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The relationship between spirituality and quality of life among university students: An autoregressive cross-lagged panel analysis

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Abstract University represents a critical transition from secondary school. University students are exposed to many new opportunities and intellectual stimulations, and some may find university life stressful and demanding. The quality of life (QoL) of university students is thus an important topic for researchers and educators alike. Furthermore, many universities are now paying attention to the spirituality of students, besides emphasizing their cognitive and psychosocial development. Using a sample of 1,160 Chinese university students mainly recruited from Hong Kong, this autoregressive cross-lagged panel study investigated a causal model of spirituality and QoL over a 3-year period. The study also tested the causal model for factorial invariance (configural, measurement, and structural invariance) across gender, religion, and time. Results indicated that spirituality was a causal predictor of QoL but not vice versa. There was some evidence to support factorial invariance of the model across gender, religion, and time. The theoretical and practical implications of the findings are discussed.

Keywords Longitudinal study · Causality · Spirituality · Quality of life · University students

Introduction

University years have been described as one of the most stressful periods in a person's life (Hales 2009). Many students struggle during the transition from secondary school to university, experiencing profound cognitive, psychosocial, and spiritual changes. They are

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constantly challenged by psychosocial crises (Newman and Newman 2012). The new demands on them can be overwhelming. In adapting to university life, students also need to experiment with their self-identity during this stage of emerging adulthood. The stress they encounter can make university experiences less satisfying and fulfilling than one may anticipate (Robotham 2008). Bland et al. (2012) found that the current coping strategies adopted by millennial college students were mostly associated with low stress tolerance. They also noted "a real need to educate this population on ineffective or maladaptive coping mechanisms that are risk factors" (p. 373) and contended that more effort should be made to identify protective factors that increase stress tolerance.

In response to the various challenges they face, some students resort to spirituality as a coping strategy (Castellanos and Gloria 2008). In surveys conducted by the UCLA Higher Education Research Institute in its National Study of College Students' Search for Meaning and Purpose, 80 % of respondents indicated that they were interested in spirituality and believed in the sacredness of life; about 66 % admitted that their spirituality was a source of joy; more than 75 % said that they believed in God; more than 66 % agreed that their religious/spiritual beliefs provided them with strength, support, and guidance; and 75 % reported feeling a sense of connection with God/a Higher Power that transcended their personal self (Astin et al. 2011, p. 3). These figures suggest that spirituality is essential to university students' lives, and highlight the crucial role of spirituality in higher education.

Spirituality is usually understood as "the experiential and personal side of our relationship to the transcendent or sacred" (Nelson 2009, p. 8). Some scholars have made a conceptual distinction between spirituality and religiosity, arguing that there are people who are spiritual but not religious, some who are religious but not spiritual, and some who are both (see, e.g., Hill 2005). As the focus of this study is not on the distinction between the concepts, it suffices to say that spirituality is at least somewhat related to religiosity, and also that spirituality does not require a theistic belief. It has more generally been identified as an important facet of human flourishing (Miner et al. 2012). Because human flourishing is often manifested in a better quality of life (QoL), spirituality and QoL should be closely associated.

QoL has received much academic attention and has been widely researched in relation to other demographic and psychological variables (Sirgy 2012). It is assessed using both objective and subjective measures at the individual or collective level (Edgerton et al. 2012). Sawatzky et al.'s (2005) meta-analysis of 62 effect sizes from 51 studies showed that spirituality and QoL were two distinct concepts and yet they were moderately correlated at $r = .34$ (95 % CI .28–.40). Furthermore, spirituality has been consistently linked to a number of positive psychological outcomes such as hope and optimism (Ciarrocchi and Deneke 2006), gratitude (Rosmarin et al. 2010), compassion (Steffen and Masters 2005), and psychological well-being (Lazar 2009). However, prior studies on the relationship between spirituality and QoL have been criticized for inadequate reliability and validity of the measuring instruments, as well as for having failed to elucidate the causal direction between the two constructs (Piedmont and Friedman 2012). Partly responsible for the ambiguity in the literature is the cross-sectional nature of the majority of existing studies. At the same time, research on spirituality has also been criticized for the inadequate attention given to the influence of demographic variables (Kapuscinski and Masters 2010). To overcome these problems, the present study examined the causal relationship between spirituality and QoL using longitudinal data collected from Chinese university students over a 3-year period. An autoregressive cross-lagged panel analysis was performed, which allows researchers to gather evidence about the direction of causality

between two variables and estimate the magnitude of the causal effects (Finkel 2004). Factorial invariance (configural, measurement, and structural invariance) (Dimitrov 2010) of the causal model was tested across gender, religion, and time.

Configural invariance means that the pattern of free and fixed model parameters remains the same across groups. Testing for configural invariance is achieved by first identifying a baseline model separately for each group. Basically, the baseline model represents the most parsimonious and best fitting model for the group. Measurement invariance is assessed at three levels: (a) metric invariance (i.e., equal factor loadings across groups), (b) scalar invariance (i.e., equal item intercepts across groups), and (c) invariance of item uniquenesses (i.e., equal item error variances/covariances across groups). Finally, structural invariance refers to a situation where factor variances/covariances are invariant across groups. Testing factorial invariance has become increasingly significant in recent years because "it allows the researcher to check whether members of different groups (e.g., female vs. male) or cultures (e.g., Brazilian vs. German students) ascribe the same meanings to scale items" (Milfont and Fischer 2010, p. 112).

Relationship between spirituality and QoL

Although there is an abundance of studies reporting a positive relationship between spirituality and QoL, Park (2007) pointed out that "much less is known about how these various aspects of religion and spirituality are translated into health outcomes" (p. 319). Another important aspect overlooked in the literature concerns the causal relationship between the two constructs. Piedmont and Friedman (2012) remarked that, as many studies in the field are correlational in nature, more empirical work is needed on understanding their causal relationship. The value of this line of causal research lies in the possible therapeutic use of spirituality as psychological input. Piedmont and Friedman asserted, "If religious and spiritual constructs do play a significant role in driving adaptation and growth, then this creates the possibility for a whole new class of potential therapeutic strategies based on these types of dynamics" (p. 324).

A few longitudinal studies have attempted to explore the relationship between spirituality and QoL or constructs related to QoL. Dy-Liacco et al. (2005) and Piedmont et al. (2009) found empirical evidence to support spirituality as a predictor of psychological growth and worldview. Brandenberger and Bowman (2013) demonstrated that initial spirituality and religiosity causes increased prosocial orientation but not vice versa. Chenot and Kim (2013) showed that spirituality and religion are causal predictors of social justice orientation attitudes and actions. Zhang et al. (2014) found that holding spiritual and transcendent values such as benevolence, conformity, tradition, and universalism positively predicted QoL a year later, whereas holding self-enhancement values such as power, achievement, and hedonism did not. Despite differences in the definitions of spirituality, QoL, and positive psychological outcomes among these studies, the results generally support the notion that spirituality is a predictor and precursor of positive psychological outcomes.

On the basis of the above findings, it was hypothesized that the causal effect of spirituality on QoL would be stronger than the reciprocal effect. Furthermore, the factorial invariance of the model was tested across gender, religion, and time with multiple-group confirmatory factor analysis. As spirituality has been found to be invariant across gender and religion (W. Lau et al. 2014), it was hypothesized that the causal model relating STS to QoL would similarly be invariant.

Method

Participants and procedure

A sample of full-time university students ($n = 1{,}106$) was drawn from a larger set of individuals who had participated in the multi-wave Formation and Transformation of Beliefs in Chinese project (E. Lau et al. 2014; Zhang et al. 2014). In this study, individuals responded to all three waves of surveys with the measures described below (information concerning participant attrition in the larger project is available from the authors). With a view to examining changes in religious variables, among others, religious believers were over-sampled. The participants were recruited through several churches and universities, as well as through paid advertisements on Facebook. They were also invited to promote the study among their friends on the Internet. To encourage participation and continuation in the follow-up surveys, the participants were offered a choice between a lottery (a one-in-a-hundred chance to win a gift voucher of HK$100) or having HK$20 donated to a charity for poverty reduction on completing each questionnaire survey. In each wave, the participants were also promised a brief personality and mental health report based on their responses on some parts of the questionnaire, on the premise that if they thought that the report would be useful, they would be motivated to answer the questions as truthfully as they could.

Of the sample, 67.8 % were female; about 15.8 % were Christians; 76.7 % were non-religious; and the rest belonged to other religions. Their mean age was 20.9 (SD = 2.37). Approximately 59.9 % of the participants reported a monthly household income under HK$20,000. Hong Kong and Macau residents made up 88.6 % and 5.2 %, respectively, of the sample.

Measures

There were three waves in this study. Wave 1 (September 2010) was followed by Wave 2 after 7 months, while Wave 2 was followed by Wave 3 after another 12 months.

Spirituality was assessed in all three waves with the Spiritual Transcendence Scale (STS; Piedmont 1999, 2004a), which is one component of the larger Assessment of Spirituality and Religious Sentiments (ASPIRES) scale (Piedmont et al. 2008). Among the more frequently used spirituality scales, the STS was highly recommended by Kapuscinski and Masters (2010) because it is not based on a specific religion and has been systematically validated across different religious groups and cultures (Piedmont 2007; Piedmont and Leach 2002). The scale provides measures "based on a broadband, inclusive conceptualization of spirituality that is pertinent for a diverse range of faith traditions, both Eastern and Western" (Piedmont 1999, p. 1007). Spirituality is construed as a universal human experience regardless of religious affiliation (Jager Meezenbroek et al. 2012). The scale is made up of three subscales: universality, prayer fulfillment, and connectedness. Universality measures the belief in the unity and purpose of life. Prayer fulfillment measures the feeling of joy and contentment that results from personal experiences with a transcendent being. Connectedness measures an individual's awareness of personal contribution and connection to others. Piedmont (1999) found the three subscales to have adequate alpha reliabilities and validity for American college students. The STS was translated into Chinese and back-translated into English, using two independent translators. The final version was endorsed by the original author, Prof. Ralph L. Piedmont.

The participants rated each item on a 5-point Likert scale (1 = extremely disagree; 5 = extremely agree).

In a previous study using the STS (W. Lau et al. 2014), several exploratory and confirmatory factor analyses were conducted to investigate the hypothesized three-factor structure in several independent Chinese samples and also the invariance of this structure across Christian and non-religious samples. A total of eleven items were removed across the series of analyses (four from universality, four from prayer fulfillment, and three from connectedness) because they did not load on the expected factors, had unacceptably low factor loadings, or were not invariant across Christian and non-religious samples. A three-factor structure was supported for the remaining 12 items, with the items loaded on the hypothesized factors. The intercorrelations between the factors ranged from .03 to .29, suggesting that the three factors were distinct. Whatever the 11 items originally measured in a Western sample, they did not measure well in the Chinese Christian and non-religious samples. The remaining 12 items, although not perfect and perhaps not covering all the specific aspects in the original STS, were believed to be the best available for the time being to measure spirituality in the Chinese population. Therefore, in this study, the 12-item revised scale was used so that the spirituality construct being tapped could be regarded as equivalent across gender and religion. Cronbach's alphas for the subscales of this revised scale universality, prayer fulfillment, and connectedness were .72, .89, and .68, respectively, for the present data set.

QoL was assessed in all three waves with the World Health Organization QOL-BREF Hong Kong version (WHOQOL-BREF [HK]; Leung et al. 1997). The 28-item scale contains two items on overall QoL and health assessment, and 26 items that cover four domains: physical health, psychological health, social relationships, and environment. The scale generally has shown good reliability and validity for populations including college students (Krägeloh et al. 2011), patients (Trompenaars et al. 2005), older people (Liang et al. 2009), and across different cultures (Saxena et al. 2001). The participants rated each item on a 5-point Likert scale. An item on whether one's favorite food is readily available and an item on sex life were excluded because of their triviality or intrusiveness. We used four indices derived from the respective domains of the instrument. Cronbach's alphas of the subscales physical health, psychological health, social relationships, and environment were .65, .81, .60, and .66, respectively, for the present data set.

Demographic information on gender, age, religion, place of residence, and income was collected at Wave 1. (Although some of these might have changed over the course of the study, we did not expect the fluctuations to affect our results and conclusion.)

Analytical procedures

All analyses were performed using Mplus 7 (Muthén and Muthén 1998–2012). Full information maximum likelihood (FIML) estimation was used to handle missing data. As the primary interest was in the relationship between spirituality and QoL across time, the complexity of the model was reduced using item parceling by averaging the items in the same factors. This statistical technique is common in previous research on the STS (e.g., Dy-Liacco et al. 2005; Piedmont 2007), and the WHOQOL (e.g., Miller et al. 2008; Rotheram-Borus et al. 2010). The goodness of fit of a proposed cross-lagged model (Fig. 1) was examined, as well as its factorial invariance across gender, religion, and time.

The cross-lagged model shown in Fig. 1 estimates and compares the correlations and regression coefficients between variables measured at one wave and the other variables measured at the next wave. The direction of causality between the two variables is inferred

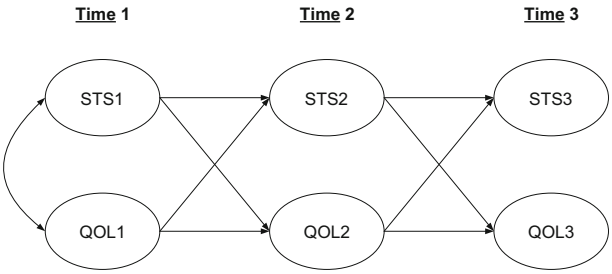

Fig. 1 A proposed cross-lagged model

in the following way. If spirituality (as measured by the STS) is a cause of QoL, spirituality measured at Wave 1 should be related to QoL at Wave 2, and a nonzero cross-lagged relationship between STS1 and QoL2 should be observed. Also, if spirituality is a more powerful cause of QoL, the strength of the cross-lagged relationship between STS1 and QoL2 should be stronger than that between QoL1 and STS2 (Finkel 2004). However, measurement errors in variables, correlations between error terms, and the identification of true causal lag may pose threats to causal inference in the model (Kessler and Greenberg 1981; Plewis 1985).

Results

Goodness of fit of the proposed measurement and structural models

Confirmatory factor analysis on the measurement model yielded a good fit to the data (Hu and Bentler 1999), $\chi^2(153) = 241.494$, $p < .001$; RMSEA = .023 (90 % CI .017–.029); CFI = .983; TLI = .977; SRMR = .043. The structural model (Fig. 1) also showed a good fit, $\chi^2(158) = 271.017$, $p < .001$; RMSEA = .026 (90 % CI = .020–.031), CFI = .978; TLI = .971; SRMR = .046.

Factorial invariance tests

A series of factorial invariance tests (Vandenberg 2002) were conducted to determine whether the entire model, or a portion of it, was equivalent across gender, religion (Christian vs. non-Christians, and Christians vs. non-religious), and time. First, a baseline model (Model 1 in Table 1) was established, in which the first factor loadings of each factor were fixed at one, while other factor loadings, item intercepts, item residuals, and factor variances/covariances were freely estimated, and factor means were fixed at zero. Next, separate models were fitted, and the invariance of factor loadings (Model 2), item intercepts (Model 3), item residuals (Model 4), factor variances/covariances (Model 5), and factor means (Model 6) were assessed by imposing equality constraints across groups and time. Instead of using $\Delta\chi^2$ criterion which was sensitive to sample size and model complexity, the study followed Cheung and Rensvold's (2002) recommendation of using a decrease in CFI greater than .01 to indicate a substantial decrease in model fit when constraining parameters across groups and time.

Table 1 Factorial invariance tests of the cross-lagged model

	χ^2	*df*	RMSEA	CFI	TLI	SRMR	Ref. model	$\Delta\chi^2$	Δdf	ΔCFI	Invariance
(a) *Invariance tests across gender (Male = 344; Female = 732)*											
M1	476.340***	306	.032	.968	.956	.054	–				
M2	496.375***	321	.032	.967	.956	.064	1	20.035	15	−.001	Yes
M3	531.577***	342	.032	.964	.956	.066	2	35.202*	21	−.003	Yes
M4	576.783***	363	.033	.959	.953	.083	3	45.206**	21	−.005	Yes
M5	618.982***	369	.035	.953	.946	.141	4	42.199***	6	−.006	Yes
M6	606.230***	363	.035	.954	.947	.133	5	12.572	6	−.001	Yes
(b) *Invariance tests across religion (Christians = 166; Non-Christians = 897)*											
M1	551.846***	306	.034	.962	.948	.058	–				
M2	581.274***	321	.034	.960	.948	.062	1	29.428*	15	−.002	Yes
M3	774.189***	342	.043	.934	.918	.141	2	192.915***	21	−.026	No
M3a	705.307***	324	.041	.941	.924	.102	2	124.033***	3	−.019	No
M3b	705.836***	324	.042	.941	.924	.108	2	124.552***	3	−.019	No
M3c	697.181***	324	.041	.943	.926	.098	2	115.907***	3	−.017	No
M3d	590.376***	325	.035	.959	.947	.063	2	9.102	4	−.001	Yes
M3e	596.811***	325	.035	.958	.946	.067	2	15.537**	4	−.002	Yes
M3f	595.502***	325	.035	.958	.946	.063	2	14.228**	4	−.002	Yes
M4	809.431***	363	.042	.931	.921	.123	3	35.242*	21	−.003	Yes
M5	813.069***	369	.042	.932	.922	.127	4	3.638	6	−.001	Yes
M6	751.767***	363	.037	.941	.939	.099	5	61.302***	6	−.009	Yes
(c) *Invariance tests across religion (Christians = 166; Non-religious = 816)*											
M1	545.965***	306	.035	.960	.946	.060	–				
M2	578.172***	321	.036	.958	.944	.064	1	32.207**	15	−.002	Yes
M3	787.441***	342	.045	.927	.910	.154	2	209.269***	21	−.031	No
M3a	710.330***	324	.043	.936	.917	.110	2	132.158***	3	−.022	No

Table 1 continued

	χ^2	*df*	RMSEA	CFI	TLI	SRMR	Ref. model	$\Delta\chi^2$	Δdf	ΔCFI	Invariance
M3b	715.380***	324	.044	.935	.916	.116	2	137.208***	3	−.023	No
M3c	704.290***	324	.043	.937	.919	.106	2	126.118***	3	−.021	No
M3d	588.023***	325	.036	.957	.944	.065	2	9.851*	4	−.001	Yes
M3e	594.461***	325	.036	.956	.943	.069	2	16.289**	4	−.002	Yes
M3f	593.520***	325	.036	.956	.943	.065	2	15.348**	4	−.002	Yes
M4	829.191***	363	.045	.923	.911	.130	3	41.75**	21	−.004	Yes
M5	832.388***	369	.044	.924	.913	.134	4	3.197	6	.001	Yes
M6	752.740***	363	.038	.933	.930	.101	5	79.648***	6	−.009	Yes

(1) Measurement invariance tests

M1: Baseline model. The first factor loadings of each factor were fixed at one. Other factor loadings, item intercepts, residual item variances/covariances, and factor variances/covariances were freely estimated across group. Factor means were fixed at zero

M2: Factor loadings were constrained to be equal

M3: In addition to M2, item intercepts were constrained to be equal

M3a: In addition to M2, item intercepts of STS at T1 were constrained to be equal

M3b: In addition to M2, item intercepts of STS at T2 were constrained to be equal

M3c: In addition to M2, item intercepts of STS at T3 were constrained to be equal

M3d: In addition to M2, item intercept of QoL at T1 was constrained to be equal

M3e: In addition to M2, item intercept of QoL at T2 was constrained to be equal

M3f: In addition to M2, item intercept of QoL at T3 was constrained to be equal

M4: In addition to M3, residual item variances/covariances were constrained to be equal

(2) Structural invariance tests

M5: In addition to M4, factor variances/covariances were constrained to be equal

M6: In addition to M5, factor means of one group were fixed at zero, while those of the other group were freely estimated

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

Section (a) of Table 1 presents the results of factorial invariance tests across gender and time. Factor loadings, item intercepts, item residuals, factor variances/covariances, as well as factor means were invariant across gender and time. Sections (b) and (c) show similar results across religion (Christians vs. non-Christians, and Christians vs. non-religious) and time. The results of both sections indicated that factor loadings, item residuals, factor variances/covariances, as well as factor means were invariant across religion and time. However, item intercepts were not invariant, as would be expected given that religious believers are generally more spiritual than non-believers. Partial invariance tests from M3a to M3f suggested that the invariance only occurred in the item intercepts of QoL, but not in the item intercepts of STS.

Direct, indirect, and total effects in the cross-lagged model

As expected, all the autoregressive effects over the three waves were statistically significant (see Table 2). More interestingly, while there was no cross-lagged effect between Wave 1 and Wave 2 variables, the effect between STS at Wave 2 and QoL at Wave 3 was statistically significant ($\beta = .136$, $p < .05$). The reciprocal effect was not statistically significant ($\beta = -.067$, $p =$ ns).

A similar significant indirect effect was observed between STS at Wave 1 and QoL at Wave 3, mediated by STS at Wave 2 ($\beta = .130$, $p < .05$), as well as a significant total effect ($\beta = .193$, $p < .01$). There was no direct or indirect reciprocal effect between QoL

Table 2 Direct, indirect, and total effects among the sets of variables

	Standardized coefficients
Direct effects	
STS1 → STS2	.954***
STS1 → QOL2	.082
QOL1 → STS2	.112
QOL1 → QOL2	.781***
STS2 → STS3	.868***
STS2 → QOL3	.136*
QOL2 → STS3	−.067
QOL2 → QOL3	.766***
Indirect effects	
STS1 → QOL2 → STS3	−.006
STS1 → STS2 → STS3	.828***
Total effects	.823***
QOL1 → QOL2 → STS3	−.052
QOL1 → STS2 → STS3	.098
Total effects	.045
STS1 → QOL2 → QOL3	.063
STS1 → STS2 → QOL3	.130*
Total effects	.193**
QOL1 → QOL2 → QOL3	.598***
QOL1 → STS2 → QOL3	.015
Total effects	.614***

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

at Wave 1 and STS at Wave 3. Therefore, the causality from STS to QoL could be established.

Discussion

The aim of the present longitudinal study was to understand the causal relationship between spirituality and QoL. In this regard, there were three key findings. First, spirituality was a causal predictor of QoL. This is in line with the findings from studies among non-Chinese samples (Brandenberger and Bowman 2013; Chenot and Kim 2013; Dy-Liacco et al. 2005; Piedmont et al. 2009; Piedmont and Friedman 2012). Second, there was no significant reciprocal effect of QoL on spirituality. Third, there was some evidence to suggest the fact that spirituality influenced QoL but not vice versa can be generalized across gender, religion, and time. This means that the finding that spirituality predicted subsequent QoL can be applied to males and females as well as to Christians and non-Christians or to Christians and non-religious people over the period of this study.

The main contribution of this study is that it helps to clarify the causal relationship between spirituality and QoL of university students. Over approximately 19 months between Wave 1 and Wave 3, and approximately 12 months between Wave 2 and Wave 3, spirituality was a predictor and precursor of QoL but not vice versa. It is thus theoretically defensible to adopt spirituality-based therapeutic strategies to enhance students' QoL (Piedmont and Friedman 2012). Some previous studies have reported preliminary evidence of the benefits of therapeutic activities targeting spiritual growth in individuals with substance abuse (Piedmont 2004b) and childhood abuse survivors (Murray-Swank and Pargament 2005). More studies are needed to elucidate the efficacy of specific treatment components and the therapeutic mechanisms involved. Potential areas of research are the enhancement of an individual's sense of membership in the society, one's uniqueness and purpose, and one's connectedness with others in a broader community. This study shed light on the relationship between spirituality and QoL in a cross-cultural and cross-faith setting. Many previous studies have been performed in western contexts, but this study provides empirical evidence to support the relationship across religion in a Chinese context. Moreover, the study contributes to the construction of a theoretical model of the relationship between the two constructs, which in turn provides a basis for further empirical examination (Levin et al. 2011).

This study has a practical implication for practitioners. We concur with Tisdell (2001) on the value of spirituality in higher education: "To ignore it [spirituality], particularly in how it relates to teaching for personal and social transformation, is to ignore an important aspect of human experience and avenue of learning and meaning-making" (p. 5). Given the importance of spirituality in higher education, university administrators and faculty members should promote spiritual development among students, just as they would promote intellectual development. This may be through overseas exchange, interdisciplinary studies, service learning, philanthropy, interracial interaction, leadership training, and contemplative practices (Astin et al. 2011). Whether religious or not, faculty members could participate in their students' spiritual formation and transformation by encouraging them to engage in a spiritual quest (Bowman and Small 2010), whether it be based on theistic or non-theistic, albeit transcendent nonetheless, pursuits.

This study has three limitations, which should be addressed in future research. First, unexpectedly, the STS-QoL causation was not significant for the time interval between Wave 1 and Wave 2 but was significant for the interval between Wave 2 and Wave 3.

There was also a significant STS-QoL indirect causation between Wave 1 and Wave 3. One possible explanation for this is that Wave 1 was followed by Wave 2 after only 7 months, while Wave 2 was followed by Wave 3 after a full year. The uneven time intervals could possibly account for the difference in the size of the cross-lagged effects across the three waves. Just as a certain period of time is needed for a person to develop signs and symptoms after exposure to a pathogen, and therefore an early medical test may not be informative, it may take more than 7 months for people who become more spiritual to show improvements in their perceived QoL. This could open a new line of inquiry for future researchers to investigate whether a certain duration of time lag is necessary for a particular causal effect of spirituality to be detectable (Little et al. 2009). Researchers could also test the interesting hypothesis that the causal effect would fade out and no longer be detectable beyond a certain period. Second, regarding the measurement of spirituality, although the 12 items in the STS were retained on the basis of a series of rigorous exploratory and confirmatory factor analyses in several independent Chinese samples, it is still possible that certain aspects of spirituality unique to the Chinese population are not included in the original STS. Further studies are required to improve the Chinese STS in terms of coverage. Third, the psychological mechanisms through which spirituality works were not identified in this study. For example, could such constructs as social support, self-esteem, healthy beliefs/lifestyle, and health concerns mediate the relationship between spirituality and QoL (WHOQOL-SRPB Group 2006)? This should be the direction of future investigations.

Conclusion

With the massification and expansion of higher education in many countries over the world during the past decade, there has been a large influx of secondary school students into university. Many university students experience high levels of stress as they attempt to adapt to university life. They often lack appropriate coping strategies to mitigate stress, which has a negative impact on their QoL. In view of this issue, many universities have devised measures to promote positive university experiences in campuses. Of all the available measures, spirituality as a psychological input for human flourishing is usually overlooked for various reasons. This study empirically shows that spirituality can be an important determinant of QoL. Universities that are seriously contemplating enhancing the QoL of their students should capitalize on the benefits of spirituality to achieve their goal.

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