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ORIGINAL PAPER

Assessing Religious Commitment in a Multicultural Inpatient Setting: A Psychometric Evaluation of the 10-item Belief into Action Scale

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Abstract

Religious and spiritual (R/S) issues impact medical decision-making, particularly among highly R/S populations, for whom existing measures have limitations in identifying levels of R/S commitment. The Belief into Action (BIAc) scale was designed for this purpose and was never tested among hospitalized patients. We interviewed 152 patients (51% men) with a mean age of 48.9 years (SD = 15.2), having either cancer (27%), cardiovascular (26%), rheumatic (21%), or other diseases (26%). Cronbach alpha was .82 and a 3-factor structure (subjective, social, and private religious commitment) was the most robust. Results suggest the BIAc has adequate convergent, divergent, and incremental validity compared to other well-established questionnaires and is appropriate for the inpatient setting.

Keywords Chronic disease · Medical hospitalization · Psychosocial assessment · Cross-cultural comparison · Factor analysis

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Introduction

Interest in the role that religiosity and/or spirituality (R/S) play in health and quality of life has significantly increased in the last decade, particularly since these concepts have been included by the World Health Organization as part of the definition of health (Moreira-Almeida et al., 2016). This definition of health denotes a combination of physical, mental, and social states of well-being and implies a sense of spiritual resolution (Charlier et al., 2016; Moreira-Almeida et al., 2016). A major concern, however, is how to measure such subjective attributes and how to assess multiple dimensions of this construct without overlapping other psychosocial concepts, while keeping the instrument brief and easy to complete (Koenig, 2008; Park et al., 2015, 2017; Selman et al., 2011).

The 10-item Belief into Action (BIAc) scale was developed to quantify a full range of religious-related behaviors, increase sensitivity and variability, and overcome a *ceiling effect* often seen in other measures (Koenig et al., 2014). It was designed to discriminate levels of religious commitment capturing the three major dimensions of religiosity, namely subjective importance of religion in life, social religious activity, and private activity. The original BIAc was validated with 231 women caregiving for relatives with disabling illnesses (Koenig et al., 2014). Later, Wang et al. (2016) translated into Chinese and applied in a sample of 1861 college students; Hafizi et al. (2016) translated into Farsi and tested with 195 young Shia Muslims; and Alakhdhair et al. (2016) into Arabic, for an online survey distributed among young-adult Muslims. More recently, Martins et al. (2019) also tested the BIAc among 150 older Portuguese cancer patients receiving chemotherapy. Although all previous studies have proven the BIAc to be reliable and capable of identifying monotheists and extremely religious populations, no consensus has been reached with regard to its factorial structure, i.e., none of the previous studies have confirmed its three conceptual dimensions.

Ethnicity and culture influence R/S issues, especially during or after nodal life events such as a disease process or death (Park et al., 2015, 2017). In fact, these are perhaps the times when these ethnic and cultural influences on R/S are mostly critical to healthcare, because they can impact medical decision-making (Balboni et al., 2013, 2019; Park et al., 2017). Higher levels of religiosity are associated with receipt of more aggressive medical interventions, lower illness understanding, lower prognostic awareness, poorer quality of life, as well as higher costs of care (Balboni et al., 2013, 2019). Religious affiliation alone does not predict these factors and few studies have been designed to identify how particular beliefs or degrees of religious involvement relate to illness progression or end-of-life outcomes (Balboni et al., 2013, 2019; Carney et al., 2019; Park et al., 2017).

The Brazilian state has notable religious, cultural, and sociodemographic diversity. We believe this multiculturalism combined with the vulnerability of individuals during a period of hospitalization constitute an ideal context in which to test the validity of the BIAc, with the potential of adding insights to our understanding of how R/S impacts the experience of illness and of identifying targets for intervention when appropriate. The aim of this study is to validate the BIAc

applied to a sample of inpatients admitted to a tertiary hospital in Sao Paulo, Brazil, analyzing its factorial structure, and association with sociodemographic and clinical profiles.

Method

Population and Settings

Patients 18 years of age or older, hospitalized in two units of Hospital Sao Paulo, Universidade Federal de Sao Paulo (UNIFESP), who were alert and oriented, were invited to participate. The exclusion criteria were severe neurological or psychiatric conditions, hemodynamic instability, and other conditions that precluded the interview. The protocol was approved by the Ethics Research Committee of UNIFESP (Nº 1.899.258) and registered in the Brazilian Registry of Clinical trials (RBR-358597). All patients signed an informed consent form.

Data collection was carried out between December 2017 and October 2018. Electronic medical records were assessed to identify patients who had been admitted in the previous 72 h. Consecutively admitted patients were then invited to participate. Sociodemographic characteristics and diagnoses upon hospital discharge were also collected. Diagnoses were categorized according to the International Classification of Diseases, 10th edition (ICD-10). All study data were managed using the Research Electronic Data Capture (REDCap) tools hosted at HSP/UNIFESP (Harris et al., 2009), in which instruments were included and interview-administered to all patients.

The Belief into Action Scale

It includes 10 items with response options ranging from 1 to 10. While item 1 is nominal and must be recoded for calculating the BIAc total score, all others are ordinal items measuring frequency, time, and money invested in religious activities, as well as the extent to which one has decided to surrender to God and conform his/her life in accordance with religious faith. For item 1, the response option 7 (relationship with God) is given a score of 10 and other options, such as health and family, are given a score of 1. The recoded item 1 is then summed with items 2 through 10 to arrive at total score, which varies from 10 to 100, with higher scores indicating higher levels of religious commitment.

The translation and adaptation of the BIAc into Brazilian-Portuguese was performed in a standardized manner (Epstein et al., 2015). First, the BIAc was independently translated from English into Portuguese. Two Portuguese versions were each back-translated by independent colleagues. Four back-translated English versions were analyzed, and corrections made in a final Portuguese version by two independent teachers of their religious faith in Brazil. Item 4, "To what extent (on a 1–10 scale) have you decided to place your life under God's direction?" was the only item with disagreement as to which terms should be used in Portuguese. In order to

determine face validity, pilot testing was conducted with a small number of patients ($n = 15$).

After the pilot testing, item 5 ("What percentage of your gross annual income do you give to your religious institution or to other religious causes each year?") was also adapted to better reflect the Brazilian culture. All versions of the BIAc are presented as supplementary material.

Other Instruments

The *Duke Religiousness Index* (DUREL) has 5 items with 5–6 points likert scales distributed in three dimensions: organizational, non-organizational, and intrinsic religiosity. The Brazilian-Portuguese version was validated on a sample of 383 adults from a population-based study (Lucchetti et al., 2012). Reliability coefficients for the total score (.73) and for the intrinsic religiosity subscale (.76) were adequate.

The *Profile of Mood States* (POMS) evaluates affective states at the moment of the application. It includes a list of 65 words/feelings in 5-point likert scales, distributed into six subscales: tension-anxiety, depression-discouragement, anger-hostility, fatigue-inertia, vigor-activity, and confusion-disorientation. The POMS total score varies from −200 to 32 and is calculated by subtracting the vigor subscale from the sum of the other subscales. A translated version of its original has been used and proven sensitive across many studies including diseased populations in Brazil and was chosen for the present study (Diniz et al., 2017; Evangelista & Santos, 2012; Raso et al., 2013).

Statistical Analysis

Descriptive statistics are presented as absolute frequencies with percentages and means with standard deviations. Associations between the BIAc and DUREL with sample's characteristics were examined using General Linear Models. The Levene test was used to evaluate homogeneity between groups. The Bonferroni or the Games-Howell post-hoc tests were used, depending on whether equal variances were or not assumed, respectively. Reliability and internal-consistency were examined using the Cronbach alpha and item-total correlations. Convergent and divergent validity, by bivariate correlations. The psychometric robustness of the original three-dimensional structure proposed in the conception of the BIAc was investigated by confirmatory factor analysis (CFA) and compared with models identified in previous validation studies. Goodness-of-fit was examined by the Chi-square test, with smaller, non-significant values indicating closer model fit. Other indices included the comparative fit index (CFI) and the Tucker-Lewis index (TLI), both $\geq .95$; the root mean square error of approximation (RMSEA) $< .06$, and the Akaike information criterion (AIC), used to scale differences in-between models (Brown, 2014). The factorability of the matrix of correlations between the BIAc items was adequate, evaluated by the Kaiser–Meyer–Olkin measure of sampling adequacy, found with a value of .85, and the Bartlett's test of sphericity, which was significant ($\chi^2 = 433.1$, $df = 45$, $p < .001$). The complete CFA output with items statistics is presented as

supplementary material. IBM SPSS Statistics version 25, AMOS version 24, and JAMOVI version 0.9.0.5 (www.jamovi.org) were used in data analyses.

Results

Sample Characteristics

A total of 213 patients' charts were reviewed, 167 were invited to participate, 161 (96.4%) responded, and 152 had complete data on the BIAc and were analyzed, with mean age of 48.9 years (SD = 15.2) and 51.3% men. Of the 213 patients evaluated, 46 were excluded due to neurological and psychiatric disorders, visual or hearing impairments, tracheostomy, and hemodynamic instability; six patients (3.6%) refused to participate; and nine had their interview interrupted due to physical or psychological malaise. Causes of hospitalization included cancer (27.5%), cardiovascular disease (25.6%), rheumatic conditions (20.6%), and others (26.3%) such as kidney, infectious, hepatic, or hematopoietic diseases.

Associations of the BIAc and DUREL

Sample characteristics with comparisons for the BIAc and the DUREL scales are in Table 1. The lowest BIAc scores were seen among men and white individuals, those with more years of education, reporting no religious affiliation, being current smokers, and having greater alcohol consumption. Similar differences for the DUREL were seen for education, smoking, and religious affiliation. As for the diagnostic reason for admission, cardiovascular disease was associated with lower DUREL scores, as compared to the other diagnostic categories. There was no difference in BIAc scores between diagnoses.

Endorsements of BIAc Items

Responses on each of the BIAc items are presented in Fig. 1. Items are grouped by the type of response options on the 1–10 scale (frequency or time spent on religious activities). Approximately 40% of patients reported attending religious services on a weekly basis, whereas 21% said they go more than once a week. The majority (61.8%) referred to having decided to surrender their life to God-10 on item's 4 scale.

Reliability and Internal Consistency

The BIAc was found to have a Cronbach alpha of .82. Table 2 presents BIAc items with their respective means and standard deviations, correlations with the total, which varied from .45 to .67, and Cronbach alpha if the item was deleted. Deleting items had little effect on the BIAc overall reliability, they all contributed significantly to the total score.

Table 1 Sample characteristics with means for the BIAc and the DUREL scales

			BIAc			DUREL		
	N	%	*M*	SD	*p*	*M*	SD	*p*
Total sample	152	100	43.3	17.9		19.2	5.5	
Sex								
Men	78	51.3	39.9	18.2	.02	18.4	5.7	.06
Women	74	48.7	46.7	17.1		20.1	5.2	
Age								
Less than 30 years	20	13.2	41.1	20.8	.59	19.3	4.8	.89
30–39 years	28	18.4	40.1	18.7		19.2	5.5	
40–49 years	32	21.1	46.6	17.3		19.4	5.8	
50–59 years	29	19.1	41.9	18.6		18.3	6.4	
60 years and more	43	28.3	44.9	16.3		19.7	5.0	
Color								
White	83	54.6	39.9	17.3	.01	18.3	5.6	.07
Pardo	45	29.6	45.0	18.3		20.4	5.4	
Black	24	15.8	51.6	16.9		20.3	6.1	
Education								
< 12 years	71	46.7	49.3	17.1	**< .01**	20.2	5.1	.04
12 or more years	81	53.3	37.9	17.0		18.4	5.6	
Marital status								
Single	24	15.8	36.4	18.4	.13	18.0	6.0	.73
Married/partnership	75	49.3	46.0	17.4		19.4	5.1	
Separated/divorced	39	25.7	43.3	18.9		19.5	6.0	
Widowed	14	9.2	40.3	14.8		19.5	5.5	
Religion								
No religion	19	12.5	31.9	17.6	**< .01**	16.7	6.1	.01
Catholic	77	50.7	37.2	13.4		18.6	5.2	
Protestant/evangelical	44	28.9	56.8	17.2		20.9	5.4	
Other	12	7.9	50.3	15.7		21.0	4.8	
Smoking status								
Never smoker	39	31.7	44.2	17.9	**< .01**	19.0	5.5	**< .01**
Former smoker (> 6 mo)	57	46.5	47.9	18.7		20.3	5.1	
Current smoker	27	22.0	33.6	13.9		15.7	5.5	
Alcohol consumption								
Never, rarely (last year)	10	65.8	46.1	18.2	.01	19.2	5.6	.94
Regular (≥ 1x/month)	52	21.3	37.9	16.3		19.3	5.4	
Reason for hospital admission								
Cancer	40	26.3	43.7	17.4	.99	20.1	5.1	.02
Cardiovascular	40	26.3	43.8	21.4		16.9	5.3	
Rheumatic	31	20.4	42.6	17.6		19.4	5.7	
Other	41	27.0	42.9	15.5		20.5	5.3	

Statistically significant values ($p < 0.05$) are given in bold

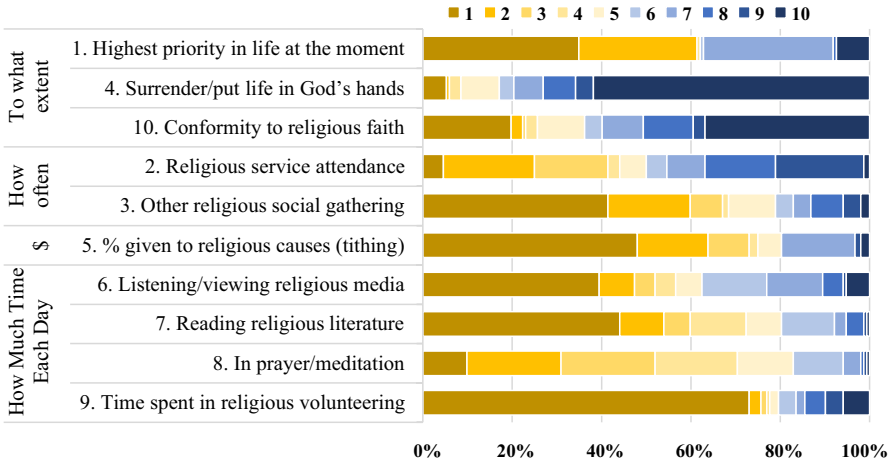

Fig. 1 Distribution of responses to the Belief into Action scale (152 patients). *Note*. Nominal Item 1 scale options are: health (1), family (2), friendships (3), job, career (4), education (5), financial security (6), relationship with God (7), travel, see the world (8), music, partying (9), and freedom to choose (10). For Items 2–3: never (1), rarely (2), couple of times a year (3), every few months (4), about once a month (5), several times a month (6), about every week (7), every week (8), more than once a week (9), and daily (10). For Item 5: zero (1), < 1%, R$10 (2), 1–2% (3), 3–4% (4), 5–6%, R$50 (5), 7–8% (6), 9–10%, R$100 (7), 11–12% (8), 13–14% (9), and 15% or more (10). For Items 6–9: zero (1), 1–5 min (2), 6–10 min (3), 11–20 min (4), 21–30 min (5), 31–60 min (6), 1–2 h (7), 2–3 h (8), 3–4 h (9), and 5 h or more (10)

Table 2 Reliability coefficients and item-total correlations for the BIAc scale

	M	SD	Item-total correlation	Cronbach's Alpha[a]
1. God highest priority in life at the moment	3.6	4.1	.45	.82
2. Frequency of religious service attendance	5.4	2.9	.67	.79
3. Frequency of other religious social gatherings	3.2	2.7	.53	.80
4. Decision to surrender or put life in God's hand	8.4	2.6	.48	.81
5. Percentage of income given to religious causes (tithe)	2.9	2.5	.53	.80
6. Time spent listening or watching religious media	3.9	2.9	.46	.81
7. Time spent reading religious literature	3.1	2.3	.49	.81
8. Time spent in prayer or meditation	3.6	1.8	.52	.81
9. Time spent in religious volunteering	2.6	3.0	.47	.81
10. Decision to adapt or obey religious teachings and faith	6.6	3.5	.58	.80
Belief into action scale	43.43	19.7		.82

[a]Unstandardized Cronbach's alpha for total scale and for total scale with individual item removal

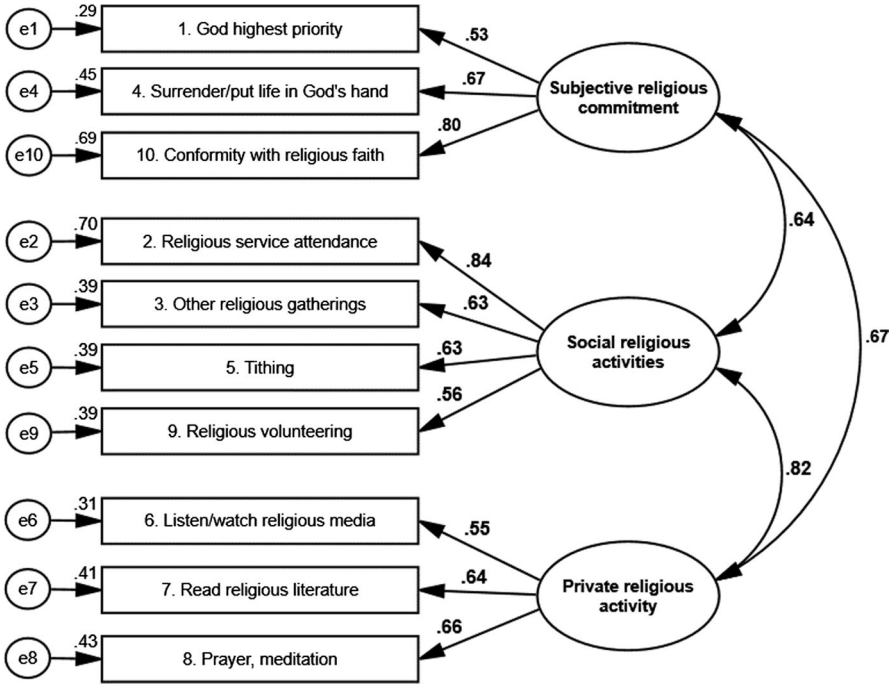

Fig. 2 Confirmatory factor analysis of the Belief into Action scale. *Note.* Model fit information: $\chi^2 = 44.3$, $df = 32$, $p = .08$, CFI = .97; TLI = .96, RMSEA = .05, AIC = 109

Confirmatory Factor Analysis

The original 3-factor structure distributes items as in Fig. 2 (see supplementary material for complete output) and it was found as the most psychometrically robust, with the best model fit ($\chi^2 = 44.3$, $df = 32$, $p = .08$, CFI = .97; TLI = .96, RMSEA = .05, AIC = 109), as compared both to a unidimensional solution ($\chi^2 = 86.1$, $df = 35$, $p < .01$, CFI = .87, TLI = .84, RMSEA = .10, AIC = 126) and to 2-factor solutions previously identified ($\chi^2 = 66.6$, $df = 34$, $p < .01$, CFI = .92, TLI = 89, RMSEA = .08, AIC = 109). Further controlling covariance between measurement errors from items 3 and 9, both in the *social* dimension, improved indices ($\chi^2 = 31.3$, $df = 31$, $p = .45$, CFI = .99, TLI = .99, RMSEA = .01, AIC = 99.5). Chi-square tests comparing AICs' differences between models 1 and 3 ($p < .001$), and 2 and 3 ($p < .01$) were significant, confirming the 3-factor solution as the most robust.

Convergent and Divergent Validity

The BIAc total and subscales' scores were positively correlated with the total and all subscales' scores of the DUREL, attesting its convergent validity. Correlation coefficients varied from .82 to .19. The strongest was between the BIAc's social religious

activities subscale and the organizational religiosity dimension of the DUREL, and the lowest between private activities and intrinsic religiosity. The correlations between the BIAc and the POMS were weaker and both positive and negative, with coefficients varying from −.17 to .26, and attesting its divergent validity. They were significant for the POMS total score, and for the vigor-activity and the confusion-disorientation subscales. Correlations and the distribution of the BIAc, DUREL, and POMS scores are in Table 3.

Discussion

It is during a period of hospitalization that many patients first realize an imminent life threat, with its potential for triggering spiritual struggle. Although a large body of research shows that these conflicts lead to emotional distress and worse outcomes, evidence regarding when and why they take place is still limited. Few studies have assessed changes in R/S beliefs and behaviors in this context, where there is opportunity for early assessment and intervention. To our knowledge, this is one of the first studies to validate a measure of R/S in a sample of hospitalized medically ill patients, aiming to refine our psychometric understanding of R/S beliefs and behaviors. Based on our findings, the BIAc is a psychometrically sound instrument for assessing the implications of religious commitment within the experience of illness, and particularly for the inpatient setting.

Table 3 Questionnaires' means and correlations with the BIAc total and subscales' scores

			BIAc total		Subjective		Social		Private	
	M	SD	ρ	*p*	ρ	*p*	ρ	*p*	ρ	*p*
BIAc total	43.3	17.9	1							
Subjective	18.6	8.0	.82	< .001	1					
Social	14.1	8.6	.82	< .001	.45	< .001	1			
Private	10.6	5.4	.77	< .001	.49	< .001	.56	< .001	1	
DUREL total	19.2	5.5	.60	< .001	.52	< .001	.52	< .001	.42	< .001
OR	3.8	1.7	.75	< .001	.45	< .001	.82	< .001	.61	< .001
NOR	4.5	1.7	.53	< .001	.42	< .001	.44	< .001	.44	< .001
Intrinsic religiosity	10.9	3.8	.38	< .001	.44	< .001	.26	< .001	.19	.02
POMS total	−25.6	33.4	.18	.03	.15	.06	.20	.02	.08	.37
Vigor	15.6	6.9	.26	< .001	.27	< .001	.18	.03	.18	.04
Tension	10.3	6.3	−.09	.28	−.02	.83	−.16	.06	−.03	.75
Depression	9.2	9.6	−.12	.17	−.06	.49	−.16	.06	−.05	.54
Anger	7.9	7.8	−.10	.24	−.07	.44	−.14	.10	−.02	.83
Confusion	6.3	4.7	−.17	.04	−.16	.05	−.14	.09	−.09	.25
Fatigue	7.3	5.9	−.09	.29	−.04	.65	−.16	.05	.01	.92

OR Organizational religiosity, NOR non-organizational religiosity, BIAc belief into action scale, DUREL duke religiousness index, POMS profile of mood states. Statistics: Bivariate correlations between the BIAc and the questionnaires are non-parametric ρ: spearman's *rho*

The score distribution seen here is comparable to that from the original study ($M = 46.3$, SD = 20.7) among stressed female caregivers (Koenig et al., 2014), as well as to that seen among Muslims in Saudi Arabia ($M = 47.6$, SD = 15.7) by Alakhdhair et al. (2016), or among young Shia Muslims in Iran ($M = 39.3$, SD = 15.5) by Hafizi et al. (2016). Scores observed by Martins et al. (2019) with older Portuguese cancer patients, on the other hand, were significantly lower ($M = 29.5$, SD = 15.6), but not as low as those ($M = 15.9$, SD = 8.8) found by Wang et al. (2016) among Chinese college students.

Women are often more religious than men (Maselko & Kubzansky, 2006; Mukerjee & Venugopal, 2018), and this difference was captured by the BIAc in this study, along with differences often seen across racial, ethnical, and religious and non-religious groups. Black and *Pardo* scored higher than Caucasians, similarly to how much Black and Hispanics scored higher than Caucasian women in the original study (Koenig et al., 2014). Catholics had significantly lower scores both in Brazil and Portugal, where they are a larger majority (87%). In contrast, Protestants/Evangelicals had the highest scores of all, compared to religious groups across all studies, both in Brazil and Portugal; while here they represent nearly 1/3 of the study population, there they were less than 1/10 (Martins et al., 2019).

One might anticipate that older individuals would be more religiously committed (Zimmer et al., 2016), but this was not seen in this study, nor in the Portuguese with over half of the cancer patients being 60 years old or older (Martins et al., 2019). Though severe chronic illnesses may increase subjective R/S or trigger a search for R/S meaning, especially acutely while hospitalized, they may also preclude participation in R/S activities. It is not clear to what extent this is a trigger for spiritual struggle; findings among studies assessing these changes are mixed (Carney et al., 2019), and detecting these trajectories in relation to aging and health is a long-recognized challenge (Zimmer et al., 2016).

As it is the association with education. We saw an inverse relationship that was not reported on previous BIAc studies. Perhaps influenced by age or other psychosocial factors, since our sample is more heterogenous, though Hafizi et al. (2013) had also noted such an inverse association validating the DUREL among medical students. In contrast, while religious involvement may strengthen education during childhood and adolescence (Brown & Taylor, 2007), it can also negatively impact attitudes toward science if combined with lower education (McPhetres & Zuckerman, 2018).

In spite of methodological differences, these findings along with evidence of how R/S impact illness understanding and prognostic awareness in the context of end-of-life medical care (Balboni et al., 2013, 2019), stresses the clinical usefulness of the BIAc. As also do findings regarding smoking and alcohol consumption, consistent with prior studies (Kendler et al., 2003; Moreira-Almeida et al., 2006); both across clinical and non-clinical populations, independently of gender or age, and particularly among adolescents (Nonnemaker et al., 2003; Wallace et al., 2003), religious involvement is systematically shown to prevent substance use and promote an overall healthier lifestyle (Svensson et al., 2019).

Reliability and Internal Consistency

The Brazilian BIAc proved to be consistent, with a Cronbach alpha comparable to that seen in the original (.89), the Chinese (.83), Arabic (.80), Iranian (.85), and Portuguese (.86) versions (Alakhdhair et al., 2016; Hafizi et al., 2016; Koenig et al., 2014; Martins et al., 2019; Wang et al., 2016). We did not perform test–retest given the difficulty of standardizing the time between the interview and the retest, length of hospital stay varied considerably, nonetheless, the previous studies did find adequate intra-class correlations.

Factorial Structure

In the original (Koenig et al., 2014) and in the Muslim-Arabic versions of the BIAc (Alakhdhair et al., 2016), a single underlying construct was suggested, depending on whether using a rotation method on principal component analysis (PCA). In the Iranian-Farsi (Hafizi et al., 2016), two-factors were identified also using PCA, but there were many cross-loadings, so an unidimensional structure was also suggested. Our findings showed for this sample of hospitalized patients that a unidimensional structure had not as good model fit as the three-dimensional one.

It is admitted that specifying too few factors will result in the loss of information; specifying too many, in contrast, may lead to an overcomplicated structure (Brown, 2014). Rotation methods are used to achieve the simplest possible structure while connecting factors to theoretical entities (Brown, 2014). They are either *orthogonal,* assuming factors are not correlated, or *oblique,* assuming they are, which is the case of the BIAc. We expect the importance of God and religion in life to correlate with the time and money invested in R/S activities; however, it is possible that even without practicing one still feels religiously committed. The fact that in the Portuguese study item 9 was excluded after CFA supports this idea. If having cancer and receiving chemotherapy hamper participation in R/S activities, asking about religious volunteering might be irrelevant. Herein item 9 was the least endorsed and modification indices suggested a redundancy with item 3, therefore removing it is an option and a 9-item BIAc is still psychometrically sound.

Differently from PCA, CFA accounts for individual item variances and estimates measurement error (Brown, 2014). Besides Martins et al. (2019), Wang et al. (2016) also performed CFA. Although they did suggest a 3-factor structure, neither tested the original, so item distribution was different and difficult to interpret. Among Chinese, for instance, item 1 isolated as one-factor though to retain factors with one item is not recommended (Brown, 2014). This raises the question of how they treated this nominal item, which we dichotomized. If many Chinese students chose 'freedom' (response option 10) as their highest priority, this could explain item 1 as one-factor, because factor analysis assumes an ordinal relationship between numbers on the scale. Choosing 'relationship with God' (option 7) as priority, however, is the variable we are interested in to compose the *subjective* dimension of religious commitment.

Convergent and Divergent Validity

Correlations seen between the BIAc and the other questionnaires establish its convergent and divergent validity. In the original study, the strongest correlation was also with the organizational religiosity subscale of the DUREL and so had item 2 the highest item-total correlation (Koenig et al., 2014). Martins et al. (2019) reported the correlation with the DUREL total score ($r = .77$), slightly higher than seen here ($\rho = .60$), and the exclusion of item 9 might account for this difference.

Other R/S dimensions used to test validity of the BIAc include intrinsic religiosity, religious coping, and church-based support, besides measures of social support, interaction, perceived stress, depression, purpose or quality of life, and physical health. All studies also found positive correlations with other R/S measures, except for the negative religious coping scale ($r = -.20$) in the original study. No correlations were seen with physical health (Koenig et al., 2014) and purpose or quality of life (Wang et al., 2016), whereas with social support, depression, and perceived stress correlations were of less magnitude and/or inverse (Alakhdhair et al., 2016; Hafizi et al., 2016; Koenig et al., 2014), similar to what we found with the POMS.

Limitations and Final Considerations

Challenges encountered during the translation process included finding a religious meaning for item's 4 "place your life under God's direction" given that there was no consensus on a literal translation to Portuguese. Perhaps the way it was interpreted based on input from patients in the pilot testing—"surrender/put life in God's hands"—was a result of their vulnerable condition—being severely ill, facing life-limiting conditions, with loss of control, and dependence, leaving them more likely to feel that their lives were in God's hands, which does not necessarily imply a conscious decision to trust God, or conformity with religious faith (Koenig et al., 2014). We believe this explains our finding that individuals without religious affiliations in this study scored much higher than did individuals without affiliations from the other BIAc studies.

Moreover, this study has other limitations. The time frame of administration of the BIAc presented a challenge in that many patients would inquire whether reporting their current frequency of attending religious service meant how frequently they used to go before becoming ill. The BIAc does not capture trajectories in religious practices. As mentioned, it is unclear how this change influences coping with the disease. Length of hospital stay was another challenge which made unfeasible standardization of a time-interval to conduct retest using similar methods and settings. Although the BIAc was designed as a self-report measure, the questionnaires were interview-administered given patients' clinical conditions, average level of education, and psychosocial vulnerability. This may have introduced bias in reporting. The generalizability of these findings and interpretations to other populations should be considered with caution.

In regard of implications for future research, our findings support a potential need for addressing the level of distress experienced due to changes in R/S practices, particularly in the inpatient setting. Moreover, future studies could investigate the combined use or integration of the BIAc and DUREL. Interestingly, we saw a modest correlation between the *subjective* dimension of the BIAc and the intrinsic religiosity subscale of the DUREL, suggesting they are complementary. Our results also point out that these scales may vary between the different diagnostic profiles, or according to different levels of life-threatening diseases.

Conclusion

The BIAc is a reliable and valid measure of religious commitment among medical inpatients in Brazil, with incremental validity as compared to other well-established measures, and capable of identifying degrees of R/S across diverse sociodemographic and clinical profiles.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10943-021-01223-8.

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Declarations

Conflict of interest Authors have no conflict of interest to declare.

Ethical standards All procedures performed were in accordance with ethical standards and the 1964 Helsinki Declaration and its later amendments. The protocol was approved by the Ethics Research Committee of Universidade Federal de Sao Paulo (Nº 1.899.258) and registered in the Brazilian Registry of Clinical trials (RBR-358597). All patients signed an informed consent form.

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