

# Outcome Expectations for Exercise Scale: Utility and Psychometrics

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**Objectives.** The purpose of this study was to develop a measure of outcome expectations for exercise specifically for the older adult (The Outcome Expectations for Exercise [OEE] Scale), and to test the reliability and validity of this measure in a sample of older individuals. This scale was developed based on Bandura's theory of self-efficacy and the work of prior researchers in the development of measures of outcome expectations.

**Methods.** The OEE scale, which was completed during a face-to-face interview, was tested in a sample of 175 residents in a continuing care retirement community.

**Results.** There was support for the internal consistency of the OEE scale (alpha coefficient of .89), and some support for reliability based on a structural equation modeling approach that used  $R^2$  estimates, although less than half of these were greater than 0.5. There was evidence of validity of the measure based on: (a) a confirmatory factor analysis in which the model fit the data (normed fit index [NFI] = .99, root mean square error of approximation [RMSEA] = .07,  $\chi^2/df = 2.8$ ); (b) support for the hypothesis that those who exercised regularly had higher OEE scores than those who did not ( $F = 31.3, p < .05$ , eta squared = .15); and (c) a statistically significant relationship between outcome expectations and self-efficacy expectations ( $r = .66$ ).

**Discussion.** This study provides some initial support for the reliability and validity of the OEE scale. Outcome expectations for exercise were related to exercise behavior in the older adult, and the OEE scale can help identify older adults with low outcome expectations for exercise. Interventions can then be implemented to help these individuals strengthen their outcome expectations, which may subsequently improve exercise behavior.

THE theory of self-efficacy states that specific efficacy expectations affect behavior, motivational level, thought patterns, and emotional reactions in response to any situation (Bandura, 1977, 1986, 1995, 1997). Two types of efficacy expectations are described within the theory. *Self-efficacy expectations* are the belief in the capability to perform a specific behavior. *Outcome expectations* are the beliefs that carrying out a specific behavior will lead to a desired outcome. Both types of efficacy expectations play a role in the adoption and maintenance of specific behaviors in older adults (Fitzgerald, Singleton, Neale, Prasad, & Hess, 1994; Kaplan & Atkins, 1984; McAuley, Shaffer, & Rudolph, 1995; Resnick, 1998a; 1998b; Resnick & Spellbring, 2000; Sharpe & McConnell, 1992).

Bandura (1977, 1986, 1995, 1997) suggests that outcome expectations are based largely on self-efficacy expectations and therefore may not add much to the prediction of behavior. However, expected outcomes may be partially separable from self-efficacy expectations when extrinsic outcomes are unchangeable. It is also possible that an older adult may believe he or she is capable of performing a specific behavior, but may not believe the outcome of performing that behavior is worthwhile.

There also is empirical evidence that outcome expectations have an important influence on older adults' exercise

behavior (Grembowski et al., 1993; Jette et al., 1998; Resnick, in press; Resnick, Palmer, Jenkins, & Spellbring, 2000; Resnick & Spellbring, 2000; Schuster, Petosa, & Petosa, 1995). In one study (Schuster et al., 1995), perceived benefits (outcome expectations) of exercise accounted for an additional 2.5% of the variance in exercise behavior, beyond the effects of barriers to exercise, social support, and self-efficacy expectations. A significant relationship between outcome expectations related to exercise and exercise behavior has been reported elsewhere as well (Conn, 1998; Schneider, 1997). Moreover, several studies (Jette et al., 1998; Resnick, 1998a) actually reported that outcome expectations were *better* predictors of exercise behavior than self-efficacy expectations.

The purpose of this study was to develop a measure of outcome expectations for exercise specifically for the older adult [The Outcome Expectations for Exercise (OEE) Scale], and to test the reliability and validity of this measure in a sample of older individuals. Despite the known benefits of exercise to the physical health and well-being of older adults, fewer than 50% participate in regular exercise activities (Resnick, 1998c; Tai, Gould, & Iliffe, 1997). Development of an appropriate measure of outcome expectations can help to understand the effects of outcome expectations, and lead to the development of interventions to strengthen

outcome expectations and thereby improve participation in exercise activities.

## METHODS

### *Study Populations*

The study sample included a group of 175 older adults living in a continuing care retirement community in an East coast city. Residents were eligible to participate if they: (a) were 65 years of age or older; and (b) scored  $\geq 20$  on a Mini-Mental State Examination (Folstein, Folstein, & McHugh, 1975). Of the 200 residents living in the facility at the time of the study, 182 were eligible to participate. Of those eligible, four residents refused to participate, and three residents were out of town during the period of data collection. The mean age of the participants was 85 ( $SD = 5.7$ ) years. The majority of the participants were Caucasian (99%), female (78%), and unmarried (78%). All participants had at least a high school education. The study was approved by the Institutional Review Board at the University of Maryland, and signed informed consent was obtained prior to data collection.

The OEE was also tested in a second, smaller study including 58 older residents living in a long-term care facility. The same eligibility criteria were used as in the initial study. The mean age of the residents was 88.5 ( $SD = 6.8$ ), and the majority were female (78%), White (97%), and unmarried (85%).

### *Development of the OEE Scale*

The OEE is a 9-item scale that was developed based on several previously tested measures that focused on the outcome expectations and benefits associated with exercise in adults (Sechrist, Walker, & Pender, 1987; Steinhardt & Dishman, 1989), as well as qualitative and quantitative studies that identified the specific benefits of exercise to older adults (Conn, 1998; Melillo et al., 1996; Resnick & Spellbring, 2000; Schneider, 1997; Sharon, Hennessy, Brandon, & Boyette, 1997). In these studies, older adults reported that exercise made them feel better and walk better, improved their blood pressure control, and decreased pain. Psychological benefits included feelings of having accomplished something, enjoying the activity, and experiencing an overall sense of well-being. While many of the same concepts were included in earlier versions of measures that focused on the benefits of exercise, the items for the OEE were written using the older adults' own words to describe the benefits they derived from exercise. Five of the items reflected physical benefits and four focused on mental health benefits. Item 9 was included in the measure because there has been a strong emphasis in the lay literature suggesting that exercise increases bone strength and prevents osteoporosis.

To complete the OEE scale the participant is asked to listen to a statement about exercise and to strongly agree (1), agree (2), neither agree nor disagree (3), disagree (4), or strongly disagree (5) with the stated outcomes or benefits of exercising. The following nine statements are included: (1) Makes me feel better physically (physical health); (2) Makes my mood better in general (mental health); (3) Helps

me feel less tired (physical health); (4) Makes my muscles stronger (physical health); (5) Is an activity I enjoy doing (mental health); (6) Gives me a sense of personal accomplishment (mental health); (7) Makes me more alert mentally (mental health); (8) Improves my endurance in performing my daily activities (physical health); and (9) Helps to strengthen my bones (physical health).

Content validity of the OEE was established by initially reviewing the items with a group of four researchers (i.e., this article's authors) who were familiar with the issues related to motivation and exercise adherence in older adults. The four researchers agreed with the items identified and proposed some wording changes so that the measure would be better understood by an older adult. The measure was then sent to two researchers who were familiar with measures that considered the benefits and barriers of exercise for older adults, and two geriatric nurse practitioners. These individuals were asked to rate the relevancy of the items on a scale of 1 (not very relevant) to 4 (very relevant). All four reviewers rated the items as either relevant or very relevant.

### *Administration and Scoring of the OEE Scale*

The OEE was administered using an interview format. The scale was scored by summing the numerical ratings for each response and dividing by the number of responses. OEE scores range from 1 to 5, with 1 indicative of low outcome expectations for exercise, and 5 strong outcome expectations for exercise.

### *Data Collection and Measurement*

The 175 study participants were interviewed face-to-face in their own apartments. In addition to the OEE scale, demographic information was collected including: age, gender, race, education, and marital status. Exercise behavior and activity were measured using the Yale Physical Activity Survey (YPAS: DiPietro, Caspersen, Ostfeld, & Nadel, 1993). Prior work (DiPietro et al., 1993) demonstrated evidence of two-week repeatability of the YPAS ( $r = 0.63$ ,  $p < .001$ ), and the YPAS was validated against several physiological variables (such as heart rate and  $\dot{V}O_2$  max) that are indicative of habitual activity (DiPietro et al., 1993; Pescatello, DiPietro, Fargo, Ostfeld, & Nadel, 1994). In addition, subjects were asked if they participated in a regular exercise program (walking, biking, jogging, swimming, resistive exercises) for 20 minutes at least three times a week.

Self-efficacy expectations were measured using the self-efficacy for walking/exercise (SEE) scale (Resnick & Jenkins, 2000). The SEE is a 9-item measure that focuses on the challenges associated with exercise activity for older adults. There is evidence of the internal consistency of the measure (alpha coefficient of .92), and evidence of concurrent criterion-related validity based on a significant correlation between self-efficacy expectations related to exercise and exercise behavior ( $r = .56$ ,  $p < .05$ ). Validity of the measure was further supported by confirmatory factor analysis. Health status was measured using the 12-item Short-Form Health Survey (Ware, Kosinski, & Keller, 1995, 1996). Prior research (Ware et al., 1995, 1996) on reliability and validity of the SF-12 supports the psychometric soundness of this measure. The 58 long-term care residents who

participated in the smaller study completed the SEE and OEE, and provided information about their exercise activity.

### Data Analysis

Evidence of internal consistency of the OEE scale was based on an  $\alpha \geq .70$  (Nunnally & Bernstein, 1994). In the larger study, using structural equation modeling, a squared multiple correlation coefficient ( $R^2$ ) (Bollen, 1989) was calculated as an alternative estimate of reliability.  $R^2$  estimates the systematic variance in the observed score that can be explained by the model (Bollen, 1989; Jagodzinski & Kuhnel, 1987; Reuterberg & Gustafsson, 1992). Ideally,  $R^2$  for each item should be close to 1.

A multiple regression analysis with a forced block entry was used for testing criterion-related validity. In the larger study six variables were entered as predictors of exercise behavior in the following order: age, gender, physical health, mental health, self-efficacy expectations, and outcome expectations. In the smaller study three predictors were entered in the following order: age, self-efficacy expectations, and outcome expectations. In both studies, criterion-related validity was also estimated by testing, based on a one-way analysis of variance, the hypothesis that those who exercised would have higher outcome expectations for exercise than those who did not. In the larger study construct validity was estimated by testing the hypothesis that there would be a statistically significant relationship between self-efficacy expectations and outcome expectations.

Based on data from the larger study, a confirmatory factor analysis was done using structural equation modeling. The sample covariance matrix was used as input and a maximum likelihood solution sought. The chi-square statistic and chi-square divided by degrees of freedom, the normed fit index (NFI), and Steiger's root mean square error of approximation (RMSEA) were used to estimate model fit. The larger the probability associated with the chi square, the better the fit of the model to the data (Bollen, 1989; Loehlin, 1998; Pedhazur & Schmelkin, 1991). The NFI tests the hypothesized model against a reasonable baseline model and ideally should be 1.0. The RMSEA is a population-based in-

dex and consequently is insensitive to sample size. An RMSEA of  $< .10$  is considered good, and  $< .05$  is very good (Loehlin, 1998). Item significance was based on the critical ratio (CR), which is the parameter estimate divided by an estimate of the standard error. A  $CR > 2$  in absolute value was considered significant (Arbuckle, 1997). A  $p < .05$  level of significance was used for all analyses.

### RESULTS

In the larger study the mean score for the OEE scale was 3.4 ( $SD = .82$ ; range 1–5), and the SEE scale was 5.7 ( $SD = 3.3$ ; range 0–10). The physical health summary score was 40.0 ( $SD = 11.8$ ), and the mental health summary score was 55.6 ( $SD = 7.0$ ). The participants engaged in 12.5 ( $SD = 8.6$ ) hours per week of overall activity and 1.7 ( $SD = 2.6$ ) hours of moderate exercise per week. All item intercorrelations were positive and statistically significant, ranging from .29 (item 3 with item 6) to .69 (item 1 with item 8). Moreover, the majority of the intercorrelations (70%) were .50 or greater. There was sufficient evidence for the internal consistency of the OEE scale with an alpha coefficient of .89. The squared multiple correlations ( $R^2$  values) ranged from .33 to .68 (see Table 1).

Results of the confirmatory factor analysis are shown in Table 1. Although the  $\chi^2$  equals 77 ( $df = 27, p = .01$ ),  $\chi^2$  divided by degrees of freedom was 2.8, suggesting an adequate (but only fair) fit (Marsh & Hocevar, 1985). Moreover, the NFI was .98, and RMSEA was .08. Each item was statistically significantly related to outcome expectations with path coefficients ranging from .57 to .82. Together the nine items explained 66% of the variance in outcome expectations.

Item 9 (helps to strengthen my bones) had the lowest  $R^2$  value (.33) and lowest path coefficient, or factor loading (.52). Therefore, the model was retested after removing item 9.  $R^2$  values and factor loadings of the revised model are shown in Table 1. All factor loadings were statistically significant, and the  $R^2$  values ranged from .38 to .70 with half of them being greater than .50. The  $\chi^2$  was 50 ( $df = 20$ ),  $\chi^2$  divided by degrees of freedom was 2.5, NFI was .98, and a

Table 1. Standardized Maximum Likelihood Path Coefficients for Confirmatory Factor Analysis and Reliability Estimates ( $R^2$ ) for the Outcome Expectations for Exercise Measure (Full Model and Revised Model With Item 9 Removed)

Question Item:	M (SD)	Full Model		Revised Model: Item 9 Removed	
		Path Coefficients	Reliability Estimates ( $R^2$ )	Path Coefficients	Reliability Estimates ( $R^2$ )
Exercise....					
1. Makes me feel better physically	3.6(1.1)	.82	.68	.79	.70
2. Makes my mood better in general	3.3(.99)	.79	.63	.76	.58
3. Helps me feel less tired	3.0(.97)	.64	.41	.64	.38
4. Makes my muscles stronger	3.6(.95)	.64	.41	.65	.42
5. Is an activity I enjoy doing	3.5(1.1)	.66	.44	.65	.42
6. Gives me a sense of personal accomplishment	3.4(1.1)	.64	.41	.62	.41
7. Makes me more alert mentally	3.3(.98)	.79	.62	.75	.57
8. Improves my endurance in performing my daily activities	3.5(.91)	.78	.61	.84	.64
9. Helps to strengthen my bones	3.4(.91)	.57	.33		

Notes: Model testing for the full model resulted in a  $\chi^2$  of 77,  $df$  of 27,  $p < .05$ , NFI of .99, and RMSEA of .08. Model testing for the revised model resulted in a  $\chi^2$  of 50,  $df$  of 20,  $p < .05$ , NFI of .99, and RMSEA of .07. Model comparisons between the two models resulted in a  $\chi^2$  difference of 27,  $df$  difference of 7, and  $p < .001$ . NFI = normed fit index; RMSEA = root mean square error of approximation.

RMSEA of .07. Comparisons between the two models resulted in a  $\chi^2$  difference of 27 (*df* difference = 7), and a statistically significant improvement in model fit with the removal of item 9 ( $p = .01$ ).

There was evidence for the criterion-related validity of the OEE. Outcome expectations were significantly related to exercise behavior with a final Beta of .31 ( $p < .05$ ; see Table 2). Physical health (final Beta = .27,  $p = .001$ ) and self-efficacy expectations (final Beta = .17,  $p = .025$ ) were also statistically significantly related to exercise behavior; combined, these three variables account for 31% of the variance in exercise behavior. Evidence of criterion-related validity of the OEE was further supported with a statistically significant difference between those who exercised regularly (at least 20 minutes three times per week) and those who did not ( $F = 31.3, p < .05, \text{Beta squared} = .15$ ). Those who exercised regularly had a mean OEE of 3.8 ( $SD = .74$ ), whereas those who did not exercise had a mean of 3.1 ( $SD = .77$ ). There was some evidence for the construct validity of the OEE based on a statistically significant correlation between self-efficacy expectations and outcome expectations ( $r = .66, p < .05$ ). The modest association between self-efficacy expectations and outcome expectations further supports that these are distinct constructs.

*Additional Use and Support for the Reliability and Validity of the OEE*

In the sample of 58 older residents living in a long-term care facility, the mean OEE score was 3.3 ( $SD = .68$ ), and the mean score for the SEE scale was 2.0 ( $SD = 3.4$ ). There was further evidence for internal consistency of the OEE with an alpha of .87. There was support for the criterion-related validity of the OEE, as outcome expectations were significantly related to exercise behavior (final beta .51,  $p = .022$ ), with self-efficacy also statistically significantly entering the model (final beta .50,  $p = .023$ ). Age did not significantly add to the regression equation. There was further support for the criterion-related validity of the OEE, as those individuals who exercised regularly had higher outcome expectations for exercise than those who did not ( $F = 17.8, p < .05$ ). Specifically, those who exercised had a mean OEE of 3.7 ( $SD = .48$ ), whereas those who did not exercise regularly had an OEE of 2.5 ( $SD = .78$ ).

Table 2. Results of Regression Analysis ( $n = 175$ ) Using Blocked Entry With Exercise Activity Regressed on Age, Gender, Physical Health, Mental Health, Self-Efficacy Expectations, and Outcome Expectations

Model	R <sup>2</sup>	R <sup>2</sup> Change	F for R <sup>2</sup> Change	Final Beta
Exercise Activity Regressed on:				
Age	.01	.01	.86	-.03
Gender	.02	.01	1.8	-.03
Physical health	.18	.17	35.3*	.27
Mental health	.18	.00	.00	-.03
Self-efficacy expectations	.23	.04	9.1*	.17
Outcome expectations	.31	.08	20.7*	.31

\* $p < .05$ .

**DISCUSSION**

These studies provide some evidence for the reliability and validity of the OEE. Although there was sufficient evidence for internal consistency (alphas .87 to .89), there was limited evidence for the reliability based on  $R^2$  values. Item 9 (helps to strengthen my bones) had the lowest  $R^2$  at .32, indicating that only 32% of the variance in item 9 was explained by the model. There was evidence for the criterion-related validity of the OEE based on significant correlations between outcome expectations and exercise behavior. Lastly, there was some evidence for the construct validity of the measure based on a statistically significant relationship between self-efficacy expectations and outcome expectations.

Confirmatory factor analysis indicated that, although all items loaded significantly on the construct, the fit of the full model to the data was fair. The model fit was statistically significantly improved with removal of item 9. The authors, however, currently recommend that this item remain in the measure pending additional reliability and validity testing. It is anticipated that older adults will recognize this as an important outcome of regular exercise behavior. Moreover, model modifications should be based on theory and empirical findings rather than modification indices or statistical results (Bollen, 1989; Loehlin, 1998). Continued use of this measure with other samples is needed to further evaluate the reliability of the OEE and explore causes for the low  $R^2$  values.

The support for the reliability and validity of this measure has important implications for clinical work as well as research. Both self-efficacy and outcome expectations play an influential role in the adoption and maintenance of exercise behavior in older adults (Clark, 1999; Conn, 1998; Dishman, 1994; Nies, Vollman, & Cook, 1997; Resnick & Spellbring, 2000), and manipulation of these variables with cognitive-behavioral strategies has been shown to have the greatest impact on increasing exercise activity in older adults (King, Rejeski, & Buchner, 1998). Clinicians can use this measure to identify individuals who have low outcome expectations related to exercise and implement interventions to strengthen outcome expectations and motivate these individuals to initiate and adhere to a regular exercise program.

The nine-item OEE is a much shorter measure of outcome expectations than previously published measures (Sechrist et al., 1987; Steinhardt & Dishman, 1989). While a shorter measure has the advantage of being easier for the older adult to complete, it is possible that adding additional relevant items (i.e., decreased falls, improved balance, improved cognition, and decreased disease) would improve model fit and explain more of the variance in outcome expectations.

This study was limited by sample size and homogeneity. The majority of the sample was White, well educated, female, unmarried, and engaged in limited physical activity. Continued exploration of the benefits of exercise as recognized by older adults is needed to establish that the full domain of outcome expectations is included in this measure. In addition, continued testing of the OEE scale, particularly with ethnically and socioeconomically diverse older adults, is needed to further ensure that this measure is consistent,

and that the items have a direct relationship with outcome expectations related to exercise for older adults.

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