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RESEARCH PAPER

Life Satisfaction, Hope, and Positive Emotions as Antecedents of Health Related Quality of Life Among Homeless Individuals

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Abstract Among a sample of individuals identifying as homeless (N' = 275), this study modeled the relationship between the psychological well-being variables of hope, life satisfaction, positive emotions, and health related quality of life (HRQoL). Specifically, covariance based structural equation modeling (CB-SEM) was used to test *a prior* theory that life satisfaction serves as an antecedent of HRQoL with hope and positive emotions as mediators. Results indicated that the theorized CB-SEM model closely fit the observed data, with the model also serving as a robust predictor of hope, positive emotions, and HRQoL. The data suggests that life satisfaction and hope are important cognitive sets influencing positive emotional well-being with all 3 variables collectively contributing to increased perceptions of HRQoL. The study concludes with a discussion of the implications of the results on future research, particularly surrounding potential quality of life interventions for individuals facing homelessness and associated health challenges.

Keywords Homeless · Hope · Positive emotions · Health related quality of life

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Life satisfaction (Diener et al. 1985) and Hope (Snyder et al. 1991a, b) and are both cognitive sets associated with perceptions of health and psychological wellbeing. Both life satisfaction and hope are linked by goal theory (Locke et al. 1981; Carver and Scheier 2013), which holds that understanding an individual consists largely of understanding that person's goals (cf. Carver and Scheier 2013; Mischel and Shoda 1995). Goals are defined as benchmarks of success that capture both long term aspirations, such as leaving homelessness, or end points of short term mental action sequences, such as walking to a meal (Carver and Scheier 2013).

As goal theories, life satisfaction and hope describe cognitive appraisals of the quality of one's goal attainment, with life satisfaction involving retrospective appraisals of having achieved benchmarks of success (Diener et al. 1985), while hope involves appraisals of the likelihood of *future* success in attaining one's goals (Snyder et al. 1991a). Perceptions of success in achieving of one's goals have been linked to affective states such as joy and happiness (Emmons 2003). Appraisals of life satisfaction (Garrido et al. 2013) and hope (Berendes et al. 2010; Snyder et al. 1991b) have also been linked to not only positive emotions, but positive subjective perceptions of physical health.

To further explore the relationships of life satisfaction, hope, and positive emotions to subjective perceptions of physical health, a cross sectional study of individuals identifying as homeless was used to test a structural equation model of the relationship between these variables. Based on established theory, life satisfaction was modeled as an antecedent of subjective perceptions of physical health, as measured by the variable health related quality of life (HRQoL), mediated by both hope and positive emotions. Given that previous research has linked homelessness to lowered perceptions of HRQoL (Sun et al. 2012), the results of this study may not only add to our basic understanding of the relationships between the variables of interest, but also inform future research into improving the practices of helping professions working with clients who are homeless.

Literature Review

Homelessness and Health Related Quality of Life

Research has well established that the experience of homelessness is linked to poorer health (Morrison 2009; Wrezel 2009; Singer 2003; McCrary and O'Connell 2005). For instance, living on the street or in crowded shelters increases not only health risks associated with prolonged stress, but also risks associated with communicable disease (e.g. TB, respiratory illnesses, etc.), violence, and exposure (Singer 2003; Wrezel 2009). Furthermore, health conditions that are manageable in a housed population can quickly become unmanaged for those experiencing homelessness (Wrezel 2009). Yet, while much is known about the empirical link between homelessness and manifest indicators of health, such as clinical diagnoses and life expectancy, less is known about the operations of subjective perceptions of health for those experiencing homelessness (Hubley et al. 2014; Gadermann et al. 2014). Research into subjective perceptions of health among individuals reporting homelessness is important because although manifest indicators of health are often used interchangeably with subjective perceptions of

health, some have recognized the distinctiveness of the variables to the experience of health and wellbeing (Moons et al. 2006).

Health Related Quality of Life (HRQoL) HRQoL is as a multi-dimensional psychological construct said to capture subjective perceptions of health (Ahmed et al. 2012). HRQoL captures latent, subjective appraisals of health across the dimensions of physical, mental, emotional, and social functioning (Ahmed et al. 2012). Because little research to date exists on the operations of HRQoL in the context of homelessness (Hubley et al. 2014; Gadermann et al. 2014), additional studies that explore HRQoL and homelessness may provide important additional information not captured by research into homelessness and manifest indicators of health. Studying HRQoL and its psychological antecedents among homeless individuals may even suggest directions for future research to improve interventions for those helping professionals working with homeless clients.

Life Satisfaction Life satisfaction is a cognitive set involving the subjective appraisal of the quality of one's life. The life satisfaction determination involves appraising the extent that an individual has realized subjectively established benchmarks of success. Such benchmarks reflect the individual's values and/or desired goals (Diener et al. 1999; Diener, Lucas, and Oishi 2002; Emmons 1986; Sheldon and Elliot 1999; Allen and Duffy 2010).

A defining characteristic of the life satisfaction appraisal is its retrospective character. Because life satisfaction involves appraisals of the quality of one's past successes, those experiencing greater life satisfaction are said to possess a stronger cognitive network of happy, satisfying memories (Collins and Loftus 1975; Seidlitz and Diener 1993). Research supports the retrospective character of the life satisfaction appraisal, with data indicating that life satisfaction judgments are positively associated with a greater recall of what individuals subjectively consider positive memories (Pavot et al. 1991). Moreover, active efforts to recall past successes, such as with life review therapy, have been shown to increase reports of life satisfaction (White 2015).

The retrospective nature of life satisfaction is also evident in the wording of a well-known measure of life satisfaction, the Satisfaction with Life Scale (SWLS) (Diener et al. 1985). The SWLS includes items such as "If I could live my life over, I would change almost nothing" and "So far I have gotten the important things I want in life." In an effort to gauge life satisfaction, such items encourage retrospective assessments of the quality of success a respondent has had in achieving desired ends.

Positive appraisals of life satisfaction have been shown to exhibit positive relationships with the other indicators of health and psychological wellbeing. For instance, life satisfaction is positively associated with hope (O'Sullivan 2011; Bailey and Snyder 2010; Bailey et al. 2007; Chang and DeSimone 2001) and positive emotions (Diener et al. 1991; Andrews and Withey 1976). Research also suggests that life satisfaction has a palliative effect for those coping with illness, with life satisfaction positively correlating with increased perceptions HRQoL (Strine et al. 2008; Garrido et al. 2013).

Life Satisfaction and Emotions As noted above life satisfaction is closely associated with positive emotional wellbeing (Diener et al. 1991; Andrews and Withey 1976). In fact, life satisfaction and positive emotional wellbeing are so strongly associated, the 2

constructs have frequently been modeled as dimensions of a single global construct dubbed *subjective well-being* (SWB), a psychological state that is associated with what is colloquially known as "happiness" (Diener et al. 1985; Pavot and Diener 1993).

Cognitive appraisals of life satisfaction are associated with happiness based on the theory that attaining subjectively chosen benchmarks of success generates positive emotions (Diener et al. 1985; Emmons 2003). Emotions are often associated with the life satisfaction determination, for as Frisch (1998) states, happiness is "the extent to which important goals, needs, and wishes have been fulfilled" (p. 35). In other words, having obtained her/his subjective benchmarks of success, a person "feels good" (Emmons 1996; Sheldon and Elliot 1999). An individual is thus considered to be in the highest state of SWB when, along with a positive cognitive appraisal of life satisfaction, he/she is experiencing greater positive over negative emotions. SWB has also been linked to the palliation of illness, with aspects of SWB demonstrating a positive relationship to HRQoL (Diener and Chan 2011; Strine et al. 2008).

Hope Theory In *Pedagogy of Hope*, noted social activist Freire (1996) describes the importance of hope to those facing adversity, noting: "There is no change without the dream, as there is no dream without hope." (p. 91). Similarly, Saleebey (2000), an early thought leader in the development of the strengths based perspective within mental health practice, notes "Hope is also very much a part of the strengths perspective and the recovery and resilience movements" (p. 132–133). Marcel, based on his work with prisoners of war, also notes that hope is essential to coping with hardship (as cited in Godfrey 1987, p. 103).

Associated with the growth of positive psychology as a subdiscpline (Seligman and Csikszentmihalyi 2000), and with the recognition within the medical literature of the palliative value of hope to perceptions of health (Hearth 1992; Snyder et al. 1991b), theories of hope have been developed that include psychometric tools that capture individual differences in hopefulness. Research using such scales has shown a positive relationship between hope and HRQoL (Rustoen et al. 2010), with hope consistently being described as exerting a palliative effect on the manner in which individuals experience illness and recovery (Gottschalk 1985; Moore 2005). For example, hope has been associated with less pain (Berg et al. 2008; Snyder et al. 2005; Groopman 2004), increases in motor functioning for those with physical disabilities (Groopman 2004), and coping with burns (Barnum et al. 1998), spinal injuries (Elliot et al. 1991), and blindness (Jackson et al. 1998). Because of hope's palliative benefits, hope has become recognized as an important component of perceptions of health (Wiles et al. 2008; Groopman 2004; Gottschalk 1985).

One of the more well-known and researched theories of hope was developed by Snyder and colleagues (Snyder et al. 1991a, b). Based on the assumption that all purposeful human action is goal directed (Snyder et al. 2000), Snyder et al. (1991a, b) trace their theoretical formulation of hope to the earlier work of Frank (1968, 1971), who defined hope as a positive expectation that one's goals are achievable. Snyder's theory of hope builds on this model, by defining hope as a cognitive set of goal-directed expectations consisting of two iterative dimensions: *hope agency* and *hope pathways* (Snyder et al. 1991a, b).

Hope agency reflects a cognitive assessment of one's capability and determination to achieve goals (i.e., "I can do it," "I'm ready," "I've got what it takes"), while hope

pathways (Snyder 1994) in turn represents a cognitive set involving the appraisal of viable pathways to goals (i.e., "I have a solid plan to achieve my goal"). Saleebey (2000) and Snyder et al. (1991a, b) both hold hope is a cognitive set of resilience because of the importance of appraisals such as "I've got what it takes" and "I can do it" to generating the motivation necessary to exert continued effort when faced with obstacles.

Using psychometric scales developed from Snyder's hope theory, research has shown hope to be a robust positive contributor to individual differences in subjective perceptions of resilience (Gillespie et al. 2007). Individuals with higher hope are thought to be more resilient because those with higher hope readily identify multiple avenues to their goals (Avey et al. 2011). Research has also demonstrated hope has a positive relationship to life satisfaction (O'Sullivan 2011; Bailey et al. 2007; Bailey and Snyder 2010; Bronk et al. 2009; Ng et al. 2014; Chang and DeSimone 2001) and positive emotional wellbeing (Ciarrochi et al. 2015), while also exhibiting a negative relationship with dysphoria (Kwon 2000). Multiple studies using Snyder's conceptualization of hope also suggest hope has a palliative role in coping with illness, as higher hope is associated with reduced pain and other physical health symptomatologies (Snyder et al. 2005; Berendes et al. 2010).

Hope and Positive Emotions Snyder's hope theory postulates that emotions are a byproduct of goal directed thought (Snyder 2000). Consequently, as one exhibits a positive expectation that goals are attainable, positive emotions result. Recent research supports this theory, with longitudinal data supporting that the cognitive appraisals associated with hopeful thinking are antecedents of positive emotions (Ciarrochi et al. 2015).

Origins of Hope As noted above, theory suggests life satisfaction involves appraisals of having reached subjective benchmarks of success. Hope, in contrast, is a prospective appraisal of the likelihood of future goal attainment. Thus, viewing life satisfaction as an antecedent of hope is consistent with theories of the origins of hope, such as that offered by Cheavens (2000), who suggests "success experiences" are drivers of hopeful thinking. In contrast, when an individual encounters repeated failures in obtaining one's goals, such individuals are more likely to develop a generalized expectancy of failure; in other words, he/she loses hope (Cheavens 2000). Relatedly, Snyder (2000) notes the ability of high hope people to consistently recall positive success experiences over failures, a process important to fueling such individuals' agency toward future goal pursuits. Such a theoretical understanding of the relationship between life satisfaction and hope aligns with the consistent positive empirical relationship demonstrated between the variables in multiple studies. However, this runs counter to the implicit theory of many of several studies that suggests hope is a predictor of life satisfaction (Bailey et al. 2007; Bronk et al. 2009; Ng et al. 2014). In our view, however, theory supports life satisfaction as an antecedent of hope rather than contrariwise.

Broaden and Build Theory of Positive Emotions While the theories described above suggest both life satisfaction and hope as cognitive antecedents of positive emotions, positive emotions themselves are thought to be important antecedents of coping with hardships such as illness. The broaden-and-build theory of positive emotions provides a framework with which to understand how positive emotions may assist in coping with

health maladies (Fredrickson 1998, 2001; Frederickson and Branigan 2005). According to the theory, positive emotions (e.g., joy, contentment, happiness) can broaden people's attention and cognitions, enabling them to draw upon a wider range of perceptions or ideas that aid in palliation, resilience, and recovery (see Fredrickson 1998, 2000, 2001). Research supports the broaden-and-build theory, as multiple studies have demonstrated positive emotions are linked to palliation and recovery, with positive emotions negatively correlating with perceptions of pain (Keefe et al. 2001; Mathew and Paulose 2011). Positive emotions also correlate positively with subjective perceptions of better physical health (Austenfeld and Stanton 2004).

The broaden-and-build theory of positive emotions may explain in part the respective links between life satisfaction, hope, and HRQoL. Given that both the life satisfaction appraisal and the hope appraisal are thought to be antecedents of positive emotions, both may be linked to HRQoL via positive emotions as a mediator per the broaden-and-build theory of positive emotions (Fredrickson 1998, 2001, 2005).

Current Study

Others have noted that research into SWB, e.g. life satisfaction and positive emotions, (Thomas et al. 2012) and HRQoL (Hubley et al. 2014; Gadermann et al. 2014) with individuals experiencing homelessness is limited. Moreover, although hope is a cognitive set considered important in the face of hardship (Saleebey 2000; Freire 1996; Snyder 1994), we know of no other research that explores the psychometric operations of hope among a sample of individuals reporting homelessness. Thus, in order to 1.) better understand the relationship of life satisfaction to HRQoL and both variables' directional associations with hope and positive emotions, and 2.) to contribute to a better understanding of the psychological strengths that may assist those experiencing homelessness, this study tested a theory based covariance based structural equation model (CB-SEM; Bollen 1989) of life satisfaction as an antecedent of HRQoL mediated by hope and positive emotions (see Fig. 1 for a graphical depiction of the proposed model). If the proposed theoretical model fit the observed data, the result would underscore the importance of life satisfaction, hope, and positive emotional wellbeing to HRQoL. The model would also suggest directions for future research into intervention approaches that target psychological wellbeing variables, such as life satisfaction and hope, as a means to improve perceptions of health.

Methods

Procedure

The study was cross sectional and conducted at a homeless outreach agency in a medium-sized city in the South Central United States. The study consisted of a paper and pencil survey that utilized standardized self-report measures to capture the variables of life satisfaction, hope, emotional wellbeing, and HRQoL. Prior to completing a survey, each participant received a consent information sheet informing him/her of the

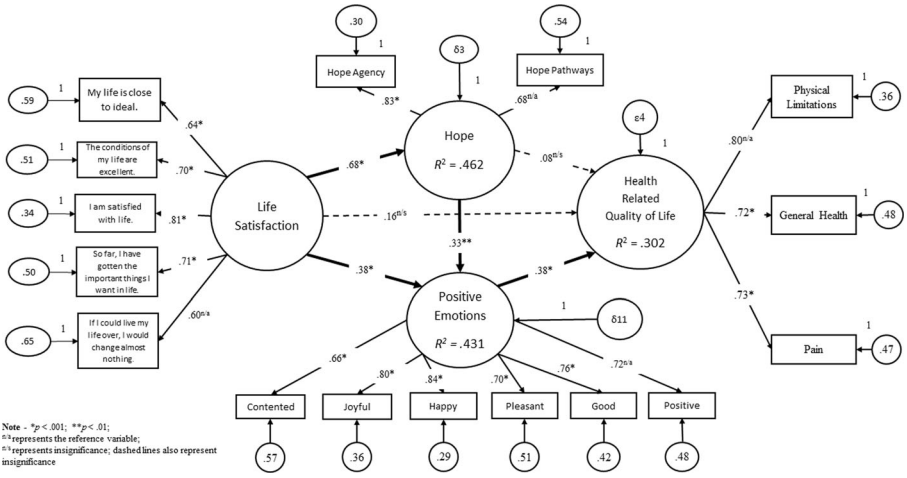

Fig. 1 Standardized values of a structural equation model of life satisfaction as an antecedent of HRQL with hope and positive emotions as mediators among a sample of individuals reporting homelessness (N' = 275)

voluntary nature of the study and the study's purpose of assessing the well-being of participants. For those who agreed to participate, fruit and a pencil was provided as an incentive. The survey took about 30 min to complete. All participants were between the ages of 18–65 who were receiving services from the agency. Participants were recruited using multiple means, including through the help of shelter staff to advertise the study and identify participants. The Institutional Review Board (IRB) of the researchers' institution approved the protocol.

Participants

The mean age of the sample was 46.6 years of age (SD = 11.0) and consisted of 65% males and 35% females. Regarding ethnicity, 61% reported being white while 39% reported minority status. As for the length of time spent homeless, 22% reported being homeless less than a year, 43% reported being homeless more than a month but less than a year, and 35% reported homelessness for greater than 1 year. Regarding mental and physical wellbeing, 46% reported a clinical mental health diagnosis while 18% reported chronic physical illness.

Measures

The Adult Hope Scale Individual differences in hope were measured using the Adult Hope Scale (AHS; Snyder et al. 1991a, b). The AHS consists of 12 items with responses measured in a Likert format, with 4 items assessing hope agency, 4 assessing hope pathways, and 4 items serving as filler. The AHS uses a Likert response format, with overall hope scores being additive, obtained by summing the agency and pathway subscales to achieve total hope scores ranging from 8 to 32, with higher scores indicating greater hope. An example of an agency item is "I energetically pursue my goals" while an example of a pathways item is "I can think of many ways to get the things in life that are important to me."

The AHS has been used in hundreds of studies and has consistently demonstrated good internal reliability, regularly exceeding the internal consistency threshold of $\alpha \geq .70$ for group study (Hellman et al. 2012). The AHS has also shown good construct validity, with scores demonstrating moderate to strong negative correlations with hopelessness and depression and moderate to strong positive correlations with positive emotions and an array of other variables associated with positive wellbeing (Snyder et al. 1991a, b; Feldman and Snyder 2005).

Satisfaction with Life Scale The SWLS is a 5 item measure that uses a Likert scale to capture a person's cognitive appraisal of life satisfaction, with higher scores representing greater life satisfaction (Diener et al. 1985). An example of an item from the SWLS is "So far I have gotten the important things I want in life."

The SWLS has been used in hundreds of studies and has demonstrated good internal reliability ($\alpha \geq .70$) (Pavot and Diener 2007; Pavot et al. 1991; Diener et al. 1985). SWLS scores have also shown good construct validity via positive and statistically significant correlations with other variables such as hope (O'Sullivan 2011; Bailey and Snyder 2010; Bailey et al. 2007), positive emotions (Diener et al. 1991), and HRQoL (Strine et al. 2008).

Scale of Positive and Negative Experience (SPANE) Positive emotions were captured using the Scale of Positive and Negative Emotions (SPANE). Each SPANE item is scored on a Likert scale with higher scores reflecting the greater endorsement of the particular emotion. The positive items of the SPANE (SPANE-P) include the feelings of "positive", "good", "pleasant", "happy", "joyful" and "contented." SPANE-P scores have shown good psychometric properties, demonstrating internal reliability with alphas > .80 and good validity as reflected by strong positive correlations with the life satisfaction and optimism (Diener et al. 2010).

The Short Form-36 The Short Form-36 (SF-36) was used to capture individual differences in participants' subjective views of HRQoL (Kopjar 1996). While the full SF-36 captures subjective perceptions of health across eight dimensions, because of the applied nature of this study with homeless individuals seeking assistance in a shelter, we elected to minimize the administrative burden of the survey by keeping the survey as brief as possible. In doing so, we selected only the 3 SF-36 dimensions of general health, physical limitations, and pain to include in the survey. These 3 dimensions were thought to capture perceptions of physical health in the broadest sense possible with the smallest number of items.

A 5-point Likert scale was employed for the general health items with higher total scores indicating perceptions of better general health. For pain and physical limitation, a Likert scale was also used with *higher* scores indicating *less* pain and *less* physical limitation, respectively. Examples of items from the SF-36 include "My health is excellent" for general health and "My health limits me from walking more than a mile" for physical limitation.

Extensive psychometric testing has been conducted with the SF-36, with the SF-36's psychometric properties being well established, with published alpha statistics of the SF-36 regularly exceeding the accepted minimum α threshold of 0.70 for group study (Turner-Bowker et al. 2002; Tsai et al. 1997; McHorney et al. 1993; Garratt et al. 1993).

Construct validity studies also support the SF-36 as an adequate measure of perceptions of physical health (Garratt et al. 1993; McHorney and Ware 1995).

Missing Data To cope with missing responses, full information maximum likelihood (FIML) analysis was used to estimate missing values. Simulation studies indicate that FIML reduces bias that may be introduced by missing data, as results of such studies indicate that FIML produces smaller errors in estimating population parameters than conventional methods of handling missing data, such as listwise or pairwise deletion, mean replacement, and most imputation approaches (Enders and Bandalos 2001; Graham 2009). FIML is effective because it operates by using all the available data and maximum likelihood analysis to estimate the missing values (Graham 2009). Moreover, for this study, of the 275 surveys returned, the missing data rate was ≤20% for each variable, well within the capabilities of FIML to effectively estimate (Enders and Bandalos 2001). The missing data rate for the individual variables is included in parentheses: SWLS (17%), the AHS dimensions of hope agency (15%) and hope pathways (20%), SPANE-P (18%), and for the SF-36, role physical (16%) and bodily pain (11%), and general health (15%). FIML was used to generate estimates for all the missing data, resulting in an $N' = 275$ for complete cases.

Analysis

Covariance-Based Structural Equation Model (CB-SEM) CB-SEM (Bollen 1989) was used to test the fit of a path model based on an a prior theory of the relationship between the variables of interest. The study employed maximum likelihood parameter estimations using the software AMOS 19.0 (Arbuckle 2010). To generate parameter estimates, we utilized the reference variable approach for each proposed factor, which involves constraining an unstandardized coefficient for a single item on each factor to 1 to provide each variable with a unit of measurement. A serial mediation analysis was also used to test the model because mediation is considered a means to test theorized directional associations between variables (Hayes 2013). The serial mediation model tested in this study was consistent with the theory that life satisfaction is an antecedent to HRQoL with hope and positive emotions as mediators, and that hope is also an antecedent of HRQoL with positive emotions as a mediator. (See Fig. 1 for a graphical depiction of the model.)

Per best practices of CB-SEM modeling, the analysis was performed in 2 steps, with the measurement model of the proposed latent factors evaluated first, followed by the testing of the predictive power of the proposed structural model (MacCallum 1995). The goodness of fit of the proposed model was evaluated using multiple indices, including the Confirmatory Fit Index (CFI), the Adjusted Goodness of Fit Index (AGFI), and the standardized root mean square residual (SRMR). For the CFI, scores ≥ .95 are considered a close fit (Hu and Bentler 1999), for the AGFI, scores ≥ .90 are considered a close fit (Hooper et al. 2008), and for the SRMR, scores ≤ .08 are considered a close fit (Hu and Bentler 1999). The Root Mean Square Error of Approximation (RMSEA) was also used to assess the model, with scores ≤ .06 considered a close fit (Hu and Bentler 1999). Finally, the χ^2 with a threshold of $p > .05$ was also examined, although the χ^2 statistic is

known to be sensitive to sample size and in most cases exhibits a $p > .05$ even when the model exhibits good fit according to other indices (Kline 2005). In addition to goodness of fit indices, the CB-SEM model was also evaluated according to the strength of the factor loadings of the manifest items on their respective latent factors and the predictive power of the independent variables of the model on their respective dependent variables. The predictive power of respective independent variables was evaluated using squared multiple correlations (R^2).

Testing of CB-SEM Normality Assumptions Before the CB-SEM model was evaluated, the assumptions of normality necessary for CB-SEM analysis were assessed. Scores on all measures met the standard criteria of univariate normality, with skewness for all measures <3 and kurtosis for all measures <4 (Kline 2005).

Power Analysis According to the accepted heuristics for CB-SEM, the sample of $N' = 275$ is considered "large." (Kline 2005). Additional power analysis using the power estimation tables of MacCallum et al. (1996) indicated that for a model with a $df = 98$ and a $N' = 275$, the overall power of the model was >.80, well above the accepted threshold of adequate power (Cohen 1988). Furthermore, per best practices in CB-SEM path modeling (Danner et al. 2015), in addition to assessing a model's overall model fit with fit indices, the statistical significance of the model's proposed indirect effects were tested using bootstrap resampling (Efron and Tibshirani 1986). With bootstrapping, subsamples are randomly drawn, with replacement, from the original data. Each subsample is then used to estimate the theorized path model. This process is repeated a large number of times, with an $N = 5000$ often referenced as the minimum number of resamples to draw (Hair et al. 2014). The estimated parameters from the bootstrapped subsamples allow for the derivation of standard errors for each parameter estimate in the original model. The standard errors are used to establish a 95% confidence interval (CI) of the "true" parameter estimates found in the population. When the CI of a parameter generated by bootstrapping contains the number 0, the parameter is not considered significant.

Bollen-Stine Test To provide additional support for the generalizability of the overall structural model, the model's fit was evaluated using the Bollen and Stine test (Bollen and Stine 1993). The Bollen and Stine (1993) test uses mathematics to transform the observed data to perfectly fit the hypothesized model. Bootstrapping (Efron and Tibshirani 1986) is then used to create a sampling distribution for overall fit of the perfect model, i.e. a bootstrapped χ^2 test. The fit of the original, non-transformed data is then compared to the sampling distribution of the χ^2 statistic for the transformed data. If the overall fit of the original data is not significantly different from the transformed data (p value of $\geq .05$), this result lends support for the generalizability of the proposed model as an accurate estimate of population parameters.

Common Method Variance (CMV) CMV is the theorized inaccurate estimation of population parameters due to systematic error introduced into a study by the usage of a single method of measurement. In this study, all variables were measured with a cross sectional design using only self-report scales, so our approach raises questions surrounding CMV.

The existence of CMV has generated much debate within the psychometric literature, with proponents of CMV contending that its presence is a hobgoblin to the accurate estimation of population parameters (Podsakoff et al. 2003). For others, CMV is considered an "urban legend" with little empirical support justifying its negative impact or even CMV's existence (Spector 2006). Yet despite the ongoing debate over the nature and likelihood of CMV, we erred on the side of caution in terms of CMV's effects, electing to address CMV with the unmeasured latent construct technique (ULMC; Williams et al. 1989). The ULMC approach operates by incorporating a latent factor into a CB-SEM model that accounts for variance that is theoretically attributable to CMV. Because the introduced latent factor is used to represent the variance attributable to CMV, adjusted scores for the other factors in the model are then used to estimate population parameters while accounting for CMV.

Results

The Cronbach's alphas for the respective scales indicated each displayed adequate internal reliability, with the SPANE-P exhibiting an $\alpha = .88$, the AHS an $\alpha = .823$, the SWLS an $\alpha = .822$, and for the 3 SF-36 dimensions, role physical exhibited an $\alpha = .88$, bodily pain an $\alpha = .85$, and general health an $\alpha = .79$. Table 1 contains the correlation matrix for all the manifest variables used in the CB-SEM model, along with their means and standard deviations.

The first step of the CB-SEM analysis was to account for CMV. Per the ULMC approach, we first modeled, along with the proposed factors of life satisfaction, hope, positive emotions, and HRQoL, an additional latent factor representing CMV (Williams et al. 1989; Podsakoff et al. 2003). Composite scores for each manifest indicator were then created that included the variance accounted for by the CMV factor. All subsequent analyses were done on these adjusted scores, thereby accounting for any potential error variance introduced by CMV.

Using the values adjusted for CMV, all manifest items were loaded on their respective factors to determine the measurement adequacy of the proposed latent variables. Results indicated that the model of 4 distinct factors, e.g. life satisfaction, hope, positive emotions, and HRQoL, exhibited close fit ($\chi^2 = 135.97$, $p = 007$; RMSEA = .04 [90% CI: .02, .05]; AGFI = .93; CFI = .98; SRMR = .04). Once adequate overall fit was established, an additional examination of factor loadings indicated that all respective factor loadings were statistically significant and robust, with all values > .60.

To provide additional support for the generalizability for the proposed model, bootstrap resampling ($N = 5000$) was used to test the stability of the model's parameters. Overall model fit was evaluated with a bootstrapped Bollen-Stine test, which indicated the proposed model was not significantly different from a model whose covariance matrix was transformed to perfectly fit the proposed model ($p = .126$). Bootstrapping was also used to evaluate the stability of the indirect effects of the model. Bootstrapping indicated that the indirect effect of life satisfaction on positive emotions was statistically significant $\beta = .225$, $p = .002$; BCa 95% CI [.095, .395]. The direct effect of life satisfaction on position emotions was also significant $\beta = .021$, *ns*; BCa 95% CI [−.016, .145]. Given that the direct effect of life satisfaction on positive

Table 1 Zero order correlations ($N' = 275$)

	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. SWLS: In most ways my life is close to my ideal.	3.25 (2.07)	1															
2. SWLS: The conditions of my life are excellent.	2.70 (1.86)	.547*	1														
3. SWLS: I am satisfied with my life.	3.41 (2.18)	.474*	.587*	1													
4. SWLS: So far, I have gotten the important things I want in life.	3.75 (2.16)	.413*	.426*	.614*	1												
5. SWLS: If I could live my life, I would change almost nothing.	2.79 (2.14)	.433*	.416*	.449*	.455*	1											
6. AHS: Hope Pathways	12.30 (2.55)	.284*	.268*	.377*	.334*	314*	1										
7. AHS: Hope Agency	11.50 (2.71)	.402*	.352*	.444*	.455*	.351*	.569*	1									
8. SF-36: Role Physical	5.73 (1.69)	.278*	.323*	.304*	.231*	.202*	.211*	.303*	1								
9. SF-36: Bodily Pain	6.91 (2.65)	.182*	.255*	.251*	.216*	.161*	.177*	.165*	.577*	1							
10. SF-36 General Health	15.67 (4.96)	.188**	.274*	.292*	.102	.100	.252*	.290*	.569*	.544*	1						
11. SPANE: Contented	3.06 (1.22)	.233*	.265*	.372*	.279*	.229*	.284*	.301*	.259*	.243*	.212*	1					
12. SPANE: Joyful	3.33 (1.18)	.274*	.299*	.419*	.360*	.290*	.343*	.436*	.328*	.237*	.238*	.558*	1				

Table 1 (continued)

	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
13. SPANE: Happy	3.59 (1.13)	.310*	.370*	.445*	.374*	.277*	.317*	.404*	.387*	.326*	.342*	.558*	.713*	1			
14. SPANE: Pleasant	3.57 (1.10)	.256*	.232*	.392*	.276*	.216*	.297*	.337*	.267*	.289*	.214*	.482*	.524*	.551*	1		
15. SPANE: Good	3.62 (1.1)	.287*	.326*	.370*	.335*	.238*	.307*	.321*	.362*	.284*	.281*	.489*	.577*	.636*	.570*	1	
16. SPANE: Positive	3.67 (1.07)	.279*	.301*	.388*	.336*	.232*	.358*	.374*	.365*	.268*	.288*	.427*	.560*	.573*	.565*	.591*	1

SD standard deviation

*$p \leq .001$; **$p \leq .01$

emotions was significant, the results indicated a complimentary form of mediation in regards to the indirect effect of life satisfaction on positive emotions via hope (Zhao et al. 2010).

Next, the indirect effect of hope on HRQoL through positive emotions was statistically significant, $\beta = .125$, $p = .002$; BCa 95% CI [.004, .264]. In contrast, the direct effect from hope to HRQoL was not significant, $\beta = .08$, $p = .557$; BCa 95% CI [-.180, .308]. Finally, the total indirect effect of life satisfaction on HRQoL via the serial mediators of hope and positive emotions, respectively, was significant, $\beta = .282$, $p = .003$; BCa 95% CI [.115, .463], while bootstrapping indicated that the direct effect from life satisfaction to HRQoL was not significant, $\beta = .16$, $p = .114$; BCa 95% CI [-.042, .401].

After establishing the goodness of fit of the proposed model both according to fit indices and a bootstrapping analysis of indirect effects, we then turned to examining the strength of the model's independent variables in predicting the variance of the model's respective dependent variables. To begin, the exogenous variable of life satisfaction was a robust and statistically significant predictor of hope, accounting for 46% of the hope's variance ($R^2 = .462$). Regarding positive emotions, life satisfaction and hope together accounted for 43% of its variance ($R^2 = .431$). For the final consequent of the path model, HRQoL, life satisfaction, hope, and positive emotions collectively accounted for 30% of HRQoL's variance ($R^2 = .302$). Moreover, consistent with the proposed mediation model, neither the direct paths from life satisfaction to HRQoL nor the direct path from hope to HRQoL were statistically significant, a result consistent with the theorized directional associations between variables.

In sum, results of the analysis indicated that the model of life satisfaction as an antecedent of HRQoL mediated by hope and positive emotions produced close fit to the data according to accepted CB-SEM fit statistics. Moreover, bootstrapping revealed a complimentary form of mediation by hope on the relationship between life satisfaction and positive emotions was expected given that theory supports that both life satisfaction (Diener et al. 1985) and hope (Snyder 2000) are independent contributors to positive emotions. The indirect effect types of mediation found with bootstrapping on the remaining variables of the model were also consistent with the broad-and-build theory of positive emotions (Fredrickson 1998, 2001, 2005). Indirect effect only forms of mediation consistent are the most straightforward type in terms of providing support for directional relationships between variables (Zhao et al. 2010). Finally, the CB-SEM analysis indicated all of the independent variables in the model were robust predictors of their respective dependent variables. Figure 1 depicts all of the empirical values of the model generated by maximum likelihood estimations using standardized values.

Discussion

To the best of our knowledge, the current study is the first to model life satisfaction as a antecedent of HRQoL mediated by hope and positive emotions among a sample of homeless individuals. The results of this study have several implications for our basic understanding of the importance of life satisfaction and hope to emotional wellbeing and HRQoL. Since life satisfaction is a retrospective appraisal of whether one has sufficiently attained one's benchmarks of success, and hope is an appraisal of the

likelihood of obtaining future goals, the model supported in this study is consistent with the theory that emotions are a byproduct of cognitive sets related to appraisals of goal attainment (Snyder et al. 2005; Carver and Scheier 2013). Results also support existing theory that positive emotions are an important contributor to perceptions of health and global wellbeing (Fredrickson 1998). Moreover, results are also consistent with previous empirical research that indicates that life satisfaction, hope, and positive emotions are all positively associated with subjective perceptions of health (Strine et al. 2008; Berendes et al. 2010; Frederickson and Branigan 2005).

Implications in the Context of Homelessness

Considering the harshness of homelessness, it is understandable that a focus of previous research has been to document the magnitude of the many adverse consequences associated with homelessness. However, a smaller yet growing portion of research into homelessness has moved toward identifying the psychological strengths necessary for well-being despite homelessness (Tweed et al. 2012; Kidd and Davidson 2007; Biswas-Diener and Diener 2006; Kosor and Kendall-Wilson 2002). In fact, psychological strengths are also important to overcoming homelessness, as found in a study by Patterson and Tweed (2009) of formerly homeless individuals that suggests psychological strengths can fuel the resilience necessary to overcome barriers, such as poverty, that perpetuate homelessness. An additional study of individuals who were formerly homeless also supports that psychological strengths help to generate the determination needed to escape homelessness (MacKnee and Mervyn 2002).

The results of this study adds to the line of research into important psychological strengths helpful to coping with homelessness and/or health hardships by identifying the cognitive sets of life satisfaction, hope, and positive emotions as potential antecedents to HRQoL. This view aligns with results of another study by Sheir et al. (2010) of homeless individuals that found that multiple respondents noted that coping with hardship was possible because as one respondent stated, "I have a lot of hope that a lot of people do not have because I used to have a life; I remember what it was like. I have a lot more hope than other people" (Sheir et al. 2010, p. 28). At least one additional qualitative study offered similar results, noting the importance of hope to coping with homelessness (Kosor and Kendall-Wilson 2002). Our results also provide insight into a study by Thomas et al. (2012) that indicates that homeless respondents placed an emphasis on the importance of "feeling good" in coping with homelessness. According to the path model supported in this study, such a conclusion is understandable because efforts to "feel good" may be positive antecedents to greater perceptions of HRQoL.

Future Research While research supports that the improvement of health and well-being of homeless individuals is improved by interventions such as the provision of housing (Larimer et al. 2009), the results of the study also point to the need for additional research into the potential usage of interventions that target the latent variables of hope, life satisfaction, and positive emotions as an additional tool to improve perceptions of HRQoL among homeless individuals and other populations. While some may decry this perspective as frivolous, the data of this study provides a small degree of additional support for the intriguing possibility offered by both Frisch

(1998) and Diener and Chan (2011) that interventions centering on psychological wellbeing variables may in fact improve health by managing the symptoms of an illness and disease. In fact, comprehensive therapy modalities have already been developed, such as quality of life therapy (Frisch 1998, 2013), that are specifically designed to improve health by targeting latent psychological wellbeing variables such as life satisfaction and positive emotions as antecedents of perceptions of health. Quality of life therapy (Frisch 1998, 2013) operates by centering on the importance of revising goals, standards, and priorities as a means of treating illness and disease.

Hope theory based therapy modalities also exist that are designed to increase hope by helping clients identify pathways to goals and to enhance clients' agency to initiate and sustain movement toward those goals (Lopez et al. 2000; Cheavens et al. 2006). Others have noted that hope theory based interventions may be particularly salient in the context of illness and disease because such interventions involve cognitive appraisals of pathways to actionable goals, such as seeking assistance from others, thereby creating a more stable living environment, and developing strategies to work around physical limitations (Berendes et al. 2010). In fact, an intervention based on Snyder's view of hope has been used to foster both increases hope and reductions in pain symptomology for those coping with illness (Berg et al. 2008). While our data is preliminary in nature, the results suggest that interventions such as quality of life and hope based therapies warrant further testing, particularly in the context of homelessness, as a potential means to help individuals moderate the harsh effects of homelessness on health and wellbeing.

Limitations

As noted earlier, despite the suggestive nature of the results, the conclusions drawn from the study must be tempered due to the study's potential limitations. First, the challenges associated with applied research using community samples is well documented (Proctor et al. 2009). In this case, the data was collected at a homeless shelter from individuals self-identifying as homeless. As a result, the survey was kept short to ease the burden of response on individuals coping with the rigors of homelessness and shelter living. This was particular impactful on the SF-36 measure, which involved using only 3 dimensions of the scale rather than the full measure. Usage of the full scale would provide more data on the relationships between all the respective variables, particular in regards to additional dimensions of HRQoL. Moreover, despite the results of the bootstrapping analysis, because the data was collected from a single city in the South Central United States, uncertainty still remains as to the parent population from which the sample was drawn. More research is needed from additional subsamples of both the homeless subpopulation and the human population as a whole to further evaluate the stability of the model. Moreover, the statistically significant indirect effects of the proposed mediators in this model do not preclude the presence of other mediators between the chosen variables (Rucker et al. 2011). Continued research is needed to explore the question of what other mediators may help explain the relationship of both life satisfaction to HRQoL and hope to HRQoL, respectively. It is also important to note that due to the close temporal association of the variables in the model, cross sectional results should always be considered suggestive when testing directional

theories, thus providing an invitation to further examine the relationships between variables through longitudinal designs. However, despite the general limitations of cross sectional research to testing causation, it is important to note that testing a directional model based on *a prior* theory and statistically evaluating the stability of parameters using bootstrapping, all done in this study, are considered best practices for testing the quality of mediation models with such data (Hayes 2013; Danner et al. 2015). Furthermore, Monte Carlo simulations have found that in conditions in which variables exhibit strong correlations and the proposed directional associations between variables is based on theoretical foundations, again both present in this case, mediation analysis with cross sectional data produces parameter estimates similar to those produced by longitudinal studies (Rindfleisch et al. 2008). Nevertheless, while it is important to consider the study's potential limitations, we feel that this study does strongly support the need for future research into these variables among both homeless and non-homeless samples.

Conclusion

The study results supports life satisfaction is an important predictor of HRQoL with hope and positive emotions as mediators. Consequently, despite the study's potential limitations, we have our own hope that researchers' growing understanding of psychological strengths like life satisfaction, hope, and positive emotions in applied settings such as among homeless individuals, will lead to more research and ultimately more effective interventions that improve HRQoL for such populations.

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