Research Article

The Good Life: Assessing the Relative Importance of Physical, Psychological, and Self-Efficacy Statuses on Quality of Well-Being in Osteoarthritis Patients

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Background and Purpose. The purpose of the present study was to examine the interrelationships among physical dysfunction, self-efficacy, psychological distress, exercise, and quality of well-being for people with osteoarthritis. It was predicted that exercise would mediate the relationships between physical dysfunction, self-efficacy, psychological distress, and quality of well-being. Methods. Participants were 363 individuals with osteoarthritis who were 60 years of age or older. Data were collected from the baseline assessment period prior to participating in a social support and education intervention. A series of structural equation models was used to test the predicted relationships among the variables. Results. Exercise did not predict quality of well-being and was not related to self-efficacy or psychological distress; it was significantly related to physical dysfunction. When exercise was removed from the model, quality of life was significantly related to self-efficacy, physical dysfunction, and psychological distress. Conclusions. Engagement in exercise was directly related to physical functioning, but none of the other latent variables. Alternatively, treatment focused on self-efficacy and psychological distress might be the most effective way to improve quality of well-being.

1. The Interrelationships of Self-Efficacy, Psychological Distress, Physical Dysfunction, Exercise, and Quality of Well-Being among People with Osteoarthritis

Osteoarthritis (OA) is a joint disorder, characterized by degeneration of cartilage creating joint pain and stiffness that worsen over time, most often affecting the hips and knees and leading to disability [1–3]. OA is the most common form of arthritis and affects close to 27 million Americans [4, 5]. After the age of 65, 60% of men and 70% of women experience OA [6]. OA is a leading cause of chronic pain, disability, and functional impairments [6]. Besides joint replacement, the most effective treatments available for OA consist of a combination of pharmacotherapy and behavioral self-management techniques [7]. Behavioral interventions have been shown to reduce the severity of symptoms associated with OA [8–10]. Behavioral treatments are largely focused on pain reduction and management and facilitation of mobility and physical functioning [11]. However, several factors affect the success of these treatments, including exercise, physical dysfunction, self-efficacy, and psychological distress [11]. These factors have been examined individually for their impact on quality of well-being in the OA population but have not been examined simultaneously.

Physical exercise has become widely recommended for individuals with OA [12], because it has been related to longevity [13]. Devos-Comby et al. [11] conducted a meta-analysis on treatments for OA and found that exercise programs reduced pain, improved physical functioning, and enhanced quality of life among individuals with OA. Despite
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this, close to 44% of adults with arthritis report not engaging in exercise [6].

When mobility and physical functioning are impaired, individuals are less likely to engage daily activity. People diagnosed with arthritis report less daily physical activity than those without arthritis [6]. The Center for Disease Control (CDC) reported that approximately 80% of adults with OA have some movement limitations that affect daily activities [1]. Physical dysfunction is related to reduced quality of life and lower self-efficacy [14–17], which is defined as a person's belief in his/her ability to influence events that affect his/her life [18, 19]. Increased self-efficacy for physical activity is associated with increased participation in exercise for people with arthritis [20, 21]. Having high levels of self-efficacy is associated with higher quality of life, decreased pain, and increased activity among people including those with OA [22–24].

Psychological distress is another factor that is associated with exercise and quality of life among people with OA [25, 26]. Evidence suggests that anxiety and depression are related to reduced functioning and to lower levels of physical activity among the OA populations [26, 27]. Although depression may pose barriers to activity engagement, physical activity has been shown to improve its symptoms [27] and is a common focus of behavioral therapies (e.g., behavioral activation). Alternatively, improvements in depression are also likely to lead to increases in activity levels and quality of life [28].

The purpose of the present study was to examine the interrelationships among physical dysfunction, self-efficacy, psychological distress, exercise, and quality of life among people with older adults with OA using structural equation modeling. These variables have not been assessed concurrently in an older OA population. It was hypothesized that physical dysfunction, psychological distress, and self-efficacy all would predict probability of participating in exercise uniquely and that participation in exercise would mediate the effect of each of these on quality of well-being.

2. Method

2.1. Participants. Participants were 363 members (N = 233 women, N = 130 men) of a large health maintenance organization (HMO) in Southern California who were 60 years of age or older (Mage = 69, SD = 5.6) and had a physician’s diagnosis of osteoarthritis (OA) that was confirmed with radiographic evidence within the individual's medical file. The participants were primarily Caucasian (92.3%), married (72.7%), and retired (75%). Nearly 29% of participants reported having completed a high school education or equivalent, 40.2% reported several years of college education, and 25.4% had obtained higher degrees or other professional certificates. Participants’ median annual income ranged from $20,000 to $30,000. See Table 1 for additional demographic information.

2.2. Measures

2.2.1. Demographic Variables. Participants were asked to provide a brief demographic history, which included their age, gender, education level, employment, income, marital status, and date of diagnosis.

2.2.2. Arthritis Impact Measurement Scale (AIMS). The AIMS is a disease-specific measure of health status for people with arthritis. The scale is self-administered and consists of 57 questions categorized into nine subscales: mobility, physical activity, dexterity, social role, social activity, activities of daily

| Table 1: Participant demographic and clinical characteristics. |
|-------------------|-----------------|--------|
| Item              | Valid %         | N     |
| Gender            | Male            | 35.81 | 130  |
|                   | Female          | 64.19 | 233  |
| Ethnicity         | White           | 92.29 | 335  |
|                   | Hispanic        | 2.75  | 10   |
|                   | Black           | 1.65  | 6    |
|                   | Other           | 1.65  | 6    |
|                   | Decline to state| 1.10  | 4    |
| Age               | 59 to 69 years  | 56.47 | 205  |
|                   | 70 to 79 years  | 40.77 | 148  |
|                   | >79 years       | 2.75  | 10   |
| Relational status | Single          | 4.96  | 18   |
|                   | Married         | 72.73 | 264  |
|                   | Widowed         | 14.33 | 52   |
|                   | Divorced        | 7.99  | 29   |
| Education         | High school graduate or less | 31.13 | 113  |
|                   | Some college/trade school | 22.31 | 81   |
|                   | Bachelor's degree | 19.28 | 70   |
|                   | Graduate level degree | 23.97 | 87   |
|                   | Decline to state | 3.31  | 12   |
| Family income     | $19,999 or less | 24.24 | 88   |
|                   | $20,000–$39,999 | 38.29 | 139  |
|                   | $40,000–$59,999 | 17.36 | 63   |
|                   | $60,000 or more | 8.82  | 32   |
|                   | Decline to state | 11.29 | 41   |
| Employment status | Part-time       | 17.08 | 62   |
|                   | Full-time       | 75.21 | 273  |
|                   | Retired/unemployed | 7.72  | 28   |
| Length of diagnosis | Less than 5 years | 30.85 | 112  |
|                   | 5–10 years      | 27.82 | 101  |
|                   | 10–15 years     | 19.56 | 71   |
|                   | 15–20 years     | 6.89  | 25   |
|                   | More than 20 years | 2.20  | 8    |
|                   | Not reported    | 12.67 | 46   |
living, pain, depression, and anxiety. Internal reliability for each of the subscales ranges from $\alpha = .63$ to .88 [29].

2.2.3. Quality of Well-Being (QWB) Scale. The QWB scale was used to assess global quality of well-being. The QWB scale evaluates the participant's functioning and symptoms for the 6 days prior to the assessment [30]. Its three subscales are mobility, physical activity, and social activity. The QWB scale has been shown to be a valid and reliable instrument for assessing health outcomes in a general elderly population and in a population with specific chronic or disabling conditions [30].

2.2.4. Center for Epidemiologic Studies Depression Scale (CES-D). The CES-D was designed to measure current levels of depressive symptoms, with an emphasis on depressed mood [31]. The CES-D is a 20-item self-report measure designed to assess depression in nonpsychiatric populations. Studies indicate that the scale is internally consistent, has moderate test-retest reliability, and has high concurrent and construct validity (e.g., 30).

2.2.5. The Arthritis Self-Efficacy Scale (ASES). The ASES consists of 20 items that require respondents to indicate how certain they are that they can perform various tasks on a scale from 10 (very uncertain) to 100 (very certain), with higher scores indicating higher self-efficacy [16]. Sample items include “how certain are you that you can manage arthritis pain during your daily activities?” and “how certain are you that you can turn an outdoor faucet all the way on and all the way off?” The questionnaire consisted of three subscales: pain, function, and other symptoms. Lorig et al. [16] found that subscale reliability was .87 for pain, .85 for function, and .90 for other symptoms.

2.2.6. Arthritis Helplessness Index (AHI). The AHI was developed by Stein et al. [32]. The questionnaire consists of 15 items, scaled in a 6-point Likert format from strongly disagree (1) to strongly agree (6). Participants were asked whether they agreed or disagreed with statements like, “I have considerable ability to control my pain” and “it seems as though other factors beyond my control affect my arthritis.” Cronbach's alpha indicated overall internal reliability of .69 and test-retest reliability of .52 over a 1-year period. Internal consistencies for the two subscales, as assessed by Cronbach's alpha, were .75 for the internality factor and .63 for the helplessness factor [32].

2.2.7. Exercise. Participants were asked to indicate whether or not they participated in exercise.

2.3. Procedure. The data for this study were collected during the baseline assessment period prior to participants engaging in a social support and education intervention. To be eligible to participate in the present study, participants had to be 60 years of age or older, have a diagnosis of OA, and be willing and able to attend 10 weekly and 10 monthly meetings over a course of 1 year. Three thousand potential participants were randomly selected from the total population of 50,450 HMO members in San Diego County. Because the prevalence of OA in this population is approximately 50% of those over the age of 60, we expected 1,500 of those contacted to be eligible to participate. Three hundred and sixty-three of the 3,000 HMA members that were contacted by mail volunteered to participate in a larger study and completed the battery of questionnaires.

2.4. Analytic Procedure. Statistical analyses were performed using Stata 12.1. A series of structural equation models (SEMs) using full information maximum likelihood (FIML) was used to test the relationships among self-efficacy, psychological distress, physical dysfunction, exercise, and quality of well-being. The primary observed response variable was quality of well-being (QWB). The latent explanatory variables were (1) self-efficacy (SE), (2) psychological distress (PSYCH), and (3) physical dysfunction (PHYS). The binary mediator was self-reported exercise (EX). No changes were made to the measurement factor loading or structural pathways within models; however, as determined by modification indices and conceptual reasoning, error covariances were added to improve model fit. This strategy was decided a priori based upon the likely high interrelatedness of many of these constructs and their components.

In order to examine the effects of the explanatory variables on QWB in this sample of individuals with OA, the model fit (using descriptive indices of model fit (e.g., Comparative Fit Index and root mean squared error of approximation)), the standardized factor loadings, and the specific tests for the factor loadings were assessed. Overall model fit was determined using the recommendations of Bentler [33]. Although the likelihood ratio $\chi^2$ is reported, this inferential test performs poorly as a sole determinant of model fit [33]. Therefore, in the current study, the Comparative Fit Index (CFI; 33) and the root mean square error of approximation (RMSEA; 34) were interpreted as measures of descriptive fit. Both the CFI and RMSEA are standardized measures of descriptive model fit that range in value from 0 to 1. For the CFI, values greater than .95 indicate a reasonable model, and values greater than .90 indicate a plausible model. For the RMSEA, values less than .08 indicate acceptable model fit, and values less than .05 indicate good model fit.

3. Results

3.1. Measurement Models for Latent Variables. The measurement models for PHYS, PSYCH, and SE fit well statistically, $\chi^2 (55, N = 363) = 51.12, P = .6237; \chi^2 (2, N = 363) = .74, P = .6896; \chi^2 (2, N = 363) = 2.87, P = .2377$, and descriptively, CFI = 1.00, RMSEA < .0001; CFI = 1.00, RMSEA < .0001; CFI = .998, RMSEA = .035, respectively. See Tables 2 and 3 for loadings and covariances, respectively, for the measurement models. The vast majority of the error covariances were subsumed in the PHYS measurement model, because individual items (not scales or subscales) were used to construct this latent variable.
Table 2: Standardized factor loadings for measurement models.

| Latent   | Observed        | B    | SE   | |z|  | P   | 95% CI LB | 95% CI UB |
|----------|-----------------|------|------|------|-----|------|------------|------------|
| PHYS    | WEIGHT          | .1988| .061 | 3.25 | .001| .0790| .3186      |            |
| PHYS    | TROUBLE         | -.5993| .0538| 11.15| <.001| -.7047| -.4940     |            |
| PHYS    | ASSWA           | -.1906| .0641| 2.97 | .003| -.3163| -.0650     |            |
| PHYS    | TROUWO          | -.5473| .0576| 9.50 | <.001| -.6603| -.4343     |            |
| PHYS    | JOINTP          | -.4085| .0566| 7.22 | <.001| -.5195| -.2976     |            |
| PHYS    | AMOVE           | .1743| .0617| 2.83 | .005| .0534| .2952      |            |
| PHYS    | TROUWM          | -.6984| .0504| 13.87| <.001| -.7971| -.5997     |            |
| PHYS    | LIMITA          | -.5866| .0537| 10.91| <.001| -.6919| -.4812     |            |
| PHYS    | SEREP           | .4089| .0568| 7.20 | <.001| -.5202| -.2976     |            |
| PHYS    | PAIN            | -.4262| .0556| 7.67 | <.001| -.5351| -.3173     |            |
| PHYS    | STIFF           | -.2989| .0616| 4.85 | <.001| -.4196| -.1782     |            |
| PHYS    | ASSIST          | -.2422| .0612| 3.96 | <.001| -.3621| -.1222     |            |
| PHYS    | STAYIN          | -.2449| .0610| 4.02 | <.001| -.3644| -.1254     |            |
| PHYS    | INBED           | -.2179| .0674| 3.23 | .001| -.3499| -.0858     |            |
| PSYCH   | CESD            | .8000| .0229| 34.97| <.001| .7552| .8449      |            |
| PSYCH   | AIMD            | .9565| .0161| 59.54| <.001| .9250| .9880      |            |
| PSYCH   | AIMA            | .7983| .0231| 34.59| <.001| .7531| .8435      |            |
| PSYCH   | AIMIS           | .3340| .0488| 6.84 | <.001| .2383| .4296      |            |
| SE      | EFFPAIN         | .3340| .0684| 4.89 | <.001| .2000| .4680      |            |
| SE      | EFFACT          | .4804| .0675| 7.12 | <.001| .3481| .6127      |            |
| SE      | EFFSYM          | .8852| .0579| 15.29| <.001| .7718| .9987      |            |
| SE      | ARTHINT         | -.5022| .0512| 9.81 | <.001| -.6026| -.4012     |            |
| SE      | ARTHHEL         | -.6061| .0520| 11.65| <.001| -.7080| -.5042     |            |

Note: SE: standard error; 95% CI LB: 95% confidence interval lower bound; 95% CI UB: 95% confidence interval upper bound.

Table 3: Standardized error covariances within measurement model.

| Latent   | First OV | Second OV | r    | SE   | |z|  | P   | 95% CI LB | 95% CI UB |
|----------|----------|-----------|------|------|-----|-----|------|------------|------------|
| PHYS    | WEIGHT   | AMOVE     | -.1162| .0528| 2.20 | .028| -.2196| -.0128     |            |
| PHYS    | WEIGHT   | ASSIST    | .1422| .0428| 3.32 | .001| .0583| .2261      |            |
| PHYS    | TROUBLE  | LIMITA    | .2229| .0702| 3.17 | .001| .0853| .3605      |            |
| PHYS    | ASSWA    | TROUWM    | .1171| .0483| 2.42 | .015| .0224| .2119      |            |
| PHYS    | ASSWA    | ASSIST    | .5049| .0381| 13.26| <.001| .4303| .5795      |            |
| PHYS    | ASSWA    | STAYIN    | .3743| .0448| 8.36 | <.001| .2865| .4621      |            |
| PHYS    | ASSWA    | INBED     | .3577| .0456| 7.85 | <.001| .2684| .4470      |            |
| PHYS    | TROUWO   | TROUWM    | .3524| .0675| 5.22 | <.001| .2200| .4847      |            |
| PHYS    | TROUWO   | STAYIN    | .1808| .0434| 4.17 | <.001| .0958| .2658      |            |
| PHYS    | TROUWO   | INBED     | .1560| .0649| 2.89 | .004| .0500| .2620      |            |
| PHYS    | JOINTP   | SEREP     | .4069| .0474| 8.59 | <.001| .3140| .4997      |            |
| PHYS    | JOINTP   | PAIN      | .4324| .0426| 9.35 | <.001| .3418| .5231      |            |
| PHYS    | JOINTP   | STIFF     | .2200| .0527| 4.18 | <.001| .1168| .3232      |            |
| PHYS    | AMOVE    | ASSIST    | -.2176| .0415| 5.25 | <.001| -.2989| -.1364     |            |
| PHYS    | TROUWM   | INBED     | .1362| .0618| 2.20 | .028| .0151| .2574      |            |
| PHYS    | LIMITA   | STIFF     | .1069| .0517| 2.07 | .039| .0055| .2083      |            |
| PHYS    | SEREP    | PAIN      | .6062| .0356| 17.01| <.001| .5363| .6760      |            |
| PHYS    | SEREP    | STIFF     | .3076| .0501| 6.13 | <.001| .2093| .4059      |            |
| PHYS    | PAIN     | STIFF     | .3140| .0502| 6.26 | <.001| .2157| .4123      |            |
| PHYS    | ASSIST   | STAYIN    | .4435| .0411| 10.80| <.001| .3631| .5240      |            |
| PHYS    | ASSIST   | INBED     | .3065| .0460| 6.66 | <.001| .2163| .3966      |            |
| PHYS    | STAYIN   | INBED     | .3476| .0458| 7.59 | <.001| .2578| .4374      |            |
| SE      | EFFPAIN  | EFFSYM    | .2637| .1099| 2.61 | .009| .0659| .4615      |            |
| SE      | EFFPAIN  | ARTHINT   | -.2836| .0534| 5.31 | <.001| -.3884| -.1789     |            |
| SE      | EFFACT   | EFFSYM    | .3517| .1061| 3.31 | .001| .1436| .5597      |            |

Note: OV: observed variable; SE: standard error; 95% CI LB: 95% confidence interval lower bound; 95% CI UB: 95% confidence interval upper bound.
3.2. Full, Mediated Model. The full model was constructed to model the effects of PHYS, PSYCH, and SE on QWB via the mediator, EX. The model did not fit statistically, \( \chi^2 \) (248, \( N = 363 \) = 888.04, \( P < .0001 \), or descriptively, CFI = .790, RMSEA = .084, AIC = 32109.794, and BIC = 32507.023. In order to permit interpretation of model coefficients, modification indices (MIs) were obtained to improve model fit via alterations in error covariances. Covariances with MIs of greatest value were added singularly, provided that the covariances were conceptually tenable. For the sequential list of added covariances, see Table 3. After five covariances were added, the descriptive fit of the model was adequate, CFI = .929, RMSEA = .050, AIC = 31691.573, and BIC = 32108.274; although, the statistical fit was lacking still, \( \chi^2 \) (243, \( N = 363 \) = 459.82, \( P < .0001 \). Based upon the adequate descriptive fit, interpretation of the model coefficients followed.

The measurement models remained sound within the structural model (see Table 4). The majority of covariances remained statistically significant (see Table 5). Examining the structural pathways, the relationship between EX and QWB was not statistically significant, \( B = .0718 \), \( P = .171 \). Neither were the relationships between PSY or SE and EX, \( B = -.0318 \), \( P = .081 \); \( B = .0653 \), \( P = .217 \), respectively. In fact, the bivariate correlation between the observed variables, EX and QWB, was nonsignificant, \( r = .0713 \), \( P = .1756 \). The only significant structural coefficient was the relationship between PHYS and EX, \( B = .0718 \), \( P = .0138 \). Thus, as physical dysfunction scores increased (demonstrating increased physical complications), the probability of participating in exercise decreased. On the whole, this model demonstrates that, in our sample of OA participants, only physical dysfunction (and not self-efficacy or psychological distress) was related to exercise, and exercise was not related to quality of well-being.

3.3. Nonmediated Structural Model. Based on the previous model, EX was eliminated from the model to determine
Table 6: Standardized error covariances within full, mediated structural model.

| Latent  | First   | Second  | r   | SE   | |z| |  | P   | 95% CI LB | 95% CI UB |
|---------|---------|---------|-----|------|-------|-------|-------|------|----------|----------|
| PHYS    | WEIGHT  | AMOVE   | -.1017 | .0522 | 1.95 | .051 | -.2040 | .0005 |
| PHYS    | WEIGHT  | ASSIST  | .1369 | .0430 | 3.18 | .001 | .0525  | .2212 |
| PHYS    | TROUWO  | LIMITA  | .2701 | .0530 | 5.10 | <.001 | .1663  | .3739 |
| PHYS    | ASSWA   | TROUWM  | .0987 | .0416 | 2.37 | .018 | .0172  | .1801 |
| PHYS    | ASSWA   | ASSIST  | .4871 | .0388 | 12.55| <.001 | .4111  | .5632 |
| PHYS    | ASSWA   | STAYIN  | .3545 | .0455 | 7.79 | <.001 | .2653  | .4437 |
| PHYS    | ASSWA   | INBED   | .3354 | .0455 | 7.79 | <.001 | .2438  | .4270 |
| PHYS    | TROUWO  | TROUWM  | .4071 | .0468 | 8.69 | <.001 | .3154  | .4989 |
| PHYS    | TROUWO  | STAYIN  | .1623 | .0422 | 3.85 | <.001 | .0796  | .2449 |
| PHYS    | TROUWO  | INBED   | .1130 | .0497 | 2.27 | .023 | .0156  | .2103 |
| PHYS    | JOINTP  | SEREP   | .3802 | .0465 | 8.17 | <.001 | .2890  | .4713 |
| PHYS    | JOINTP  | PAIN    | .4009 | .0458 | 8.75 | <.001 | .3122  | .4907 |
| PHYS    | JOINTP  | STIFF   | .1996 | .0512 | 3.89 | <.001 | .0991  | .3000 |
| PHYS    | AMOVE   | ASSIST  | -.2219| .0417 | 5.32 | <.001 | -.3036 | -.1401|
| PHYS    | TROUWO  | STAYIN  | .0797 | .0507 | 1.57 | .116 | -.0196 | .1791 |
| PHYS    | TROUWO  | INBED   | .1054 | .0481 | 2.19 | .028 | .0111  | .1998 |
| PHYS    | SEREP   | PAIN    | .5829 | .0358 | 16.30| <.001 | .5128  | .6530 |
| PHYS    | SEREP   | STIFF   | .2885 | .0488 | 5.91 | <.001 | .1929  | .3842 |
| PHYS    | PAIN    | STIFF   | .2926 | .0489 | 5.99 | <.001 | .1968  | .3883 |
| PHYS    | ASSIST  | STAYIN  | .4167 | .0420 | 9.93 | <.001 | .3345  | .4990 |
| PHYS    | ASSIST  | INBED   | .2750 | .0472 | 5.83 | <.001 | .1826  | .3674 |
| PHYS    | STAYIN  | INBED   | .3118 | .0475 | 6.56 | <.001 | .2187  | .4050 |
| SE      | EFFPAIN | EFFSYM  | .2621 | .0714 | 3.67 | <.001 | .1221  | .4021 |
| SE      | EFFPAIN | ARTHINT | -.2832| .0486 | 5.83 | <.001 | -.3784 | -.1880|
| SE      | EFFFACT | EFFSYM  | .3225 | .0662 | 4.87 | <.001 | .1928  | .4523 |
| PHYS    | SE      | EFFSYM  | -.6868| .0486 | 14.13| <.001 | -.7820 | -.5915|
| SE      | EFFFACT | -.4443 | .0604 | 7.36 | <.001 | -.5626 | -.3260|
| QWB     | PHYS    | -.7920 | .0361 | 21.96| <.001 | -.8627 | -.7213|
| QWB     | SE      | -.3476 | .0462 | 7.52 | <.001 | .2570  | .4381 |
| PSY     | SE      | -.3408 | .0524 | 6.51 | <.001 | -.4435 | -.2381|

Note: OV: observed variable; SE: standard error; 95% CI LB: 95% confidence interval lower bound; 95% CI UB: 95% confidence interval upper bound.

whether PHYS, PSY, and SE uniquely and significantly contributed to QWB. In this model, the MI changes entered into the previous model were maintained, with the exception of the covariances that related to QWB, because QWB was exogenous in the nonmediated model (see Table 8 for all error covariances). This model did not fit statistically, \( \chi^2 (222, N = 363) = 406.34, P < .0001 \), but it did fit well descriptively, CFI = .939, RMSEA = .048, AIC = 31132.477, BIC = 31521.918, and CD = .827. The measurement models remained intact (see Table 6), and the covariances remained consonant with previous models (see Table 7). The structural model (QWB \( \rightarrow \) SE, PHYS, PSYCH) demonstrated that physical dysfunction, psychological distress, and self-efficacy were related largely and significantly to QWB, \( B = -.7910, P < .0001 \); \( B = -.2852, P < .0001 \); \( B = .4267, P < .0001 \), respectively. These relationships are in the expected directions, with greater physical impairment relating to lower QWB, greater psychological impairment relating to lower QWB, and greater self-efficacy relating to higher QWB. Both Akaike's and the Bayesian Information Criteria support the superiority of this model to the model that includes EX as a mediator.

4. Discussion

In this study, structural equation modeling was used to determine whether exercise mediated the relationships among self-efficacy, physical dysfunction, psychological distress, and QWB and to examine the interrelationships among these variables. The results indicated that self-efficacy and psychological distress did not relate to engagement in exercise; only level of physical dysfunction was related to engagement in exercise. In addition, exercise was not related to one’s QWB. However, physical dysfunction, psychological distress, and self-efficacy each were independently related to health status. These findings are consistent with past research and illustrate the importance of these factors in health status [16, 34].

Exercise was related to physical dysfunction, but because of the study’s cross-sectional design, we do not know...
The measure of QWB used in this study assessed mobility, decreasing psychological distress to improve QWB. Be well advised to develop interventions directly focused to affect QWB may not include exercise. Researchers may OA. The results from this study indicate that the pathway take to affect changes in QWB among older people with self-efficacy, psychological distress, and physical functioning should focus on increasing exercise. On the other hand, if quality of well-being is the priority, then treatment might not theirengagementinexercise. Thus, the QWB in older adults with OA is predicted by a person’s goal of treating OA to improve quality of life or to increase longevity? If longevity is the goal, then treatment programs should focus on increasing exercise. On the other hand, if quality of well-being is the priority, then treatment might be most effective when it is focused directly on affecting self-efficacy, physical dysfunction, and psychological distress. The participants in this study had a mean age of over 69. It did not affect quality of life through exercise. Thus, the QWB was related to mobility and physical functioning, it is not surprising that physical functioning was directly related to QWB. However, the fact that exercise was not related to the QWB calls into question the goals of treating OA. Is the goal of treating OA to improve quality of life or to increase longevity? If longevity is the goal, then treatment programs should focus on increasing exercise. On the other hand, if quality of well-being is the priority, then treatment might be the most effective when it is focused directly on affecting self-efficacy, physical dysfunction, and psychological distress.

People who experience greater physical impairment because of their chronic condition are less likely to engage in activities that might improve their condition and more likely to experience psychological distress [28]. The present study suggests that we need to identify the pathways that self-efficacy, psychological distress, and physical functioning take to affect changes in QWB among older people with OA. The results from this study indicate that the pathway to affect QWB may not include exercise. Researchers may be well advised to develop interventions directly focused on improving self-efficacy and physical functioning and decreasing psychological distress to improve QWB.

In the present study, exercise was not related to QWB. The measure of QWB used in this study assessed mobility, physical activity, and social activity. Because physical functioning was related to mobility and physical functioning, it is not surprising that physical functioning was directly related to QWB. However, the fact that exercise was not related to the QWB calls into question the goals of treating OA. Is the goal of treating OA to improve quality of life or to increase longevity? If longevity is the goal, then treatment programs should focus on increasing exercise. On the other hand, if quality of well-being is the priority, then treatment might be the most effective when it is focused directly on affecting self-efficacy, physical dysfunction, and psychological distress.

Table 7: Measurement models within nonmediated structural model.

| Latent   | Observed | B    | SE    | |z|   | P   | 95% CI LB | 95% CI UB |
|----------|----------|------|-------|---|-----|-----|-----------|-----------|
| PHYS     | WEIGHT   | .1265| .0562 | 2.25 | .024 | .0164 | .2367     |
| PHYS     | TROUBLE  | -.5760| .0401 | 14.36 | <.001 | -.6546 | -.4974   |
| PHYS     | ASWA     | -.2623| .0523 | 5.02  | <.001 | -.3647 | -.1599   |
| PHYS     | TROUWO   | -.5251| .0422 | 12.43 | <.001 | -.6079 | -.4423   |
| PHYS     | JOINTP   | -.4501| .0456 | 9.87  | <.001 | -.5395 | -.3607   |
| PHYS     | AMOVE    | .1724 | .0544 | 3.17  | .002  | .0658  | .2790    |
| PHYS     | TROUWM   | -.6194| .0387 | 16.01 | <.001 | -.6953 | -.5436   |
| PHYS     | LIMITA   | -.5392| .0420 | 12.83 | <.001 | -.6215 | -.4568   |
| PHYS     | SEREP    | -.4562| .0452 | 10.09 | <.001 | -.5449 | -.3676   |
| PHYS     | PAIN     | -.4883| .0436 | 11.21 | <.001 | -.5737 | -.4029   |
| PHYS     | STIFF    | -.3261| .0504 | 6.48  | <.001 | -.4248 | -.2274   |
| PHYS     | ASSIST   | -.3280| .0500 | 6.56  | <.001 | -.4259 | -.2300   |
| PHYS     | STAYIN   | -.3488| .0493 | 7.07  | <.001 | -.4455 | -.2522   |
| PHYS     | INBED    | -.3277| .0501 | 6.54  | <.001 | -.4260 | -.2294   |
| PSY      | CESD     | .8165 | .0212 | 38.43 | <.001 | .7748  | .8581    |
| PSY      | AIMD     | .9312 | .0152 | 61.31 | <.001 | .9014  | .9610    |
| PSY      | AIMA     | .8134 | .0214 | 37.94 | <.001 | .7714  | .8554    |
| PSY      | AIMIS    | .3454 | .0488 | 7.08  | <.001 | .2500  | .4411    |
| SE       | EFFPAIN  | .3117 | .0588 | 5.30  | <.001 | .1965  | .4269    |
| SE       | EFFSYM   | .8502 | .0351 | 24.20 | <.001 | .7814  | .9191    |
| SE       | EFFECT   | .8805 | .0635 | 13.87 | <.001 | .7560  | 1.0049   |
| SE       | ARTHINT  | -.4691| .0462 | 10.15 | <.001 | -.5597 | -.3786   |
| SE       | ARTHHEL  | -.6449| .0406 | 15.87 | <.001 | -.7246 | -.5652   |

Note: OV: observed variable; SE: standard error; 95% CI LB: 95% confidence interval lower bound; 95% CI UB: 95% confidence interval upper bound.
Table 8: Standardized error covariances within nonmediated structural model.

| Latent First   | Second  | r   | SE  | |z|   | P   | 95% CI LB | 95% CI UB |
|----------------|---------|-----|-----|-----|-----|-----|----------|----------|
| PHYS WEIGHT    | AMOVE   | -.1017 | .0522 | 1.95 | .051 | -.2040 | .0006    |
| PHYS WEIGHT    | ASSIST  | .1363 | .0430 | 3.17 | .002 | .0520  | .2206    |
| PHYS TROUFE    | LIMITA  | .2700 | .0531 | 5.07 | <.001 | .1654 | .3737    |
| PHYS ASSWA     | TROUWM  | .0998 | .0415 | 2.40 | .016 | .0184  | .1812    |
| PHYS ASSWA     | ASSIST  | .4880 | .0388 | 12.58 | <.001 | .4119 | .5640    |
| PHYS ASSWA     | STAYIN  | .3551 | .0455 | 7.80 | <.001 | .2659 | .4443    |
| PHYS TROUWO    | TROUWM  | .4096 | .0467 | 8.76 | <.001 | .3180 | .5012    |
| PHYS TROUWO    | STAYIN  | .1617 | .0421 | 3.84 | <.001 | .0791 | .2442    |
| PHYS TROUWO    | INBED   | .1148 | .0497 | 2.31 | .021 | .0174  | .2122    |
| PHYS JOINTP    | SEREP   | .3781 | .0467 | 8.10 | <.001 | .2866 | .4695    |
| PHYS JOINTP    | PAIN    | .3991 | .0459 | 8.69 | <.001 | .3091 | .4892    |
| PHYS JOINTP    | STIFF   | .1974 | .0513 | 3.85 | <.001 | .0968 | .2981    |
| PHYS AMOVE     | ASSIST  | -.2214 | .0417 | 5.31 | <.001 | -.3032 | -1.397 |
| PHYS TROUWM    | INBED   | .0826 | .0507 | 1.63 | .103 | -.0167 | .1820    |
| PHYS LIMITA    | STIFF   | .1048 | .0482 | 2.17 | .030 | .0103  | .1992    |
| PHYS SEREP     | STIFF   | .5819 | .0359 | 16.22 | <.001 | .5116 | .6523    |
| PHYS SEREP     | PAIN    | .2868 | .0489 | 5.86 | <.001 | .2190 | .3827    |
| PHYS TROUWO    | STAYIN  | .2909 | .0490 | 9.94 | <.001 | .1949 | .3869    |
| PHYS TROUWO    | INBED   | .4172 | .0420 | 9.94 | <.001 | .3349 | .4995    |
| PHYS TROUWO    | STAYIN  | .2762 | .0471 | 5.86 | <.001 | .1838 | .3685    |
| PHYS TROUWO    | INBED   | .3126 | .0475 | 6.58 | <.001 | .2195 | .4057    |
| SE EFFPAIN     | EFFSYM  | .2607 | .0705 | 3.70 | <.001 | .1225 | .3989    |
| SE EFFPAIN     | ARTHINT | -.2828 | .0486 | 5.82 | <.001 | -.3780 | -.1876 |
| SE EFFACT      | EFFSYM  | .3253 | .0649 | 5.01 | <.001 | .1981 | .4526    |
| PHYSEFFACT     | SE      | -.7172 | .0703 | 10.21 | <.001 | -.8530 | -.5795 |
| SE EFFACT      | EFFSYM  | -.4759 | .0625 | 7.61 | <.001 | -.5985 | -.3534 |
| PSYSEFFACT     | SE      | -.3549 | .0537 | 6.61 | <.001 | -.4601 | -.2497 |

Note: OV: observed variable; SE: standard error; 95% CI LB: 95% confidence interval lower bound; 95% CI UB: 95% confidence interval upper bound.

Conflict of Interests
The authors declare that they have no conflict of interests regarding this paper.

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