a need to differentiate between positive and negative aspects of spiritual beliefs/experiences.

## **Purpose and Rationale for the Current Study**

It is important to determine whether previously identified BMMRS religious, spiritual, and congregational support constructs are universal across different cultural and religious groups. To determine this, the current study completed a factor analysis of the BMMRS based on individuals from the USA and India, including Christians, Hindus, and Muslims. Given the BMMRS was designed to examine religion and spirituality in relation to health, our cross-cultural and cross-religion research focused on a population with a serious health condition, i.e., individuals with traumatic brain injury (TBI).

## **Methods**

### **Participants**

The participants were part of a study evaluating relationships among spirituality, religious behaviors, prosocial behaviors, and neuropsychological functions for a population of individuals with TBI from different countries, cultures, and religious backgrounds. The total sample included 109 individuals, including 60 individuals from the USA and 49 individuals from India (average age = 37.7, SD = 14.2, range = 18–78). To increase cultural, ethnic, and religious diversity of the sample, individuals were recruited from Missouri ( $n = 35$ , primarily Caucasian Christians), Michigan ( $n = 25$ , primarily African-American Christians), and Kanpur, India ( $n = 49$ , Hindus and Muslims). All participants had a medical history of TBI. Given that the goal was to assess the factor structure of the BMMRS, and that different injury severity data were collected at the different sites, the specific characteristics related to the sample's TBIs are not reported. However, it is noted that increased heterogeneity in TBI severity and characteristics was desired to help

elucidate distinct BMMRS factors (i.e., increased severity of TBI is likely to be associated with increased range in BMMRS scores, helping to identify distinct factors).

Table 1 lists the demographic characteristics of the entire sample. Table 2 lists the demographic characteristics for the sample based on site of participant recruitment. Table 3 lists demographics based on faith tradition. Participants reported the following religious affiliations: 50 % Christian, 28 % Hindu, 18 % Muslim, and 4 % unknown.

## Procedures

The study used a convenience sample. Participants were contacted in rehabilitation departments (USA) or a surgery department (India) by a faculty member or a research staff member and asked to participate in the study. Participants from Missouri were referred for clinical neuropsychological evaluations as outpatients. Participants from Michigan were recruited if they were participants in the Southeastern Michigan TBI Model System Center which required that they were recruited during inpatient rehabilitation for a mild complicated to severe TBI, although data collection occurred after they were discharged from the hospital and living in the community. Participants from India received services for TBI through a university surgery department. All US and Indian participants were in the non-acute stages of TBI (i.e., at least 6 months post-injury) and living in the community, and completed the measures as outpatients. After giving informed consent, the participants subsequently completed a research packet consisting of paper-and-pencil measures of spirituality/religion (and other measures not included in this study) for which they were compensated USD \$25 (or its equivalent).

**Table 1** Demographics (entire sample)

	<i>N</i>	Percent
Gender		
Male	78	71.6
Female	31	28.4
Ethnicity		
Caucasian	32	29.4
African-American	26	23.9
Indian/Asian	50	45.9
Hispanic	1	0.9
Education		
Less than HS/some HS	25	22.9
HS diploma	17	15.6
Some college	50	45.9
Bachelor's degree	13	11.9
Master's degree	1	0.9
PhD/JD/MD	2	1.8
Unknown	1	0.9
Religious affiliation		
Christian	55	50.2
Hindu	30	27.5
Muslim	20	18.3
Other	4	3.7

**Table 2** Demographics by site

	India		Michigan		Missouri	
	<i>N</i>	Percent	<i>N</i>	Percent	<i>N</i>	Percent
Gender						
Female	7	14.3	3	12.0	14	40.0
Male	42	85.7	22	88.0	21	60.0
Ethnicity						
Caucasian	0	0.0	1	4.0	31	88.60
African-American	0	0.0	24	96.0	2	5.70
Indian/Asian	49	100	0	0.0	1	2.90
Hispanic	0	0.0	0	0.0	1	2.90
Education						
Less than HS/some HS	11	22.4	12	48.0	2	5.7
HS diploma	5	10.2	2	8.0	10	28.6
Some college	25	51.0	11	44.0	14	40.0
Bachelor's degree	6	12.2	0	0.0	7	20
Master's degree	0	0	0	0.0	1	2.9
PhD/JD/MD	2	4.1	0	0.0	0	0
Religious affiliation						
Christian	0	0.0	23	92.0	30	85.7
Hindu	30	61.2	0	0.0	0	0.0
Muslim	19	38.8	0	0.0	1	2.9
Other	0	0.0	2	8.0	4	11.4

## Translation of Measures

Given the cross-cultural nature of the sample, the BMMRS was translated into the Hindi language for South Asian participants. To make the BMMRS more culturally relevant to the participants from India, the following changes were made: the term “church” was changed to “temple”; the term “Grace” was changed to “prayers”; the term “Bible” was removed; and the term “congregation” was changed to “religious community.” The measure was first translated from English into Hindi by two bilingual individuals (i.e., English and Hindi) originally from India who were living in the USA. The translated Hindi BMMRS was then back-translated into English and modified by the Indian co-investigators. Both the English and Hindi versions of the BMMRS were then administered to 10 members of a Hindu temple in a large Southeastern urban area to assure that the translated measures were assessing the constructs of interest.

## Religion/Spirituality Measure

### *The Brief Multidimensional Measure of Religiousness/Spirituality (BMMRS)*

The BMMRS is a 38-item self-report survey with Likert scale formats. For all samples, any reference to “God” in the original BMMRS items was changed to “higher power” for this

**Table 3** Demographics by religion

	Hindu		Muslim		Christian	
	N	Percent	N	Percent	N	Percent
<b>Gender</b>						
Male	28	93.3	15	75.0	37	69.8
Female	2	6.7	5	15.0	16	30.2
<b>Ethnicity</b>						
Caucasian	0	0.0	0	0.0	30	56.6
African-American	0	0.0	1	5.0	22	41.5
Asian/Pacific Islander	30	100	19	95.0	0	0.0
Hispanic	0	0.0	0	0.0	1	1.9
<b>Education</b>						
Less than HS/some HS	1	3.3	10	50.0	13	24.5
HS diploma	2	6.6	3	15.0	12	22.6
Some college	19	63.3	6	30.0	21	39.6
Bachelor's degree	6	20.0	0	0.0	7	13.2
Master's degree	0	0	1	5.0	0	0.0
PhD/JD/MD	2	6.6	0	0.0	0	0.0

**Table 4** BMMRS descriptive statistics (entire sample)

	N	Min.	Max.	Mean	SD
<b>BMMRS</b>					
Daily Spiritual Experiences	109	6	36	21.36	7.71
Meaning	108	2	8	4.29	1.43
Values/beliefs	109	2	8	4.14	1.36
Forgiveness	108	3	12	6.92	2.01
Religious/Spiritual Coping	107	7	25	16.26	3.85
Private Religious Practices	108	6	37	23.67	8.58
Organizational Religiousness	108	2	12	8.35	2.73
Religious support	96	3	12	8.14	2.00

study to make the measure more suitable for individuals of varied faith traditions. Lower scores are indicative of a higher degree of the measured trait. Descriptive BMMRS statistics for the entire sample are presented in Table 4.

**BMMRS Spiritual Experience Subscales**

*Daily Spiritual Experience* measures the individual’s connection with a higher power in daily life (e.g., “I desire to be closer to or in union with a higher power.”). This subscale consists of 6 items rated on a 6-point response format, ranging from 1 (many times a day) to 6 (never). Cronbach’s alpha for this scale was 0.94.

*Meaning* measures a sense of purpose or meaning in life (e.g., “The events in my life unfold according to a divine or greater plan.”). This subscale is composed of 2 items with a 4-point response format, ranging from 1 (strongly agree) to 4 (strongly disagree). Cronbach’s alpha for this scale was 0.73.

*Values/Beliefs* measures religious values and beliefs (e.g., “I believe in a God who watches over me.”). This subscale is composed of 2 items with a 4-point response format, ranging from 1 (strongly agree) to 4 (strongly disagree). Cronbach’s alpha for this scale was 0.63.

*Forgiveness* measures the degree to which individuals are willing to forgive others, and a belief in the Forgiveness of a higher power (e.g., “I know that I am forgiven by a higher power.”). The subscale consists of 3 items rated on a 4-point response format, ranging from 1 (always) to 4 (never). Cronbach’s alpha for this scale was 0.63.

*Religious/Spiritual Coping* purportedly measures Spiritual Coping strategies (e.g., “I look to a higher power for strength, support, and guidance.”). This subscale consists of 7 items with a 4-point response format, ranging from 1 (a great deal) to 4 (not at all). Cronbach’s alpha for this scale was 0.82.

### **BMMRS Religious Practices Subscales**

*Private Religious Practices* measures the frequency of religious activities (e.g., “How often do you watch or listen to religious programs on TV or radio?”). This subscale is composed of 5 items with an 8-point response format, ranging from 1 (more than once a day) to 8 (never). Cronbach’s alpha for this scale was 0.86.

*Organizational Religiousness* measures the frequency of involvement in formal public religious events with a 6-point response format, ranging from 1 (more than once a week) to 6 (never). Cronbach’s alpha for this scale was 0.74.

*Religious Support* measures the degree to which individuals perceive that their local congregations provide help, support, and comfort (e.g., “If you had a problem or were faced with a difficult situation, how much comfort would the people in your congregation be willing to give you?”). This subscale is composed of 4 items and a 4-point response format was used, ranging from 1 (very often) to 4 (never). The internal consistency reliability was .57.

## **Results**

Given that the BMMRS items do not have the same range of scores for each subscale, all subscale items were standardized so that their scaling was equivalent (i.e., each item was scaled based on a range of 0 to 3) consistent with previous studies (Johnstone et al. 2009). Specifically, the 5 subscales which consisted of a 4-point answer format (i.e., Meaning, Values/Beliefs, Forgiveness, Religious and Spiritual Coping, and Religious Support) were transformed from a 1 to 4 range into a 0 to 3 range (i.e., 1.0 was subtracted from the actual score for each item). For the Daily Spiritual Experience and Organizational Religiousness subscales, which were composed of a 6-point response format, 1.0 was subtracted from the actual score, which was then multiplied by 3/5. For the 4 items that used an 8-point range on the Private Religious Practices scale, 1.0 was subtracted from the actual score, which was then multiplied by 3/7. In addition, for one item with a 5-point range on Private Religious Practices, 1.0 was subtracted from the actual score, which was then multiplied by 3/4.

A principal components factor analysis with varimax rotation and Kaiser normalization was then conducted to assess the factor structure of the BMMRS, with the expectation that eight factors would be identified. Six factors were identified which had extraction

**Table 5** Factor Analysis results

Rotated component matrix <sup>a</sup>	Original BMMRS scale	Component					
		1	2	3	4	5	6
<b>BMMRS</b>							
<b>ITEM</b>							
Positive Spirituality/Private Religious Practices							
I feel the love of a higher power for me, directly or through others	Daily Spiritual Experiences	<b>.853</b>	.221	.091	.107	.166	.112
I feel the presence of a higher power	Daily Spiritual Experiences	<b>.836</b>	.182	.095	.087	.118	.009
I find strength and comfort in my religion	Daily Spiritual Experiences	<b>.811</b>	.320	.122	.184	.126	.075
I work together with a higher power as partners	Religious/Spiritual Coping	<b>.804</b>	.238	.229	.032	-.027	.244
I feel deep inner peace or harmony	Daily Spiritual Experiences	<b>.786</b>	.029	.049	.097	.131	.260
I desire to be closer to or in union with a higher power	Daily Spiritual Experiences	<b>.783</b>	.354	.101	.125	.114	.105
I think about how my life is part of a larger spiritual force	Religious/Spiritual Coping	<b>.768</b>	.297	.263	.089	.082	.234
I am spiritually touched by the beauty of creation	Daily Spiritual Experiences	<b>.741</b>	.234	.147	.194	.144	.119
Within your religious or spiritual tradition, how often do you meditate?	Private Religious Practices	<b>.716</b>	-.016	.074	.087	.257	.018
I look to a higher power for strength, support, and guidance	Religious/Spiritual Coping	<b>.693</b>	.455	.174	.076	.065	.181
How often do you pray privately in places other than at church or synagogue?	Private Religious Practices	<b>.656</b>	.387	.080	.330	.296	.142
To what extent is your religion involved in understanding or dealing with stressful situations in any way?	Religious/Spiritual Coping	<b>.645</b>	.203	.077	.338	-.002	.275
How often do you watch or listen to religious programs on TV or radio?	Private Religious Practices	<b>.614</b>	-.072	.083	.243	.519	-.033



Table 5 continued

Rotated component matrix <sup>a</sup>		Component					
BMMRS	Original BMMRS scale	1	2	3	4	5	6
ITEM							
How often are prayers or grace said before or after meals in your home?	Private Religious Practices	<b>.512</b>	.315	.092	.197	.337	.332
The events in my life unfold according to a divine or greater plan	Meaning	<b>.492</b>	.249	.167	.107	.417	.114
Positive Congregational Support							
If you had a problem or were faced with a difficult situation, how much comfort would the people in your congregation be willing to give you?	Religious support	.289	<b>.747</b>	-.132	.191	.114	.058
If you were ill, how much would the people in your congregation help you out?	Religious support	.181	<b>.673</b>	.035	.489	.096	.050
I know that I am forgiven by a higher power	Forgiveness	.462	<b>.627</b>	.124	.057	.133	.168
I believe in a higher power that watches over me	Values	.471	<b>.565</b>	.084	-.012	.466	-.154
I have a sense of mission or calling in my own life	Meaning	.434	<b>.515</b>	.154	-.096	.270	.167
Negative Spirituality/Negative Congregational Support							
I wonder whether I have been abandoned by a higher power	Religious/Spiritual Coping	.218	.078	<b>.819</b>	-.151	-.012	.045
How often are the people in your life critical of you and the things you do?	Religious support	.048	.032	<b>.804</b>	.234	-.013	-.022
How often do the people in your congregation make too many demands on you?	Religious support	.106	-.035	<b>.777</b>	.208	.136	-.105

**Table 5** continued

Rotated component matrix <sup>a</sup>		Component					
BMMRS	Original BMMRS scale	1	2	3	4	5	6
ITEM							
I feel I am being punished by a higher power for my sins or lack of spirituality	Religious/Spiritual Coping	.241	-.076	<b>.730</b>	-.097	.074	.069
I try to make sense of the situation and decide what to do without relying on a higher power	Religious/Spiritual Coping	-.003	.281	<b>.656</b>	-.383	-.057	.229
Organizational Religion							
Besides religious services, how often do you take part in other activities at a place of worship?	Organizational Religion	.185	.081	.009	<b>.748</b>	.062	.023
How often do you go to religious services?	Organizational Religion	.320	.279	.002	<b>.710</b>	.113	.256
Unnamed							
I feel a deep sense of responsibility for reducing pain and suffering in the world	Values	.116	.353	.033	-.003	<b>.756</b>	.311
How often do you read the Bible or other religious literature?	Private Religious Practices	.484	.126	-.017	.366	<b>.543</b>	.033
Forgiveness							
I have forgiven those who hurt me	Forgiveness	.241	.205	-.134	.105	.139	<b>.778</b>
I know that I am forgiven by a higher power	Forgiveness	.410	-.060	.307	.100	.120	<b>.697</b>

Extraction method: principal component analysis

Rotation method: Varimax with Kaiser normalization

Bolded numbers indicate statistical significance

<sup>a</sup> Rotation converged in 7 iterations

eigenvalues greater than 1.0 (i.e., 9.29, 3.43, 3.34, 2.25, 2.14, and 1.89, respectively) and which explained a cumulative total of 72.1 % of the variance in the scores (Table 5). Consistent with current accepted practices, all factors with eigenvalues greater than 1.0 were retained for interpretation. It is noted that the eigenvalue of the sixth factor was not statistically significantly different from 1.00. However, for the purposes of this study, this sixth factor was conceptualized as a distinct factor.

It is noted that the fifth factor ( $\alpha = .60$ ) included two items that did not create a logically coherent factor (i.e., values #10: “I feel a deep sense of responsibility for reducing pain and suffering in the world”; and Private Religious Practices #17: “How often do you read the Bible or other religious literature?”). Given the lack of conceptual congruence between these variables, and that no other factor analysis of the BMMRS has identified a similar factor, this was considered to be a statistical anomaly and it was not considered to be a distinct BMMRS factor. This may need to be reconsidered if future BMMRS factor analyses replicate such a factor.

To establish a coherent descriptive label for each factor, the general content of the questions in each factor was reviewed. As is common in factor analyses, it is noted that several factors included items that did not cohere in a consistent manner, and as a result, general descriptors were identified. After consultation with co-investigators from religious studies and the sciences, the five factors were labeled as follows: 1) Positive Spirituality/Private Religious Practices (15 items,  $\alpha = .96$ ); 2) Positive Congregational Support (5 items,  $\alpha = .84$ ); 3) Negative Spirituality/Negative Congregational Support (5 items,  $\alpha = .82$ ); 4) Organizational Religiousness (2 items,  $\alpha = .74$ ); and 5) Forgiveness (2 items,  $\alpha = .56$ ).

Pearson product–moment correlations were conducted for the six factors (see Table 6). It is noted that all factors were significantly and positively correlated, with the exception of the Negative Spirituality/Negative Congregational Support factor which was significantly correlated only with the Positive Spirituality/Private Religious Practices factor.

## Discussion

Overall, the results are generally supportive of previous factor analytic studies of the BMMRS (Idler et al. 2003; Johnstone et al. 2009), suggesting that religious, spiritual, and congregational support constructs (both positive and negative) in US Christian populations are generally consistent across diverse ethnic, cultural, and faith tradition groups. These results are also generally consistent with other studies that suggest the existence of

**Table 6** Pearson correlations among BMMRS factors

Factor	1	2	3	4
1. Positive Spirituality/private religious practice				
2. Positive Congregational Support	.74 ***			
3. Negative Spirituality/Negative Congregational Support	.27 **	.18		
4. Organizational Religiousness	.51 ***	.47 ***	.02	
5. Forgiveness	.56 ***	.41 **	.16	.44**

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

universal religious and spiritual constructs across faith traditions and cultures (MacDonald et al. 2015; Piedmont and Leach 2002). The main findings of the current study can be summarized as follows:

1. Religious and spiritual constructs are statistically distinct from one another;
2. There is a need to distinguish between positive and negative aspects of both spirituality and congregational support factors; and
3. Spiritual subscales tend to cohere together in terms of general positive and negative constructs, other than for Forgiveness, which has consistently been identified as a statistically separate spiritual dimension.

However, the current results differ slightly from previous factor analytic studies as follows:

1. An Organizational Religion factor was the only unique religious factor identified in the current study, compared to previous studies which have generally identified a general religion factor that included both the BMMRS Private Religious Practices and Organizational Religion subscales. In the current study, Private Religious Practices loaded on a factor with Positive Spirituality, indicating that individuals with TBI who reported feeling closer to a higher power also reported engaging more frequently in Private Religious Practices (i.e., prayer, meditation, ritual). This finding may be related to the diverse cultural and religious make-up of the sample compared to previous studies, and specifically that there may be stronger associations between spiritual beliefs and Private Religious Practices for African-American congregations and Muslim and Hindu faith communities in India (Ellison et al. 2000; Flood 1996; Yoon and Lee 2004). This finding may also be related to the fact that individuals with TBI are relatively isolated due to increased functional disability and limited transportation and therefore may be unable to attend organized religious services (Johnstone et al. 2002; Waldon-Perrine et al. 2011). As a result, it may be that Private Religious Practices are the primary method by which they can express their spiritual beliefs.
2. A previous BMMRS factor analytic study (Johnstone et al. 2009) identified distinct Positive and Negative Congregational Support factors, whereas the current study only identified a Positive Congregational Support factor. In the current study, items from the Negative Congregational Support factor loaded with the Negative Spirituality factor. These results suggest that for some cultures and faith traditions, there is a strong association between negative beliefs in a punishing/abandoning higher power and the negative social support provided by one's congregation. This may reflect the possibility that some cultures or congregants of faith traditions may believe that illnesses/injuries (e.g., TBI) are in fact reflective of divine punishment and as such treat individuals accordingly (i.e., that they are not deserving of support).

### **BMMRS Factors and Psychoneuroimmunological Models of Health**

The current results are also generally supportive of previous suggestions that the BMMRS factors are most appropriately conceptualized in terms of three distinct domains including: a) *Emotional Experience* (i.e., connectedness with a higher power); b) *Cultural Practices* (i.e., specific behaviors/practices associated with theologically/mystically based belief systems); and c) *Congregational Support* (i.e., the perceived social support associated with an individual's congregation; Johnstone et al. 2009). As such, rather than suggesting that the BMMRS be conceptualized in terms of religious versus spiritual dimensions, it is

proposed that the BMMRS be conceptualized in terms of: *behaviors* (e.g., religious rituals, prayer, etc.), *emotional* experiences (e.g., spiritual connection with a higher power), and *social support* factors (e.g., congregational support). This conceptualization is believed to be appropriate given that psychoneuroimmunological models of health stress the influence of behaviors, emotional experiences, and social support on health, regardless of whether these variables are characterized as either religious or spiritual (Ray 2004). Such a conceptualization is likely to improve future research in this area as it will decrease debate regarding arbitrary distinctions offered regarding the terms “religious” and “spiritual” (Fitzgerald 2000) and instead focus on the specific behavioral, emotional, and social aspects of faith traditions that influence health outcomes. From a clinical perspective, it may then become easier to determine the specific mechanisms by which a variety of specific religious and spiritual variables impact health (e.g., reducing behavioral risk factors, offering of social support, enhancement of emotional coping, etc.). This could lead to the implementation of effective religious and spiritually based interventions.

## Limitations and Future Directions

The results are limited in generalizability to persons with TBI. In addition, although the results provide clarity regarding the general cross-cultural and cross-religion validity of the BMMRS, the limited number of participants in each faith tradition precludes drawing any specific conclusions about the factor structure of the BMMRS for each culture, ethnicity, and faith tradition investigated. Replication of this study with larger populations is suggested, and also including other ethnicities, cultures, and faith traditions similar to recent studies that included over 4000 participants from eight different countries (MacDonald et al. 2015). Given the increased interest in determining relationships among religiosity, spirituality, and health (i.e., the reason for which the BMMRS was created), additional research is also needed to determine whether specific spiritual, religious, and congregational support factors (i.e., emotional, behavioral, and social constructs) are in fact predictive of health and functional outcomes as has been shown in previous studies (Campbell et al. 2010; Cohen et al. 2009; Waldon-Perrine et al. 2011).

The current study also indicates a continued need to differentiate between the needs of individuals with positive versus negative spiritual beliefs/emotions, and particularly given the association between negative beliefs and worse health outcomes (e.g., Bodling et al. 2002; Ellison et al. 2000; Thoresen 1999). Similarly, future research can investigate associations between the willingness to forgive and health outcomes, as Forgiveness has been shown to be associated with better health (Baskin and Enright 2004; Pargament and Rye 1998; Johnstone et al. 2012). Forgiveness interventions may be particularly relevant for persons with TBI, as individuals who were injured intentionally by others report increased psychological problems one year post-injury compared to individuals with unintentional TBIs (Hart et al. 2007). Practicing forgiveness toward other individuals who are perceived as being responsible for one’s TBI may lead to better long-term psychological outcomes.

The current research also suggests a need to determine the manner in which cultural factors influence religious behaviors, spiritual experiences, and social relationships. Specifically, the need exists to determine why and how Positive Spirituality and Private Religious Practices cohered on one factor in this study versus previous ones. Previous studies suggest that such a relationship may exist as many persons with TBI (and other

disabilities) often have limited transportation and independence, and as a result have limited opportunities to engage in social activities including organized religion (e.g., church services; Johnstone et al. 2002). As a result, their primary or only avenue for expression of spirituality may be through Private Religious Practices engaged within the home setting. This needs additional investigation as it may prove important in the development of productive rehabilitation interventions for persons with TBI and other disabling conditions. Similarly, it will be important to determine why Negative Spirituality and Negative Congregational Support Factors loaded on one factor in this study, compared to separate ones in previous studies.

**Acknowledgments** The authors wish to acknowledge the following individuals who assisted in completing the study: Anita Grover, Brigid Perrine-Waldron, and Jayanta Verma.

## References

- Baskin, T. W., & Enright, R. D. (2004). Intervention studies on forgiveness: A meta-analysis. *Journal of Counseling and Development, 82*, 79–90.
- Bodling, A., Cohen, D., Johnstone, B., Yoon, D. P., Schopp, L. H., McCormack, G., et al. (2002). Relationships between negative spiritual beliefs and health outcomes for individuals with heterogeneous medical conditions. *Journal of Spirituality in Mental Health, 18*, 109–117.
- Bodling, A., Walsh, J., Heneghan, M., Yoon, D. P., & Johnstone, B. (2013). Factor analysis of the Brief Multidimensional Measure of Religiousness/Spirituality with an Irish sample. *International Journal of Therapy and Rehabilitation, 20*, 72–78.
- Campbell, J., Yoon, D. P., & Johnstone, B. (2010). Determining relationships between physical health and spiritual experience, religious practices, and congregational support in a heterogeneous medical sample. *Journal of Religion and Health, 49*, 3–17.
- Cappana, C., Stratta, P., Collazzoni, A., & Rossi, A. (2013). Construct and concurrent validity of the Italian version of the Brief Multidimensional Measure of Religiousness/Spirituality. *Psychology of Religion and Spirituality, 5*, 316–324.
- Cohen, D., Yoon, D. P., & Johnstone, B. (2009). Differentiating the impact of spiritual experiences, religious practices, and congregational support on the mental health of individuals with heterogeneous medical disorders. *International Journal for the Psychology of Religion, 19*, 121–138.
- Ellison, C. G., Hummer, R. A., Cormier, S., & Rogers, R. G. (2000). Religious involvement and mortality risk among African American adults. *Research on Aging, 22*, 630–667.
- Fetzer Institute & National Institute on Aging Working Group. (1999). *Multidimensional measurement of religiousness/spirituality for use in health research*. Kalamazoo, MI: Fetzer Institute.
- Fitzgerald, T. (2000). *The ideology of religious studies*. New York: Oxford University Press.
- Flood, G. (1996). *An introduction to hinduism*. New York: Cambridge University Press.
- Hackney, C. L., & Sanders, G. S. (2003). Religiosity and mental health: A meta-analysis of recent studies. *Journal for the Scientific Study of Religion, 42*, 43–55.
- Hart, T., Hanks, R., Bogner, J. A., Millis, S., & Esselman, P. (2007). Blame attribution in intentional and unintentional traumatic brain injury: Longitudinal changes and impact on subjective well-being. *Rehabilitation Psychology, 52*, 152–161.
- Idler, E. L., Musick, M. A., Ellison, C. G., George, L., Krause, N., Ory, M. F., & Williams, D. R. (2003). Measuring multiple dimensions of religion and spirituality for health research: Conceptual background and findings from the 1998 General Social Survey. *Research on Aging, 25*, 327–365.
- Johnstone, B., Nossaman, L. D., Schopp, L. H., Holmquist, L., & Rupright, S. J. (2002). Distribution of services and supports for persons with traumatic brain injury in rural and urban Missouri. *Journal of Rural Health, 18*(1), 109–117.
- Johnstone, B., Yoon, D. P., Cohen, D., Schopp, L. H., McCormack, G., & Smith, M. (2012). Relationships among spirituality, religious practices, personality factors, and health for five different faith traditions. *Journal of Religion and Health, 51*, 1017–1041. doi:10.1007/s10943-012-96158.
- Johnstone, B., Yoon, D. P., Franklin, K. L., Schopp, L. H., & Hinkebein, J. (2009). Reconceptualizing the factor structure of the Brief Multidimensional Measure of Religiousness/Spirituality. *Journal of Religion and Health, 48*(2), 146–163.

- MacDonald, D. A., Friedman, H. L., Brewczynski, J., Holland, D., Salagame, K. K. K., Mohan, K. K., et al. (2015). Spirituality as a scientific construct: Testing its universality across cultures and languages. *PLoS One*, *10*(3), e0117701. doi:[10.1371/journal.pone.0117701](https://doi.org/10.1371/journal.pone.0117701).
- Mokuau, N., Hishinuma, E., & Nishimura, S. (2001). Validating a measure of religiosity/spirituality for Native Hawaiians. *Pacific Health Dialog*, *8*(2), 407–416.
- Neff, J. A. (2006). Exploring the dimensionality of “religiosity” and “spirituality” in the Fetzer Multidimensional Measure. *Journal for the Scientific Study of Religion*, *45*(3), 449–459.
- Pargament, K. I., & Rye, M. (1998). Forgiveness as a method of religious coping. In E. L. Worthington Jr (Ed.), *Dimensions of forgiveness: Psychological research and theological perspectives* (pp. 59–78). Philadelphia, PA: The Templeton Foundation Press.
- Piedmont, R. L., & Leach, M. M. (2002). Cross cultural generalizability of the spiritual transcendence scale in India. *American Behavioral Scientist*, *45*, 1888–1904.
- Piedmont, R. L., Mapa, A. T., & Williams, J. E. G. (2007). A factor analysis of the Fetzer/NIA Brief Multidimensional Measure of Religiosity/Spirituality. *Research in the Social Scientific Study of Religion*, *17*, 177–196.
- Ray, O. (2004). How the mind hurts and heals the body. *American Psychologist*, *59*(1), 29–40.
- Stewart, C., & Koeske, G. F. (2006). A preliminary construct validation of the Multidimensional Measurement of Religiosity/Spirituality Instrument: A study of southern USA samples. *International Journal for the Psychology of Religion*, *16*(3), 181–196.
- Thoresen, C. E. (1999). Spirituality and health. Is there a relationship? *Journal of Health Psychology*, *4*, 291–300.
- Waldon-Perrine, B., Rapport, L. J., Hanks, R. A., Lumley, M., Meachen, S.-J., & Hubbarth, P. (2011). Religion and spirituality in rehabilitation outcomes among individuals with traumatic brain injury. *Rehabilitation Psychology*, *56*, 107–116.
- Yoon, D. P., & Lee, E. O. (2004). Religiosity/spirituality and emotional well-being among rural elderly Whites, African Americans, and Native Americans. *Journal of Human Behavior in the Social Environment*, *10*(1), 191–211.