

RESEARCH PAPER

## Purposiveness, physical activity, and perceived health in cardiac patients

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### Abstract

*Purpose.* This study examined the relationship of purposiveness, defined as maintaining purpose in life and a sense of personal growth, with physical activity and perceived health in a sample of cardiac outpatients.

*Method.* Participants were 130 outpatients recruited through medical settings serving cardiac patients in a southwestern US community. Participants had an average age of 60 years (SD 12.37). Participants responded to a structured questionnaire at the medical setting. The hypothesized mediational model was tested using Latent Variable Structural Equations Analysis (LISREL) 8.

*Results.* As hypothesized, the results of a LISREL analysis showed that a sense of purposiveness predicted more positive perceived health. Further, as predicted, this relation was mediated by physical activity. Purposiveness was linked to more physical activity, and a high level of physical activity, in turn, predicted better perceived health. A two-group LISREL analysis indicated that the model was equally valid for both sexes.

*Conclusions.* The present results underscore the importance in cardiac rehabilitation of the continued study of factors that foster meaning in life, including a sense of purpose and individual growth, and of their potential to promote recovery of cardiac patients.

**Keywords:** Cardiac illness, physical activity, perceived health, personal growth, purpose in life

### Introduction

Regaining quality of life after cardiac illness is psychologically challenging and typically requires significant lifestyle change [1,2]. Engagement in physical activity is essential for a return to functioning [3–5] and in the prevention of relapse in cardiac illness [6,7]. However, individuals with heart disease must often overcome psychological barriers to engage in physical activity, and long-term adherence to physical-activity recommendations is generally poor [8,9]. One factor that may promote engagement in positive health behavior among cardiac patients is purposiveness—maintaining purpose in life and a sense of personal growth [10].

Life meaning and a commitment to personal growth are central to contemporary intentional self-development theory [11]. As noted by Ryff [12],

these dimensions are inherent in most classical personality theories of the well-functioning person. Purposiveness may be related to perceived health, which has been shown to be an important health variable. Perceived health is positively related to objective measures of health, predicts mortality over and above physician reports [13,14], and contributes important information in the assessment of quality of life [15,16]. Scheier et al. found that engagement with life was related to perceived general health in a community sample of women, as well as in samples of women with early-stage and late-stage breast cancer [17]. Conversely, Echteld et al. found that goal disturbance (i.e. perceived interference with attaining personal goals) was negatively related to disease-specific quality of life in coronary angioplasty patients [18].

Positive health behaviors might mediate the link between purposiveness and perceived health. In analyzing core features of positive health, Ryff & Singer [10,19] proposed that having purpose in life and personal growth can play an important role in establishing and maintaining positive health behaviors: "It is individuals with positive purpose who are likely to sustain practices of taking care of themselves... Simply put, taking good care of oneself in terms of daily health practices presupposes a life that is worth taking care of" [19, p 22]. Engagement with health behaviors, in turn, promotes better health. Positive health behaviors, such as physical activity, provide salient cues about one's health [20–23]. Exercise is associated with positive physiological changes [24], and the positive effects of appropriate exercise programs on cardiac patients are well documented [5].

This study examines the relationship between purposiveness and physical activity and perceived health, using a sample of 130 cardiac patients. It was predicted that purposiveness would be positively related to perceived health. Further, it was hypothesized that this relationship would be mediated by physical activity, with purposiveness linked to more physical activity and physical activity in turn predicting more positive perceived health. Because women cardiac patients have a poorer prognosis than men with respect to both physical and psychological outcomes [25–27], the study also explored the effect of sex in these links.

## Methods

### *Sample selection*

The participants were 130 outpatients recruited through medical settings serving cardiac patients in a southwestern US city, for whom there were complete data on the study measures. Participants were recruited from medical settings specializing in cardiac care. The settings included hospital-based cardiac clinics at all of the city's four hospital systems and a private cardiology medical practice associated with one of the hospitals, providing broad socio-demographic diversity. Patients were recruited at the time of their medical appointment. Nurses or other medical office personnel informed patients of the study and invited patients to speak with study personnel, who were present in the medical setting. Participants provided informed consent and responded to a structured questionnaire administered in a private room in the medical setting. The study was approved by the University of Texas Institutional Review Board.

### *Measures*

All of the measures have been used previously, in the National Survey of Midlife Development in the United States collected by the John D and Catherine T MacArthur Foundation (for detailed information on these measures, see Brim et al. [28]).

Purposiveness was measured by two subscales—purpose in life and personal growth—developed originally by Ryff [12]. The present 3-item indexes were constructed to capture the conceptual breadth of the original 20-item scales; they are highly correlated with the original scales ( $r > 0.70$ ), which are highly reliable ( $\alpha \pm = 0.90$  for both purpose in life and personal growth) [29,30]. Purpose in life was developed to assess beliefs that one's life has purpose and meaning, including goals and a sense of directedness. Purpose-in-life items included "Some people wander aimlessly through life, but I am not one of them" and "I sometimes feel as if I've done all there is to do in life" (reverse scored). Personal-growth items were developed to assess the sense of continued development and growth and expansion of a person. Such items included "I think it is important to have new experiences that challenge how you think about yourself and the world" and "I gave up trying to make big improvements or changes in my life a long time ago" (reverse scored). Responses were coded on a 4-point scale ranging from disagree strongly (0) to agree strongly (3), and items were summed to form each index. In terms of construct validity, these measures of purpose in life and personal growth are positively related with life satisfaction and happiness, and negatively related with depression [29].

Physical activity was measured by two items indexing moderate activity and vigorous activity. The moderate activity item was "How often do you engage in moderate physical activity for a combined total of 30 minutes or more per day? Moderate physical activity means walking briskly, vacuuming, digging in the garden, general housework, or any other physical activity of similar exertion." The vigorous activity item was "How often do you engage in vigorous physical activity for 20 minutes or more each time? Vigorous physical activity includes activities such as power walking, jogging, aerobic dancing, biking, rowing, weight lifting, etc." Responses to each item were coded on a 5-point scale ranging from none (0) to five times a week or more (4). Self-report measures of physical activity have been found to be reliable and to correlate well with actual activity patterns [31,32].

Perceived health was measured by one item, which was "Would you say that in general your health is: excellent, very good, good, fair, or poor." Responses were coded on a 5-point scale ranging from poor (0)

to excellent (4). Single item measures of perceived health have been studied extensively and have good validity [15,16,33].

**Results**

*Sample characteristics*

The sample comprised approximately equal numbers of women ( $n = 66$ ) and men ( $n = 64$ ), and the mean age of participants was 60.22 years (SD 12.37). An effort was made to include a substantial representation of Hispanic patients ( $n = 66$ ), who are strongly represented in the broader community. Participants reported a range of cardiac diagnoses, with a third reporting coronary artery disease. Table I summarizes the demographic and health characteristics of the sample.

*Analyses*

We tested the hypothesized mediational model using Latent Variable Structural Equations Analysis (LISREL) 8 [34]. Variance-covariance matrices were used in the LISREL analyses, with listwise deletion of missing values ( $n = 130$ ). Zero-order correlations, means, and standard deviations for the study variables are presented in Table II.

Table I. Sample demographic characteristics and distribution of diagnoses by sex.

Diagnosis	Number of men (%)	Number of women (%)
Heart attack	11 (17.2)	8 (12.1)
Angina	6 (9.4)	2 (3.0)
High blood pressure	2 (3.1)	5 (7.6)
Valve disease or aortic disorders	4 (6.3)	2 (3.0)
Blocked/closed artery or coronary artery disease	21 (32.8)	22 (33.3)
Arrhythmias	4 (6.3)	11 (16.7)
Heart murmur	3 (4.7)	2 (3.0)
Heart failure	6 (9.4)	9 (13.6)
Other cardiac diagnosis	7 (10.9)	5 (7.6)

*Hypothesized model.* We first tested a direct model to show that purposiveness was significantly related to perceived health without physical activity in the model. The parameter in the structural model showing a direct link between purposiveness and perceived health was significant at the 0.05 level ( $B = 0.52$ ). We then tested the hypothesized mediational model, which provided a good fit to the data (overall  $\chi^2$  [4,  $n = 130$ ] = 4.76,  $p = 0.31$ ; Standardized Root Mean Square Residual (SRMR) = 0.03; Adjusted Goodness of Fit Index (AGFI) = 0.95; Normed Fit Index (NFI) = 0.96; Root Mean Square Error of Approximation (RMSEA) = 0.04 [90% CI 0.0–0.14]). All parameter estimates in the measurement and structural models were significant at the 0.05 level (Figure 1).

*Alternative models.* We also compared the hypothesized mediational model to an alternative, full model that added a parameter reflecting a direct path between purposiveness and perceived health. The full model did not significantly improve model fit, and the hypothesized mediational paths through physical activity remained significant at the 0.05 level. We also examined plausible alternative models with the latent constructs in a different predictive order. A model with perceived health mediating the association between purposiveness and more physical activity had a poor overall fit. Models with perceived health predicting purposiveness, either as the first path (i.e. perceived health to purposiveness to physical activity) or second path (i.e. physical activity to perceived health to purposiveness) in the model, failed to show significant mediation.

*Two-group model.* We examined the hypothesized mediational model for women ( $n = 66$ ) and men ( $n = 64$ ) separately in a two-group LISREL analysis. Although women reported less favourable perceived health than men ( $t(128) = 2.00, p < .05$ ), the hypothesized two-group model, with model parameters equated across groups, provided a good fit to the data (overall  $\chi^2$  [15,  $n = 130$ ] = 9.11,  $p = 0.87$ ; Standardized Root Mean Square Residual (SRMR) = 0.053; Goodness of Fit Index (GFI) = 0.97; Normed Fit Index (NFI) = 0.93; Root

Table II. Correlations between and means and standard deviations of the study variables.

Variable	1. Purpose in life	2. Personal growth	3. Moderate activity	4. Vigorous activity	5. Perceived health	Mean	SD
1. Purpose in life	–	0.26	0.22	0.15	0.26	6.03	1.97
2. Personal growth	–	–	0.19	0.35	0.27	7.48	1.62
3. Moderate activity	–	–	–	0.40	0.45	2.60	1.35
4. Vigorous activity	–	–	–	–	0.46	1.38	1.54
5. Perceived health	–	–	–	–	–	1.81	1.09

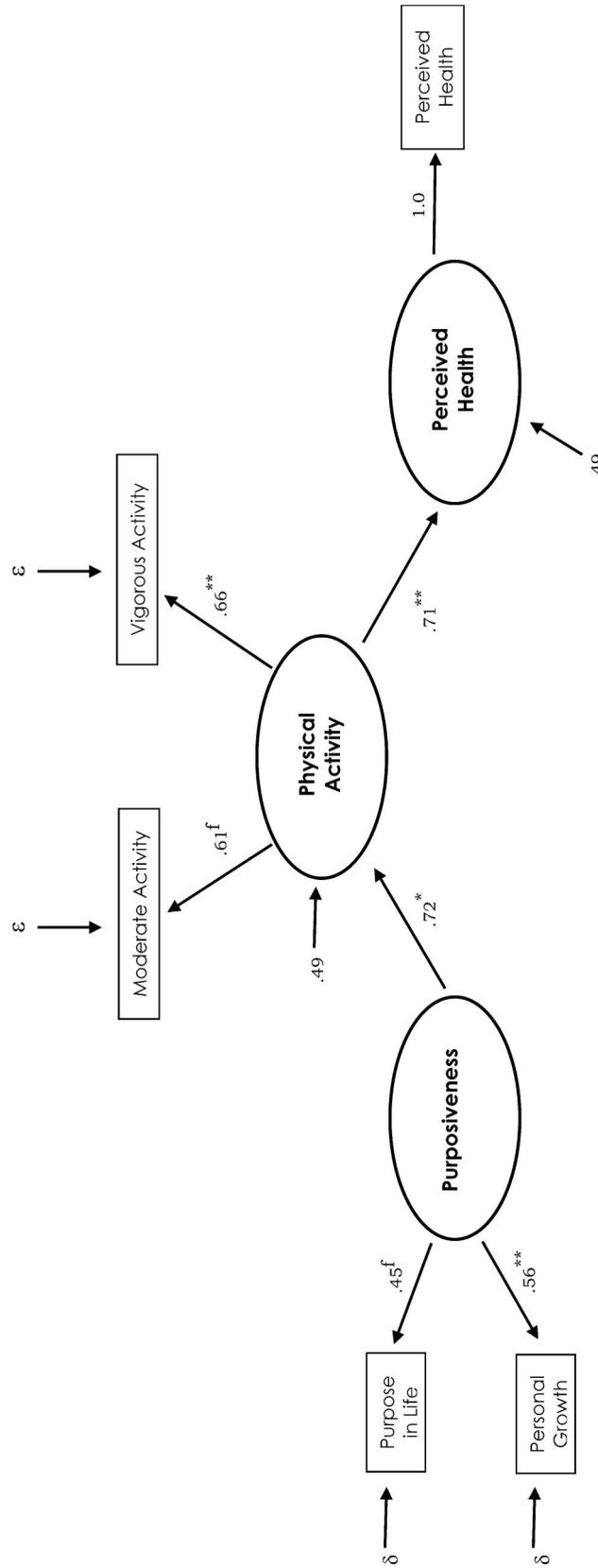


Figure 1. Standardized estimates of the structural equation and measurement models ( $n = 130$ ), using the Latent Variable Structural Equations Analysis (LISREL) test. Latent constructs are shown in ellipses, and observed variables are shown in rectangles. <sup>f</sup>Indicates a parameter set to 1.0 in the unstandardized solution; 1 and  $\epsilon$  represent unique variance in the observed X and Y variables, respectively; \* $p < 0.01$ .

Mean Square Error of Approximation (RMSEA) = 0.0 [90% CI 0.0–0.06]). All parameter estimates in the measurement and structural models were significant at the 0.05 level, with parameters very close to those of the model for the full sample.

## Discussion

As hypothesized, in a sample of 130 cardiac patients, a sense of purposiveness predicted more positively perceived health. Further, as predicted, this relationship was mediated by level of physical activity. Purposiveness was linked to more physical activity, and more physical activity, in turn, predicted better perceived health.

The present results serve to examine the link between health behavior and perceived health in the context of positive psychology [35]. They demonstrate that positive approaches to life, even in the context of illness, can have beneficial effects. Consistent with research by Scheier et al. on life engagement in the context of physical illness [17], we found that purposiveness predicted levels of perceived health. Moreover, we found that physical activity played a central role in mediating the association between purposiveness and perceived health. Congruent with Ryff & Singer's analysis of the core features of good health [19], we found that purposiveness was linked to higher levels of physical activity. In addition, supporting the considerable existing literature on the importance of physical activity to health [24], we found that physical activity was associated with better perceived health.

Although positive health behaviors are an essential component of cardiac recovery [3,4,36], long-term improvement in health habits is challenging for cardiac patients [8,9]. Moreover, even when cardiac rehabilitation is successful, the psychological mechanisms underlying positive health change are poorly understood [37]. Individuals who feel that their lives are meaningful and fulfilling may be motivated to comply with physicians' advice to engage in positive health behaviors [10,19]. The search for meaning and purpose in life within the context of illness and disability is challenging but potentially rewarding [38,39]. However, cardiac patients whose lives are meaningful may be more motivated to recover as much function as possible, and to transform cardiac illness into an opportunity for personal development.

The pattern of results from this study suggests that severity of illness does not account for the relationships observed between the study variables. The fact that the model in which perceived health was the antecedent variable had poor fit is consistent with an interpretation that severity of illness is not driving the model.

Purposiveness is known to be inversely associated with depression, which underscores its importance in cardiac recovery. While an immediate brief experience of depressed mood after experiencing a coronary event may be viewed as a normal reaction [2], continuing, longer-term depression can also be experienced. Depression is a risk factor for continuing cardiac morbidity and mortality [1,40,41], and may impede cardiac recovery through a maladaptive pattern of health behavior [42,43]. The ability of individuals to find meaning and purpose in life might be an antidote to depression in the context of cardiac recovery.

The present findings are relevant to rehabilitation efforts with female cardiac patients, who have a poorer prognosis both medically and emotionally than do male cardiac patients [25–27]. Consistent with previous research, we found that women with cardiac illness reported less favorably perceived health than men. However, the salutary advantages of purposiveness were as strong for women as for men, and the explanatory mechanism through physical activity was the same for both sexes.

This study has several limitations. The questionnaire measures in the present study were brief and carry the limitations of self-report, which involve social desirability and common method variance. These limitations tend to reduce statistical power and would be of greater concern in the context of a failure to support hypotheses. Nevertheless, future research is needed in order to extend our findings to include broader measures and objective indexes of exercise frequency, duration, and intensity (e.g. wristwatch accelerometers or heart rate monitors). Information concerning severity of illness and co-occurring medical conditions was not collected in this study; future research should examine the potential moderating impact of illness severity and co-occurring illnesses on the predictive model used here. Further, these cross-sectional findings preclude causal inference.

Cardiac rehabilitation includes essential practical components—ongoing medical evaluation, physical activity programs, and lifestyle and vocational guidance. But regaining quality of life after serious illness also involves a deeper search for meaning. The present results underscore the importance in cardiac rehabilitation of the continued study of factors that foster meaning in life, including a sense of purpose and individual growth, and of their potential to promote the recovery of cardiac patients.

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