

Older adults' spirituality and life satisfaction: a longitudinal test of social support and sense of coherence as mediating mechanisms

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ABSTRACT

Spirituality is proposed to be a component of successful ageing and has been shown to predict wellbeing in old age. There has been conceptual discussion of possible mechanisms that link spirituality with positive psychological functioning in older adults, but few empirical examinations of these linking mechanisms over time. The current study examined the role of Antonovsky's Sense of Coherence (SOC) and social support in mediating the effects of spirituality on life satisfaction in older participants over a four-year period. The study used a cross-lagged panel analysis to evaluate longitudinal mediation within a path analysis framework. Results showed that the meaningfulness dimension of SOC mediated the influence of spirituality on life satisfaction over time, suggesting that spirituality may influence older adults' experience and perception of life events, leading to a more positive appraisal of these events as meaningful. Social support was not found to mediate the pathway between spirituality and life satisfaction. This study may be the first to examine the link between spirituality, sense of coherence, social support and wellbeing, as measured by life satisfaction, using longitudinal data from a community sample of older adults. The study provides evidence for the positive role of spirituality in the lives of older people. This is an area that requires further examination in models of successful ageing.

KEY WORDS – spirituality, meaningfulness, social support, wellbeing, longitudinal, older adults.

Introduction

The growing literature on successful ageing has led to improved recognition of indicators of 'successful' versus 'usual' ageing (Rowe and Kahn 1987), and the primary determinants of these outcomes in old age (Depp, Glatt and

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Jeste 2007). While this literature has provided the basis for proposed strategies to enhance successful ageing (Fries 2002), it has been criticised for relying heavily on a biomedical perspective (Young, Frick and Phelan 2009) and defining successful ageing in terms of physical health and the absence of disease or disability (Depp and Jeste 2006). This biomedical approach contrasts with multi-dimensional (Young, Frick and Phelan 2009) and psycho-social (Bowling and Dieppe 2005) perspectives that highlight psychological indicators of successful ageing, including subjective wellbeing and its constituent components (*e.g.* life satisfaction, positive affect; Diener 2009). This increasing emphasis on the psychological aspects of successful ageing has been driven, in part, by evidence that older adults often maintain levels of subjective wellbeing, even though physical health declines may be difficult or impossible to avoid (Kunzmann, Little and Smith 2000). Many older adults also subjectively rate themselves as ageing well, notwithstanding chronic illness and functional difficulties (Strawbridge, Wallhagen and Cohen 2002). This focus on psychological outcomes is aligned with a positive psychology framework (Seligman and Csikszentmihalyi 2000) that also argues against rigid adherence to ideas of pathology and illness (Duckworth, Steen and Seligman 2005), and has identified variables associated with subjective wellbeing in general populations (*e.g.* Park, Peterson and Seligman 2004). There is a clear and ongoing need for research to elucidate the determinants of older adults' positive psychological and emotional states (Depp, Vahia and Jeste 2010).

Spirituality is one factor that is shown to predict positive psychological states in old age (*e.g.* Kirby, Coleman and Daley 2004). Such findings have informed arguments to expand models of successful ageing to reflect older adults' spiritual orientations (Crowther *et al.* 2002), as well as general discussions suggesting that spirituality is an important, yet understudied, psychological construct (*e.g.* Hill and Pargament 2003). While definitions of spirituality vary widely (for discussion, *see* Emmons and Paloutzian 2003), they often converge with reference to an experience of the 'sacred' (Hill *et al.* 2000: 64), or some 'divine being, higher power, or ultimate reality, as perceived by the individual' (George *et al.* 2000: 104). For the current purposes, spirituality is defined as the 'feelings, thoughts, experiences, and behaviors that arise from a search for the sacred' (Larson, Sawyers and McCullough 1998: 21). Although religion and spirituality share emphasis on a search for the sacred, religion can be distinguished in terms of additional features that are not essential to definitions of spirituality. In particular, religion generally involves spiritual practice in a collective context (Pargament 1997), and the provision of validation and support for this practice by an identifiable group (*e.g.* church community). Religion may also be characterised by a search for 'non-sacred' goals, such as personal identity and belongingness

(see Hill *et al.* 2000). People may be spiritual even if they do not report being religious (Woods and Ironson 1999).

Several reviews have provided critical appraisals of evidence supporting the link between spirituality and mental health. Hill and Pargament (2003) note that most studies focus on formal religious participation, rather than spirituality, and that many comprise large-scale epidemiological surveys. Although some of these epidemiological studies are based on longitudinal data, they typically rely on crude measures of formal religious participation, such as frequency of church attendance (*e.g.* Law and Sbarra 2009). In contrast, focused studies of spirituality are scarce, and few have examined samples of older adults. Most of these studies (*e.g.* Kirby, Coleman and Daley 2004; Lawler-Row and Elliott 2009) have also relied on cross-sectional data taken at a single point in time. Although limited longitudinal evidence provides support for the assertion that spirituality predicts positive outcomes over time (*e.g.* Wink and Dillon 2002, 2003), such conclusions remain tentative. The available literature also provides limited insight into the explanatory mechanisms by which spirituality may exert influences on indices of positive psychological functioning, such as life satisfaction, over time. However, many authors (*e.g.* Ellison and Levin 1998; Park 2007) have argued for the need to develop understanding and theoretical accounts of such processes. George *et al.* (2000) provide one such account that indicates two main mechanisms involving social support and sense of coherence, respectively. Although they suggest a third mechanism involving spiritual orientations and prohibition of risky behaviours (*e.g.* drinking alcohol), they further note that such health behaviours typically explain limited variance in outcome variables. Given that health behaviours may also have greatest influence on physical health, rather than psychological functioning, this mechanism will not be considered further here.

First, George *et al.* (2000) argue that public religious participation may facilitate the development of social bonds, and spirituality (if broadly aligned with religious participation) may promote subjective wellbeing through increased social support. According to Hill and Pargament (2003), individuals may derive both instrumental and emotional social support from religious members and leaders who share similar values and world-views. Studies of social support among older adult samples have consistently found links with subjective wellbeing (Pinquart and Sorensen 2000), while individuals reporting greater religious participation also tend to score high on levels of social contact (Ellison and George 1994) and satisfaction with social support (Nooney and Woodrum 2002). Although there is cross-sectional evidence to suggest that social support may partly mediate the relationship between spirituality and positive psychological functioning (*e.g.* Lawler-Row and Elliott 2009), other perspectives (*e.g.* George *et al.* 2000) are more

critical, and suggest that social support may have a modest role (explaining small amounts of variance) in these associations. Despite this, such critical perspectives have focused mainly on links with physical health, and it is plausible that social support would have greater influence on indicators of psychological functioning, such as life satisfaction.

A second main mechanism by which spirituality might relate to positive psychological functioning involves sense of coherence. Specifically, George *et al.* (2000: 111) suggest that spirituality may provide ‘a sense of coherence and meaning so that people understand their role in the universe, the purpose of life, and develop the courage to endure suffering’. This psychological mechanism is aligned with Antonovsky’s (1979) model of Sense of Coherence (SOC), which reflects the tendency to perceive life events as:

comprehensible (that is rational, predictable, structured, and understandable), manageable (in that adequate and sufficient resources are perceived to be available to aid difficulty resolution...), and meaningful (such that demands created by adversity exposure are seen as challenges and are worthy of engagement). (Surtees, Wainwright and Khaw 2006: 221)

These characteristics are reflected in the SOC model, which comprises three dimensions of comprehensibility, manageability and meaningfulness.

Although links between spirituality and the SOC construct are reflected in the coherence hypothesis of George *et al.* (2000), there have been no direct tests of this proposal. However, spirituality could be expected to have a positive influence on multiple dimensions of SOC, especially when considered in the context of an older population. Meaningfulness is suggested to be a particularly important dimension of SOC (Antonovsky 1993), and the ability to find meaning in life and life events also features in models of successful ageing and psychological wellbeing (*see e.g.* Marcoen 1994; Ryff 1989). Although speculative, spirituality may provide a belief structure or ‘meaning system’ (Park 2007: 320) that allows older adults to interpret and appraise stressful life events, including losses associated with physical decline, in a meaningful fashion. This is consistent with James and Wells (2003), who provide a formal integration of religious beliefs in a cognitive-behavioural framework. They argue that spiritual beliefs can function as a generic mental model (schema) that influences appraisals about life events. Strong spiritual beliefs may facilitate older adults’ positive (or less negative) appraisals of challenging life events (*e.g.* functional difficulties), thus promoting better psychological functioning. While there is less conceptual basis for analogous hypotheses regarding the other dimensions of SOC, a strong degree of spirituality may make events seem more comprehensible and, perhaps to a lesser extent, more manageable.

In sum, the current study proposes that spirituality, as reported by older adults, may be associated with social support and dimensions of SOC, and

that these characteristics will predict positive psychological functioning over time. In the current study, positive psychological functioning was defined in terms of life satisfaction, which is conceptualised as the cognitive (rather than affective) component of subjective wellbeing (*see* Diener 2009). The proposed series of associations correspond to a model of mediation (*cf.* Frazier, Tix and Baron 2004), whereby social support and SOC explain the effects of spirituality on life satisfaction. As discussed by Cole and Maxwell (2003), examinations of mediation traditionally rely on cross-sectional data, which can often provide biased tests of mediated effects. By way of alternative, they propose a method for testing mediation using repeated measures data, which provides insight into the temporal sequencing of relationships, and can situate the independent variable, mediator, and dependent variable, sequentially in time. The current study contributes to existing literature by considering measures of spirituality, social support, SOC and life satisfaction, obtained across time from community-living older adults, and tests longitudinal mediation across a four-year interval.

Method

Participants

Participants were $N=324$ community-living older adults who were participants in the 2004 measurement of Melbourne Longitudinal Studies on Healthy Ageing programme (MELSHA; Browning and Kendig 2010). MELSHA is a longitudinal project involving data collected bi-annually since 1994. In 2004, the participants had a mean age of 80.55 years (standard deviation=4.1; range=75–96), and around half (53%) were female. The 2004 sample comprised groups who were currently married or living with a partner (50.6%), widowed (35.2%), divorced or separated (6.1%), or had never been married (3.7%), with some missing values. In terms of highest education attained, most participants had left school younger than 14 years and had not obtained further qualifications (32.1%), left school older than 14 with no further qualifications (21.6%), or had obtained a certificate or diploma (25.9%), trade or apprenticeship qualification (11.1%), or a Bachelor degree or higher (8.6%), also with some missing values.

These current participants were a subset of $N=1,000$ who took part in the original 1994 measurement of the MELSHA study. Consistent with all longitudinal studies of ageing, the original representative sample has been affected by attrition; $N=674$ participants dropped out from 1994 to 2004, while another $N=139$ dropped out between 2004 and 2008 ($N=185$ in 2008). It is reasonable to assume that such attrition reflects certain

systematic processes (see Chatfield, Brayne and Matthews 2005). Most notably, there is expected to be a healthy ‘survivor’ effect that changes the composition of both the sample and population (Murphy et al. 2011). Given few options for statistically adjusting results when drop-out is substantially attributable to death (Murphy et al. 2011), the current study is best characterised as relying on a convenience (rather than representative) sample of older adults, consistent with many other longitudinal projects (e.g. Coleman, Ivani-Chalian and Robinson 2004). Data on the variables considered in this study were available from measurements in 1994, 2004 and 2008. However, only data from 2004 and 2008 were considered as a ten-year interval (separating 1994 and 2004) was viewed as too long to expect relations. Data were analysed using Full Information Maximum Likelihood estimation (Enders 2001), which uses all available data (including participants who had data in 2004 but not 2008) and provides less biased estimates than alternative strategies for managing drop-out (Schafer and Graham 2002).

Measures

Spirituality Perspective Scale (SPS). The SPS (Reed 1987) is a ten-item scale measuring spiritual beliefs (six items; e.g. My spirituality is a significant part of my life) and behaviours (four items; e.g. How often do you read spiritually-related material). All items are answered according to a five-point scale (1 = not at all; 5 = about once a day), and were summed to provide a total score ranging from 10 to 50. The SPS was originally evaluated in samples of older adults, and demonstrated internal consistency estimates ranging from 0.93 to 0.95 (Reed 1987). Cronbach’s alpha also indicated high levels of internal consistency in 2004 ($\alpha=0.96$) and 2008 ($\alpha=0.95$) measurements of the current study.

Social support. Social support was measured using five items adapted from the British Health and Lifestyle Survey (Cox et al. 1987). Items comprised statements (e.g. There are people in my life who make me feel loved; There are people in my life who can be relied on no matter what happens), to which participants gave responses on a three-point scale (0 = Not true; 2 = Certainly true). The mean inter-item correlation was calculated as an index of item homogeneity (Cronbach’s alpha is biased when the number of items is small), with values above 0.20 suggesting adequate homogeneity (cf. Briggs and Cheek 1986). Results indicated acceptable properties for the scale in both 2004 (mean $r=0.38$) and 2008 (mean $r=0.40$).

Sense of Coherence (SOC). Dimensions of SOC were measured using items from a brief version of Antonovsky’s (1987) Orientation to Life

questionnaire. While this scale comprises 13 items, a single item from the manageability subscale was omitted due to an administration error in 2004. As such, 12 items were initially used in the current analysis, measuring the SOC subscales of meaningfulness (four items), manageability (three items) and comprehensibility (five items). Results indicated acceptable item homogeneity for meaningfulness (mean $r=0.33$ and 0.30) and comprehensibility (mean $r=0.38$ and 0.35) in 2004 and 2008, respectively. However, manageability had acceptable homogeneity in 2004 (mean $r=0.28$), but not in 2008 (mean $r=0.19$), and item analysis also indicated some very low item-total correlations in 2008. Given these poor psychometric properties of the manageability scale, this measure was not considered in subsequent analyses.

Life satisfaction. Life satisfaction was measured by five items adapted from a larger inventory (*cf.* Campbell, Converse and Rodgers 1976). These items provide an overall assessment of satisfaction with several life domains including health, finances, friendships, handling problems and life in general. One scale item also asked about satisfaction with marriage, but was found to have high levels of missing data and was thus excluded from analysis. All questions were based on the same item stem (How satisfied or dissatisfied are you with the following areas of your life?), followed by specific domain questions (*e.g.* your own health and physical condition). All items were rated on a five-point Likert scale (1=Extremely satisfactory; 5=Very dissatisfied) and were re-scored such that higher scores indicated greater levels of life satisfaction. The mean inter-item correlation was acceptable in both 2004 (0.32) and 2008 (0.34).

Data analysis

Data screening was conducted in PASW Version 18.0, while descriptive statistics and path analysis models were estimated in MPlus Version 6.12 (Muthen and Muthen 2010). Path analysis has strengths relative to other techniques suited for testing relations among variables over time (*e.g.* multiple regression), including the ability to: (a) generate statistical indices of fit that allow models to be evaluated and compared; and (b) estimate relationships among multiple dependent variables simultaneously. The current study adopted path analysis (using observed variables) rather than a latent variable model as the available sample size (particularly in 2008) did not support complex models with multiple indicators of latent variables. The numbers of items identifying certain constructs (*e.g.* SOC meaningfulness) were also not ideal for specifying latent variables. Models were estimated using the Maximum Likelihood

(ML) algorithm, and evaluated using the χ^2 statistic and approximate fit indices, based on Hu and Bentler (1999), including: (a) Standardised Root Mean Square Residual (SRMR) <0.08 ; (b) Root Mean Square Error of Approximation (RMSEA) <0.06 ; (c) Confirmatory Fit Index (CFI) >0.95 ; and (d) Tucker–Lewis Index (TLI) >0.95 .

The primary analysis proceeded in accordance with Cole and Maxwell's (2003) method for evaluating longitudinal mediation within a Structural Equation Modelling (SEM) framework. The appropriate statistical model corresponds to a cross-lagged panel model (*cf.* Martens and Haase 2006), which yields several estimates of interest. These include *autoregressive* pathways between the Time 1 and Time 2 values of the same variable ($X_1 \rightarrow X_2$) that reflect stability over time. Cross-lagged pathways between Time 1 (T_1) values of one variable and Time 2 (T_2) values of the other ($X_1 \rightarrow Y_2$) capture relative *change* in the endogenous variable (controlling for stability effects). In the current study, separate models were estimated to examine the mediating effects of social support and two dimensions of SOC (meaningfulness and comprehensibility) when these mediators were considered independently. When two waves of measurement are considered, longitudinal mediation can be inferred from a pattern of relationships whereby, when controlling for stability effects, there are: (a) significant cross-lagged pathways from T_1 values of the independent variable to T_2 values of the mediator; and (b) significant cross-lagged pathways from T_1 values of the mediator to T_2 values of the dependent variable (other pathways can be constrained to zero). In each model this pattern of pathways was specified, and evaluated for fit to the data. To examine whether results could be explained by shared variance, a cross-lagged model including all variables was evaluated in a second stage of analysis. In this multiple mediator model a fully cross-lagged model was estimated first, before non-significant pathways were trimmed from the model.

Results

Descriptive statistics

Means, standard deviations and correlations among scale scores are shown in Table 1. As can be seen, there was very little mean change in any construct over time, while each construct measured in 2004 was also positively associated with itself measured four years later in 2008 (indicating rank-order stability). The lowest such correlation was for social support, while the highest was for spirituality. Spirituality was modestly and positively associated with social support and meaningfulness in both 2004 and 2008. In contrast, the associations with comprehensibility were either negative or approached zero.

TABLE 1. Means, standard deviations (SD) and Pearson correlations for study constructs

		Mean	SD	1	2	3	4	5	6	7	8	9
1	SPS ₂₀₀₄	31.58	12.89	–								
2	SPS ₂₀₀₈	31.25	12.50	0.78	–							
3	SS ₂₀₀₄	9.74	0.87	0.09	0.11	–						
4	SS ₂₀₀₈	9.68	0.96	0.12	0.17	0.29	–					
5	MEAN ₂₀₀₄	22.85	4.23	0.14	0.06	0.06	0.12	–				
6	MEAN ₂₀₀₈	22.94	3.98	0.19	0.17	0.10	0.22	0.69	–			
7	COMP ₂₀₀₄	28.68	5.01	0.02	0.04	0.05	0.05	0.63	0.47	–		
8	COMP ₂₀₀₈	28.69	5.04	–0.11	–0.07	0.11	0.13	0.42	0.56	0.65	–	
9	LSAT ₂₀₀₄	18.70	2.83	0.06	0.08	0.07	0.04	0.47	0.44	0.47	0.30	
10	LSAT ₂₀₀₈	18.31	2.80	0.02	0.09	0.26	0.15	0.51	0.50	0.45	0.46	0.67

Notes: SPS: Spirituality Perspective Scale. SS: social support. MEAN: SOC meaningfulness. COMP: SOC comprehensibility. LSAT: life satisfaction. SOC: Sense of Coherence.

TABLE 2. Model fit indices

Model	χ^2	df	<i>p</i>	CFI	TLI	RMSEA	SRMR
SPS, LSAT and social support	1.40	4	0.844	1.00	1.00	0.00	0.01
SPS, LSAT and SOC meaningfulness	7.40	4	0.117	0.99	0.97	0.05	0.03
SPS, LSAT and SOC comprehensibility	0.47	4	0.977	1.00	1.00	0.00	0.01
Multiple mediator model: Trimmed model	13.43	15	0.569	1.00	1.00	0.00	0.04

Notes: SPS: Spirituality Perspective Scale. LSAT: life satisfaction. SOC: Sense of Coherence. df: degrees of freedom. CFI: Confirmatory Fit Index. TLI: Tucker–Lewis Index. RMSEA: Root Mean Square Error of Approximation. SRMR: Standardised Root Mean Square Residual.

Model testing

A series of cross-lagged panel models specifying lagged associations consistent with longitudinal mediation were fit to the data. Each model included measures of spirituality, life satisfaction and one mediator (social support, meaningfulness or comprehensibility). In each instance the mediation model provided excellent fit to the data, as reflected in a non-significant *p*-value and all approximate fit indices in the desired range (see Table 2). Standardised parameter estimates for the three models are shown in Figure 1.

Panel (a) shows parameter estimates when social support was specified as a mediator between spirituality and life satisfaction. As can be seen, there was a small positive pathway from spirituality to social support, although this did not attain statistical significance ($p > 0.05$). Social support was associated with relative increases in older adults' life satisfaction over time. Panel (b) shows estimates when meaningfulness was included in the model, and these results were consistent with longitudinal mediation. Spirituality was associated with relatively higher levels of meaningfulness four years later, while meaningfulness was associated with relative increases in life satisfaction over time. Panel (c) shows estimates when comprehensibility was included in the model, and is also consistent with longitudinal mediation. However, contrary to expectations, it was found that spirituality was associated with relative declines in comprehensibility. Comprehensibility was associated with higher levels of life satisfaction over time. This pathway was smaller in magnitude when compared to the analogous pathway from meaningfulness.

To examine the unique relationships among spirituality, life satisfaction and the three proposed mediators, a cross-lagged model including all variables was fit to the data. This multiple mediator model evaluated pathways controlling for associations with other variables. A fully cross-lagged panel model was estimated first, before non-significant pathways ($k = 15$)

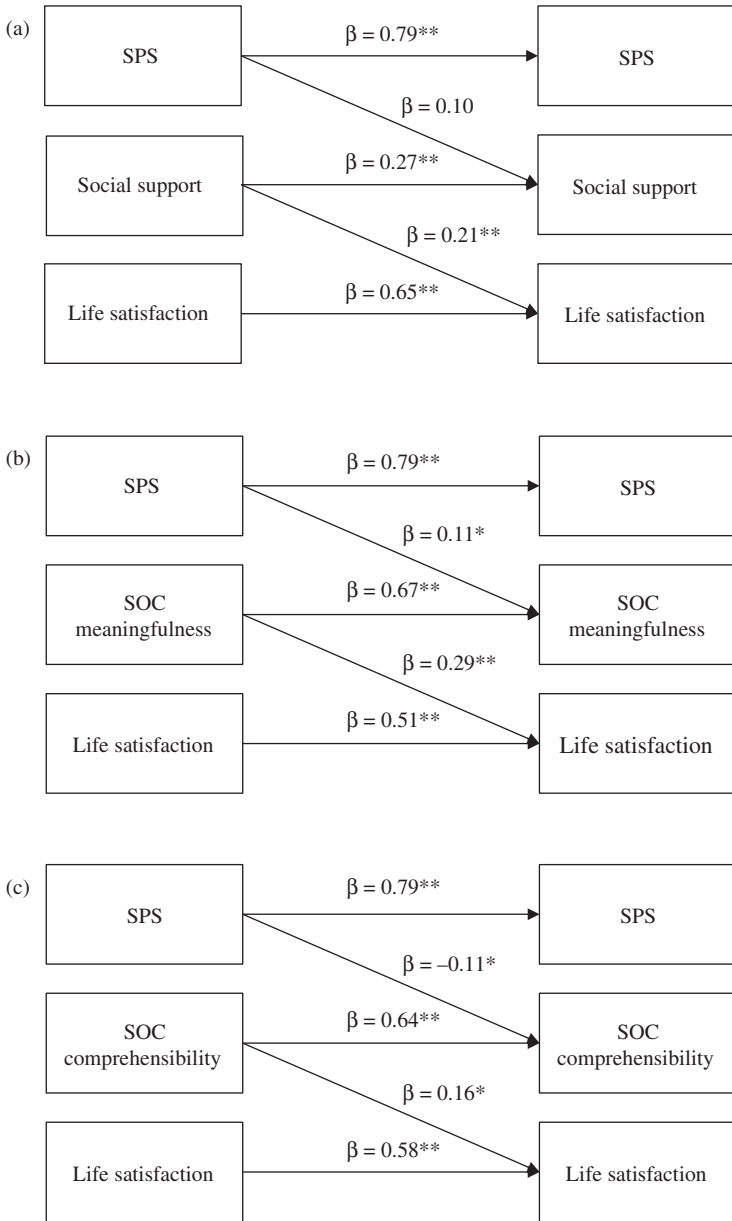


Figure 1. Single mediator models.

Notes: SPS: Spirituality Perspective Scale. SOC: Sense of Coherence.

Significance levels: * $p < 0.05$, ** $p < 0.01$.

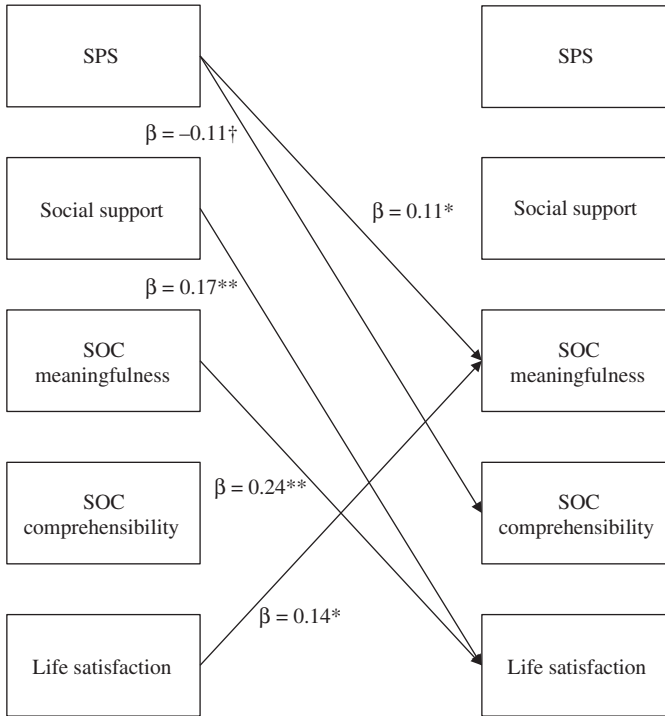


Figure 2. Multiple mediator model.

Notes: SPS: Spirituality Perspective Scale. SOC: Sense of Coherence.

Significance levels: $^\dagger p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$.

were trimmed from the model. This trimmed model provided excellent fit to the data (see Table 2), and the standardised parameter estimates are shown in Figure 2. As can be seen, spirituality was still associated with subsequent levels of meaningfulness when controlling for other variables, while meaningfulness was associated with subsequent life satisfaction. A pathway from life satisfaction to subsequent meaningfulness was also observed, suggesting a possible bi-directional influence. Social support remained positively related to subsequent life satisfaction, while spirituality was associated with comprehensibility, although at a liberal level of significance only ($p < 0.10$). No other pathways were statistically significant.

Discussion

The current study makes several contributions to existing literature. It considered the life satisfaction component of subjective wellbeing as a positive outcome associated with spirituality over time, and may be the first to

examine such pathways using longitudinal data from a sample of community-living older adults. There are several proposed mechanisms by which spirituality might influence subjective wellbeing, and the current investigation was the first to examine whether social support and dimensions of Antonovsky's (1987) Sense of Coherence construct might mediate the effects over time. These mechanisms were grounded in empirical and theoretical literature, and mediating effects were evaluated using a longitudinal method allowing the temporal sequencing of relationships among variables to be established.

The main finding from the study was that spirituality was associated with increased life satisfaction over time, and this effect was seemingly indirect, through the SOC dimension of meaningfulness. Although the capacity to find meaning in events has been implicated in successful ageing (*see* Marcoen 1994), few studies have considered factors that may facilitate this capacity. Speaking about religious and spiritual involvement, Idler (1987) refers to a body of knowledge and meaning that allows individuals to make sense of their daily experiences. James and Wells (2003) provide a formal integration of religious and spiritual beliefs into a cognitive-behavioural framework, and argue that such beliefs can be understood as a generic mental model, or schema, that contributes to appraisals about life events. They suggest that the content of the religious mental model can influence situational appraisals, individual responses, and thus protect against mental health problems. The current results support this perspective and indicate that spirituality can influence older adults' interpretations of events, making them seem generally meaningful, and determining whether events are seen as opportunities and challenges, rather than threats and demands. Levels of meaningfulness were then associated with higher levels of life satisfaction over time.

Results also supported a mediating effect involving SOC comprehensibility. However, contrary to expectations, it was found that this relationship was negative, such that spirituality predicted relative *declines* in the tendency to view the environment as structured, predictable and explicable. One possible explanation is that spiritual attributions about life events, including explanations that involve divine will, may invoke views that explanations are beyond logic or understanding. Such explanations may not facilitate the perception of future events as predictable or explicable. Alternatively, it may be that spirituality is associated with both positive and negative outcomes, while reduced comprehensibility is a manifestation of one such negative consequence of strong spiritual beliefs. James and Wells (2003) note that the content of a religious mental model may determine the nature of mental health outcomes, and negative content (*e.g.* belief in a punishing God) may promote rumination and vulnerability to psychological disturbance. Other

studies (*e.g.* Pargament *et al.* 1998) have documented negative manifestations of spirituality. Bjorck and Thurman (2007) suggest that these negative reactions may occur when adverse events are experienced without relief, perhaps as in older age (*e.g.* mortality of friends, while undergoing physical and cognitive decline). It may be difficult to reconcile many adverse events with spiritual beliefs, and this may force changes in cognitive structures (at least temporarily), such that the world is seen as less controllable, predictable or comprehensible.

There was limited evidence for mediating effects involving social support. Specifically, it was found that while social support was associated with higher levels of life satisfaction over time, the pathway from spirituality to social support was not significant. This contrasts with the findings of previous cross-sectional studies (*e.g.* Lawler-Row and Elliott 2009), and supports George *et al.* (2000) who argued that social support has a modest role explaining associations between religious beliefs and health. The results are also potentially consistent with the idea that public religious involvement (*e.g.* attending church groups), rather than spirituality *per se*, are associated with social support, and that it may be necessary to distinguish between religious involvement and spiritual beliefs. However, conclusions regarding such links should be drawn with caution, as the pathway was evident at the trend level, and was similar in size to the pathway observed from spirituality to meaningfulness. The failure to find a significant pathway was potentially attributable to sample size and lower precision of the parameter estimate, which may have made it difficult to detect true effects. The current study also used a brief measure of overall social support, which is limited relative to investigations (*e.g.* McLaughlin *et al.* 2010) that distinguish between structural (*e.g.* size of social networks) and functional (*e.g.* satisfaction with social support) dimensions of social support.

Another broad finding of the study was that the SOC dimensions had varying relations with spirituality and life satisfaction. It was found that meaningfulness shared a stronger relation with life satisfaction than did comprehensibility, and this salient role of meaningfulness may be particularly apparent for older adults. As noted above, older age may be characterised by accumulation of challenging events, such as declining physical functioning. It may be that the ability to find meaning in such events, as opposed to predict future outcomes, is particularly important for maintaining life satisfaction and subjective wellbeing. More generally, several studies have argued that a single dimension underlies items from different versions of the SOC scale (*see e.g.* Feldt and Rasku 1998), and that only the SOC total score should be used. In contrast, the current results indicated that these dimensions were differentially associated with antecedents and outcomes. Spirituality was positively associated with meaningfulness across time, but was

negatively related to comprehensibility. Using the total score only would lose this information, and the results thus indicate value from treating the SOC dimensions as independent constructs.

The current findings must be interpreted in light of limitations to the study. As described by Hill and Pargament (2003), spirituality is a complex construct involving cognitive, emotional, behavioural and interpersonal dimensions, and the current study considered a partial and incomplete selection of these components. Consistent with general research on ageing populations, the current study was also affected by attrition, reflecting death, entry to residential care, dementia, refusal to participate and loss to follow-up. While the analytic method made maximum use of the available data, the later waves of observation may particularly reflect older adults with better physical health. SOC was also measured using a short form of Antonovsky's (1979) scale, and some constructs were identified by a small number of items. The manageability construct was measured in this study, but the scale demonstrated marginal item homogeneity and was not considered in the analysis. Finally, while two waves of data provide a valid means for testing longitudinal mediation (*cf.* Cole and Maxwell 2003), this technique assumes that the pattern of lagged associations are stable, and that similar results would be found across subsequent waves of measurement, if they were observed.

Conclusions

The current study found that older adults' spirituality was indirectly related to life satisfaction four years later. This extends the available body of mainly cross-sectional evidence that suggests a positive link between spirituality and subjective wellbeing. The findings also support the proposition that older adults' wellbeing can be maintained through psychological adaptation involving spirituality and resilience, notwithstanding health declines typically associated with old age (Young, Frick and Phelan 2009). The study found that this positive influence of spirituality was mainly through the effect of SOC meaningfulness, rather than other potential mediators (*e.g.* social support) discussed in the literature. This is in line with arguments that spiritual beliefs can function as a generic mental model that may influence older adults' perceptions of life events, leading to more positive appraisals of these events as meaningful.

The current findings suggest value from attending to older adults' spirituality in the provision of health-care services. Previous studies indicate that health practitioners may under-utilise spiritual beliefs as a resource to maintain wellbeing for patients and their families (Silvestri *et al.* 2003). Several authors (*e.g.* Koenig 2004) have recommended that clinicians

routinely consider their patients' spiritual beliefs, while many health-care organisations are now advised to assess patients' religious denomination and spiritual practices during patient intake (Cadge, Freese and Christakis 2008). Patients' spiritual beliefs may be an intensely private aspect of self-concept, and should thus be approached with great sensitivity (see D'Souza 2003). However, a consensus panel of the American College of Physicians (see Lo, Quill and Tulskey 1999) has provided guidance to help clinicians explore their patients' spiritual beliefs and issues. They suggest that it may be useful and appropriate to routinely ask: (a) Is faith (religion, spirituality) important to you in this illness?; (b) Has faith (religion, spirituality) been important to you at other times in your life?; (c) Do you have someone to talk to about religious matters?; and (d) Would you like to explore religious matters with someone?

If spiritual assessment identifies older adults' as having a spiritual or religious orientation, then it may be valuable to discuss these beliefs and consider implications for treatment. Interventions that adapt cognitive-behavioural methods to work with spiritual issues (e.g. D'Souza and Rodrigo 2004) are available and may be useful adjuncts to other treatment. It may be suitable to refer patients to practitioners who are trained to deliver such interventions. Many hospitals in the United States of America, as well as others in the United Kingdom and Australia, provide specialised support services (e.g. pastoral care, chaplaincy) to help respond to patients' spiritual and religious needs (Orton 2008). Such services could be used for referrals. Some of these programmes are the focus of debate. In the United Kingdom, for example, it has been argued that religious or spiritual support services do not influence clinical outcomes, and that financial resources invested in such supports should be diverted towards other medical services (National Secular Society 2011). In contrast, the current results suggest that spiritual support services may be justified in terms of beneficial impacts on older adults' positive psychological outcomes, and thus should remain in one form or another.

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