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## Perceived difficulty, importance, and satisfaction with physical function in COPD patients

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### Abstract

**Background:** Research suggests that patients' satisfaction with their physical functioning (SPF) is a critical component of HRQL. This study was designed to examine the extent to which perceptions of physical function and the value placed on physical function are related to satisfaction ratings. The sample consisted of older adults suffering from a progressively debilitating disease, chronic obstructive pulmonary disease (COPD).

**Methods:** During baseline assessments, COPD patients participating in a randomized controlled physical activity trial completed measures of SPF, perceived difficulty, and perceived importance.

**Results:** An ANCOVA controlling for age and gender indicated that perceived difficulty, perceived importance, and their interaction accounted for 43% of the variance in SPF. Additionally, participants were most satisfied with important tasks that they performed with little difficulty. Participants were least satisfied with important tasks that they perceived as highly difficult.

**Conclusion:** The results of the present study indicate that not being able to perform valued tasks produces discontent that is reflected in lower rating of satisfaction with physical functioning. Clearly, the significance of loss in function to individual patients is related to the importance of the functional activities that may be compromised. These data have implications for the scope of patient assessment in clinical care and for the conceptual basis of future research in the area of physical functioning.

### Background

Researchers and clinicians agree that an assessment of quality of life is central to evaluating treatment efficacy in various chronic disease populations (e.g., [1]). A precise understanding of patients' quality of life offers much information regarding the personal and social consequences of disease progression and treatment effectiveness. Although quality of life has been conceptualized as a unidimensional, global construct reflecting one's con-

scious cognitive judgment of satisfaction with one's life (see [2]; [1]), researchers in medicine more commonly describe quality of life within the broad rubric of Health-Related Quality of Life (HRQL) to capture the effect that various health conditions have on multiple dimensions of functioning; e.g., physical, cognitive, emotional, and social. As such, researchers have identified patient's satisfaction with physical functioning (SPF) as one component of HRQL. More specifically, research has found that

decreased satisfaction with physical abilities is associated with greater physical impairment [3], greater disability in valued activities [4,5], and depressive symptoms [4]. In older adults with chronic knee pain, SPF appears to be related to perceived disability and the value patients' place on specific disabilities [6]. Furthermore, SPF has been found to mediate the influence of a physical activity intervention on increased subjective well-being [7]. The purpose of the present study was to examine the role of perceived physical function and the value of this function on SPF in a sample of older adults suffering from a progressively debilitating disease, chronic obstructive pulmonary disease (COPD).

Emerging evidence from research examining the progression of disease and disability suggests that satisfaction with physical functioning is an important component in perceived disability and HRQL. Adopting a relational model of stress and coping (see [8]), Rejeski and colleagues examined satisfaction with physical function in patients with knee osteoarthritis [9]. They found that the perceived difficulty of tasks (i.e., perceived disablement) interacted with the importance of such tasks (i.e., value) in their relationship with SPF. That is, individuals with high disability who viewed their physical function as important were more dissatisfied with their physical function than individuals experiencing similar disability who placed less importance on their physical function. Furthermore, as a motivational consequence, individuals may avoid activities in which they feel limited in order to reduce feelings of dissatisfaction. To the extent that those activities include physical activity, dissatisfaction with physical function may result in a sedentary lifestyle, which further increases one's risk for disablement and for other chronic disease (e.g., CVD).

Underscoring the importance of SPF, Katz, Neugebauer and colleagues [5],[4] examined the role of satisfaction with physical abilities on disability in valued activities and depressive symptoms in a sample of individuals with rheumatoid arthritis (RA). They found that satisfaction with abilities mediated the influence of RA on depressive symptoms, suggesting that individuals who lose the ability to perform valued activities and become dissatisfied with their level of functioning are more likely to experience increases in depression. In a subsequent study, they found that low satisfaction with abilities was an important predictor of depressive symptoms and that it mediated the impact of several other variables (e.g., physical impairment, valued activity disability, and social comparisons) on depressive symptoms [4]. Consistent with research by Rejeski et al [10], they argue that the personal meaning an individual attaches to changes in functional status is critical in understanding the long-term psychological well-being of that individual.

The importance of SPF is further illustrated by recent research of ours which has shown that SPF mediates the influence of physical activity interventions on changes in subjective well-being [7]. Similarly, in a sample of obese older adults with knee osteoarthritis, SPF was found to mediate the influence of changes in lifestyle physical activity on measures of physical and psychological health [11]. Thus, SPF appears to be an important mediator in understanding why physical activity causes change in various components of health status.

Research to date has examined the correlates of SPF in healthy middle-aged and older adults and older adults suffering from arthritis. As such, research examining these relationships in individuals suffering from other, potentially physically disabling diseases is warranted. Therefore, the purpose of the present study was to examine the influence of perceived difficulty and importance on satisfaction with physical function in patients suffering from COPD. We hypothesized that participants would report the least satisfaction with physical competence related to tasks that were perceived as high in difficulty and high in importance. In contrast, we anticipated that participants would be most satisfied with their physical competence in tasks that were perceived as important, but not difficult to complete.

## **Method**

### **Design**

The data reported in the present study were collected during baseline assessments in the Reconditioning, Exercise, and COPD trial (REACT). REACT was a single center, single blind, controlled randomized clinical trial designed to compare the effects of short-term exercise versus long-term exercise on measures of self-reported disability, physical function, exercise capacity and pulmonary function. The trial was single blinded such that those individuals collecting outcome data were unaware as to which intervention arm patients had been randomized. Recruitment, data management and statistical analyses for the study were carried out by the Recruitment and the Biostatistics and Data Management Cores of the Claude D. Pepper Older Americans Independence Center at Wake Forest University. The Wake Forest University Institutional Review Board approved the study, and all participants signed an informed consent prior to participating in the study. Recruitment for the study was via mass mailings, mass media advertising and requests to local physicians for referral of patients to the study.

### **Participants**

The study sample consisted of 142 participants and the demographic properties of this sample have been reported elsewhere (see [12]). Participants were eligible if they: (1) were between 55 and 80 years of age; (2) had an

expiratory airflow limitation that was not reversible with bronchodilator inhalation such that the ratio of the one second forced expiratory volume ( $FEV_1$ ) to the forced vital capacity (FVC) was less than or equal to 70% and the  $FEV_1$  was greater than or equal to 20% of predicted, (3) reported difficulty in performing at least one of the following activities as a result of dyspnea: walking a city block, grocery shopping, doing household chores, lifting objects chest height or higher, walking up stairs and/or getting out of a chair, (4) were free of severe cardiovascular and peripheral vascular disease, (5) were not undergoing active treatment for cancer, (6) were free of uncontrolled diabetes or hypertension, (7) had not actively participated in a pulmonary or exercise rehabilitation program during the previous six months, (8) had no plans to move from the area within the next 15 months, and (9) were willing to accept random assignment to either one of the intervention arms. The diagnosis of a medical condition that excluded participation was made by a medical history, a physical examination performed by a study physician and laboratory testing. All participants remained under the care of their personal physician during the study.

### Measures

#### Perceived difficulty

Perceived difficulty with physical tasks was assessed using the methodology developed by Rejeski, Martin, and colleagues [9]. They identified five common physical activities (walking, stair climbing, light house work, heavy work around the house, and lifting and carrying) and developed a hierarchy of difficulty with five steps adapted from the measurement methodology used to create self-efficacy scales (e.g., "How much difficulty would you have walking leisurely, non-stop for the following periods of time.") [13]. Each step was rated on five-point scale ranging from 0 to 4: no difficulty, a little difficulty, moderate difficulty, a lot of difficulty, and unable to do. Scores were calculated by averaging scores across all five steps of each activity. Therefore, a perceived difficulty score was calculated for each activity ranging from 0 to 4 with higher scores representing more perceived difficulty. Finally, values for each activity were averaged to create a perceived difficulty index. Research has demonstrated adequate psychometric properties of this measure (see [9]). The internal consistency of this measure in the present study was acceptable ( $\alpha = 0.88$ ).

#### Satisfaction and importance of physical function

The perceived satisfaction and importance of each of the five items described above was assessed using Likert response scales. For satisfaction ratings, a 7-point scale was used ranging from -3 to +3: -3 (very dissatisfied), -2 (somewhat dissatisfied), -1 (a little dissatisfied), 0 (neutral), +1 (a little satisfied), +2 (somewhat satisfied), and

+3 (very satisfied). For importance, a 5-point response scale was used: 0 (not at all important), 1 (somewhat important), 2 (moderately important), 3 (very important), and 4 (extremely important). Example items include, "How satisfied or dissatisfied are you with your current walking ability?" and, "How important to you is your walking ability?" Overall indices of both satisfaction and importance were created by averaging values across the five items, with higher values representing greater satisfaction with physical function and importance. Rejeski, Martin, and colleagues [9] provided evidence of the construct validity and internal consistency of these measure. The internal consistency of the satisfaction and importance scales in the current study were  $\alpha = 0.82$  and  $\alpha = 0.84$ , respectively.

### Procedures

Following screening and informed consent, eligible participants reported to the laboratory for baseline testing. These procedures have been described in detail elsewhere [14]. Participants completed the questionnaires in small groups in a quiet classroom. A trained staff member supervised questionnaire completion and was available to answer questions. As previously noted, the data presented here represent baseline data [14].

### Data analyses

To test the study hypothesis, it was first necessary to classify participants' SPF values based on perceived difficulty and importance. Means (SD) for perceived importance and difficulty are presented in Table 1. High and low groups for each construct were created using median splits. We then conducted a 2 (low vs. high importance)  $\times$  2 (low vs. high difficulty) ANCOVA with SPF values as the dependent variable and age and gender as covariates via the general linear model program within SPSS 11.5. This approach statistically controls for the influence of age and gender and provides statistical tests of significance for the 2 main effects (importance, difficulty) and their interaction (importance  $\times$  difficulty). The interaction effect was decomposed with pairwise comparisons for specific contrasts of interest using a Bonferroni adjustment. We also calculated effect sizes when appropriate.

### Results

The ANCOVA indicated that perceived importance, difficulty, the interaction of these two main effects, and the covariates (age, gender) accounted for 43% of the variance in SPF values (adjusted  $R^2 = .43$ ;  $F_{5,125} = 20.68$ ;  $p < .001$ ). Additionally, the analyses revealed a significant main effect for difficulty ( $F_{1,125} = 77.32$ ;  $p < .001$ ) and a significant difficulty by importance interaction ( $F_{1,125} = 8.05$ ;  $p < .01$ ). Table 2 presents the means and standard deviations of the SPF values categorized by levels of perceived importance and difficulty. Simple effects analyses are

**Table 1: Means (SD) for Satisfaction with Physical Function and perceived importance items**

Activity	Satisfaction with Physical Function <sup>1</sup>		Perceived importance <sup>2</sup>		Perceived difficulty <sup>3</sup>	
	Mean	SD	Mean	SD	Mean	SD
1. Climb a set of stairs (equipped with a handrail) without stopping or pausing.	-1.65	2.59	1.95	1.03	1.19	.71
2. Walk leisurely.	-1.75	2.69	2.65	.97	1.56	.98
3. Light work around the house (dusting, collecting trash, sweeping, appliance repair, making beds, indoor gardening).	-.56	2.88	2.43	1.14	1.10	.94
4. Heavy work around the house (e.g., painting, outdoor gardening, lawn mowing, washing windows, and/or floors, vacuuming, mopping).	-1.62	2.68	2.01	1.11	1.80	1.21
5. Lifting and carrying.	-1.25	2.74	2.13	.95	1.18	.86

Note: <sup>1</sup> = Satisfaction with Physical Function (SPF) stem: "How satisfied or dissatisfied are you with your ability to...", range: -3 to +3; <sup>2</sup> = Perceived Importance stem: "How important to you is your ability to...", range: 0 to 4; <sup>3</sup> = Perceived Difficulty stem: "How much difficulty would you have...", range: 0 to 4.

**Table 2: Satisfaction with Physical Function values categorized by perceived importance and difficulty**

Perceived difficulty	Importance			
	Low		High	
	M	SD	M	SD
Low	-0.36 <sub>a</sub>	1.76	0.31 <sub>b</sub>	2.20
High	-2.14 <sub>c</sub>	1.22	-3.12 <sub>d</sub>	1.45

**Table 3: Pairwise comparisons of Satisfaction with Physical Function: Perceived difficulty by importance**

Comparison	Mean Difference <sup>1</sup>	Effect Size*
c vs. d	.99	.74
b vs. a	.68	.34
b vs. d	3.44	1.88
a vs. c	1.78	1.19

<sup>1</sup>all mean differences significant at p < .01; \* effect size =  $M_1 - M_2 / SD_{pooled}$

presented in Table 3. As can be seen, all four pairwise comparisons are significantly different from one another (all p's < .05) and effect sizes ranged from small (a vs. b; ES = .34) to large (b vs. d; ES = 1.88). Consistent with the stated hypothesis, participants reported the lowest satisfaction ratings when tasks were perceived as highly difficult and highly important and were most satisfied when difficulty ratings were low and the tasks were rated as high on importance.

**Discussion**

The purpose of the present study was to explore the possible moderating effect that task importance has on perceived difficulty for physical function in determining satisfaction with physical function (SPF). In this particular study, the sample consisted of older adults with COPD. Consistent with the study hypothesis, we found that COPD patients were most *dissatisfied* with their physical function when they reported difficulty in performing physical tasks that were important to them. Conversely,

these patients were most *satisfied* with their physical function when they had little difficulty in performing tasks that were of importance to them. These results are consistent with similar research conducted in older adults with chronic knee pain (Rejeski et al, 1998). The interaction between importance and task difficulty in determining satisfaction with physical function is consistent with predictions from Lazarus and Folkman's [8] model of stress and coping and the basic tenets of social learning theory [15]. Specifically, not being able to perform valued tasks produces discontent that is reflected in lower rating of satisfaction with physical functioning.

Evidence suggests that low satisfaction with physical function (SPF) is associated with greater physical impairment [3], greater disability in valued activities [4,5], and depressive symptoms [4]. Furthermore, positive change in SPF has been found to mediate the positive influence that a physical activity intervention has on increased subjective well-being [7] and is a significant component of health-related quality of life [1]. Interestingly Martin and her colleagues [16], in studying older adults with chronic knee pain, found that those individuals who reported a high level of difficulty with their physical functioning, yet continued to value this domain of functioning, were more physically active than individuals who reported high level of difficulty and lower value for this domain of functioning. Thus, it would appear that dissatisfaction with level of physical functioning is a motivational factor in the self-management of health behaviors such as physical activity.

So what are the clinical implications of these findings and how might these data serve future research? First, it is clear that SPF is an important outcome in the clinical management of older adults with chronic disease. As noted above, SPF is central to the disablement process and has been linked to mental health outcomes such as depression. Second, with the recent focus on lifestyle behaviors in health care, it is reasonable to propose that SPF could be a target of intervention research. For example, what is the best approach to increasing older adults' perceptions of their physical function? Work by Frank and Patla [17] suggests that physical activity programs need to build a repertoire of strategies to control balance under a wide range of activities and environmental challenges. Current programming efforts for older adults are very limited in this regard, typically encouraging activity that involves level walking on uncluttered, well-lit paths. If participants do not attach any sense of importance to such a task, the efficacy of such interventions to influence processes involved in behavior change may be limited. Moreover, it appears that cognitive-behavioral counseling strategies can help older adults to generalize new found abilities from controlled environments to those more typically encountered in day-to-day functioning [18]. And third, there are many

measurement challenges in this area of research including problems with ceiling and floor effects. With the importance that the domain of physical functioning has to health-related quality of life, it seems timely to expand on newer measurement technological such as Computerized Assisted Testing (cf. [19]) to improve both the quality of research design and the implementation of assessment in this area into clinical practice.

## Conclusion

In conclusion, evidence continues to mount demonstrating the importance of SPF to health-related quality of life and health behavior. The results of the present study suggest that the manner in which COPD patients evaluate their SPF is codetermined by the perception of difficulty and the importance of physical tasks. It is recommended that future research and intervention efforts aimed at maximizing the quality of life of terminally ill patients continue to examine the factors that influence patients' perception of their physical function, particularly as it relates to their expectations, social roles, and personal desires.

## Authors' contributions

JK assisted in data analyses and manuscript preparation. WR contributed to study conception, design, and administration; data analyses; and manuscript preparation. KW assisted with data analyses and manuscript preparation. MB contributed to study conception, design, and administration; and manuscript preparation.

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