

Outcome Expectancies, Functional Outcomes, and Expectancy Fulfillment for Patients With Shoulder Problems

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Objectives: This study was conducted to evaluate the relationship among patient outcome expectancies, perceived shoulder function changes, and perceptions of expectancy fulfillment.

Methods: Patients (n = 199) treated for shoulder problems at one orthopedic surgeon's office completed a baseline survey comprised of measures of outcome expectancies, shoulder function, health status, and demographics. At 1 month, 2 months, and 3 months, patients completed a mailed follow-up survey comprised of all baseline measures except demographic variables. At 3 months, a measure of expectancy fulfillment was added. A general linear modeling approach was used to assess the significance and effect size of 1) outcome expectancies on changes in shoulder function; and 2) outcome expectancies, shoulder function changes, and their interaction on perceptions of expectancy fulfillment.

Results: Outcome expectancies significantly predicted changes in shoulder function and accounted for 10% of the variance in functional improvement. The improvement difference between patients with high expectancies compared with those with low expectancies was clinically relevant (4.57 points), as it was greater than the minimal clinically important difference (3.02 points). Outcome

expectancies and shoulder function changes significantly predicted patients' perceptions of fulfilled expectancies, but their interaction was not statistically significant.

Conclusions: Results highlight the importance of patient expectancy in medical encounters. The findings suggest the need for interventions targeting patient expectancies such as including discussions about expectancy in patient-physician negotiations of therapeutic plans. Results also underscore the need for the development of better measures of outcome expectancies and expectancy fulfillment.

Key Words: outcome expectancies, shoulder function, outcomes, expectancy fulfillment

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In the psychologic literature, Social Learning Theory has promoted many studies examining the relationship among patient outcome expectancies and outcomes. This theory posits that outcome expectancy is a person's subjective probability that an outcome will occur.^{1,2} More recently, clinical and health services researchers have begun to investigate the importance of outcome expectancies on medical outcomes. Much of the expectancy medical research has focused on alcohol expectancies, although the expectancy research is expanding to many other content areas.^{3–5}

Patient outcome expectancies are defined as patients' perceptions that an outcome of medical care is likely to occur.^{6,7} To date, many expectancy studies have concentrated on the impact of outcome expectancies on patient *satisfaction*. Expectancies, for example, have been shown to be important predictors of patient satisfaction in studies of total hip arthroplasty,⁸ surgery for sciatica,⁹ back surgery,¹⁰ and physician visit.¹¹

The role of expectancy in predicting *symptoms* has been studied less frequently, and the results have been less clear. Patient expectancies have been found to predict pain and dysfunction in back problems,^{12–14} throat symptoms of tonsillitis,¹⁵ and pain experiences.¹⁶ Other studies have failed to find such a relationship. For example, in one study,⁹ expectancies were not found to significantly predict pain and func-

tion symptoms in sciatica after surgery. Similarly, chronic back patients' outcome expectancies did not predict functional outcomes.¹⁷

Of the studies that have evaluated how expectancies predict symptoms, most have assessed the relationship between baseline expectancies and symptoms at a later time but have not controlled for baseline symptoms. Because most of these studies are observational with no control group or random assignment, the lack of control for baseline symptoms obscures the real influence of expectancies on outcomes. A better understanding of expectancies and outcomes in observational studies could be obtained from focusing on the influence of expectancies on *changes in symptoms*.¹⁸ Results from the few studies that have evaluated the relationship of expectancies and changes in symptoms have not been consistent. In several studies, for example, patient expectancies significantly predicted symptom changes for patients undergoing treatment of back pain, total hip or knee replacement, and urologic problems.^{10,12,19,20} However, findings from other studies have indicated that patient expectancies are not predictive of symptom changes. In 2 prospective studies, for example, patients' expectancies of pain did not predict their pre-/postchanges in pain reports.^{21,22} The lack of agreement in results from these studies could indicate that a meaningful relationship does not exist, exists under certain conditions, or exists but the measures used to evaluate the relationship were not good measures. All of these possible explanations for the inconsistent results highlight the need for further evaluation of outcome expectancies as predictors of symptom changes.

If expectancies indeed predict symptom changes and researchers want to understand the mechanism through which expectancies work, it is important to understand determinants of expectancy fulfillment. Based on Fulfillment Theory, expectancy fulfillment is defined as the extent to which a patient's perceived occurrence agrees with his or her prior expectation about that occurrence.²³⁻²⁵ In our study, the occurrence refers to changes in shoulder function. Research has consistently shown that patients' perceptions of expectancy fulfillment relate to their satisfaction.^{3,11,26,27} However, what is not clear is how patients come to perceive their expectancies as being fulfilled. We would expect from Fulfillment Theory that the interaction between outcome expectancies and symptom changes predicts expectancy fulfillment, or that outcome expectancies moderate the relationship between symptom changes and expectancy fulfillment. For people with high outcome expectancies, we would expect a strong relationship between symptom changes and expectancy fulfillment, because good outcomes would need to be reached for expectancy fulfillment to be high. For people with low outcome expectancies, we would expect a less strong relationship, because outcomes would not need to be very good to meet with the low expectations.

Of the few health services research studies examining outcome expectancies, symptom changes, and expectancy fulfillment, one study found that positive expectancies related to less disappointment when controlling for symptom changes.²⁸ Another study found that only symptom changes predicted expectancy fulfillment and that outcome expectancies did not uniquely add to the prediction.²⁹ These studies did not test whether the interaction of outcome expectancy and outcomes predicted expectancy fulfillment. Understanding the predictors of expectation fulfillment is a necessary precursor for designing interventions that lead to expectancy fulfillment and subsequently satisfaction.

In summary, review of the outcome expectancy literature indicates that patient expectancies are important predictors of satisfaction, but the role of expectancies in predicting symptom changes has not been well established. Furthermore, research has not clarified the roles of expectancies and symptom changes on expectancy fulfillment. Therefore, we conducted the present study to assess the role of outcome expectancies in symptom changes and to better understand determinants of expectancy fulfillment.

We chose the treatment of persons with shoulder problems as the setting for our study. Studying outcome expectancies in persons treated for shoulder problems is important because few studies have done so to date.³⁰ Furthermore, the outcomes of patients treated for shoulder problems are not consistently positive. In fact, the proportion of patients who have unsatisfactory outcomes after treatment varies considerably. In a study of persons who underwent shoulder surgery to repair a torn rotator cuff tendon, unsatisfactory outcomes have been reported to range from 10% to 50%,³¹⁻³⁵ indicating that large numbers of patients are not improving with treatment. Therefore, variability in outcomes exists, and outcome expectancies might account for some of this variation.

MATERIALS AND METHODS

Study Sample

Patients were recruited consecutively over 4 months (May–August 2001) at the office of an orthopedic surgeon specializing in the treatment of shoulder problems. Participants completed self-report assessments at baseline, 1, 2, and 3 months. All but the baseline assessments were mailed to participants and returned in a prestamped envelope. Many steps were taken to encourage participants to return their assessments, including handwritten reminders, phone calls, e-mails, and postcards. Baseline assessments included demographic questions, and measures of shoulder function and outcome expectancies regarding their shoulder status in the coming month. At follow-up assessments, patients repeated all baseline measures excluding the demographic questions. At the final assessment, rather than reporting their expectancies for the coming month, patients rated the extent to which

their expectancies were met regarding their shoulder outcomes.

Outcome Variables

The primary outcome variable was shoulder functioning as measured by the Flexilevel Scale of Shoulder Function (FLEX-SF). This self-report measure is self-adaptive and consists of an initial routing item and 3 “testlets” that target high, medium, and low shoulder functioning. The initial routing item asks “How much difficulty do you have using your affected arm to place a can of soup (approximately 1 lb.) on a shelf at shoulder height?” and has 5 response options ranging from “I can’t do this” to “no difficulty.” Persons’ answers to the initial item are used to route respondents to the testlet that best targets their level of shoulder function. All items have been calibrated using Andrich’s rating scale model, a Rasch model for items with more than 2 response categories. Testlet scores have been equated to a common mathematical metric. Using a concordance table, raw scores on each testlet are associated with their calibrated FLEX-SF scores (which range from 1–50, with higher scores indicating better functioning). In the current sample, the FLEX-SF exhibited high reliability at both the scale (intraclass correlation coefficient, $3,1 = 0.90$) and trait levels as compared with the American Elbow and Shoulder Surgeons scale of shoulder function. The construct validity of the FLEX-SF was supported by the pattern of its associations with other health status measures and its internal and external responsiveness. Furthermore, the minimal clinically important difference, calculated as the mean change score for patients who reported they were just worse or just better, was shown to be 3.02.³⁶

A secondary outcome measure was patients’ perceptions of expectancy fulfillment regarding their shoulder problem. No measure existed to assess expectancy fulfillment; therefore, we created the Patient Shoulder Expectancy Fulfillment (PSEF) measure as part of this study. This 3-item measure asks patients to report the extent to which their expectancies for their shoulder problem, their shoulder pain, and their ability to move and use their shoulder were met. PSEF scores range from 0 to 18, with higher scores indicating greater expectancy fulfillment. The PSEF items are presented in Appendix A. Evidence for the unidimensionality of this measure was obtained from a confirmatory factor analysis using data from the current study in which one factor accounted for 93% of the item variance, and the internal consistency of this measure, calculated using Cronbach’s alpha, was .96.

Independent Variables

No published shoulder-specific assessment of outcome expectancies existed, so we also created the 3-item Patient Shoulder Outcome Expectancies (PSOE) measure as part of

this study. The 3 PSOE items ask patients to consider their shoulder problem overall, their shoulder pain, and their ability to move and use their shoulder at the present time and rate their expectancies regarding these 3 areas for the next month. PSOE scores range from 0 to 18, with higher scores indicating more positive expectancies. PSOE items are presented in Appendix A. Evidence for the unidimensionality of this measure was obtained from a confirmatory factor analysis in which one factor accounted for 89% of the item variance, and the internal consistency of this measure, calculated using Cronbach’s alpha, was 0.94.

Patients’ health status was assessed using the Medical Outcomes Study 12-item Short-Form Health Survey (SF-12). Administration of the SF-12 results in a Physical Component Summary score (PCS) and Mental Component Summary score (MCS). Scores on these 2 measures range from 0 to 100, with higher scores indicating better health. Test–retest reliability of these measures over a 2-week period exceeded 0.75 according to a report by Ware and colleagues.³⁷ The PCS and MCS have demonstrated strong evidence of validity in 5 different studies. In addition, the SF-12 has been used to assess outcomes for patients treated for shoulder problems.³⁸

Six variables were used to control for variability in patients’ clinical features. These included 4 variables capturing baseline clinical features such as primary diagnosis, preexisting chronic shoulder conditions, previous physical therapy for the shoulder, previous shoulder surgery, and prior use of medications for shoulder-related conditions. We also included 3 variables that described clinical events occurring during the study that might influence patients’ outcomes or perceptions of expectancy fulfillment such as shoulder surgery during study, new regimen of physical therapy for the shoulder, or the start of new medications for shoulder-related conditions.

Statistical Analysis

All analyses were conducted using a general linear modeling approach (SPSS for Windows, 2001).³⁹ Initially, univariate analyses were conducted to determine which demographic and independent variables would be included in the multivariate analyses. We tested the significance of each independent variable for predicting each of the outcome variables, changes in physical functioning, and expectancy fulfillment. Independent variables that demonstrated a trend toward significantly predicting an outcome measure ($P < 0.20$) were included in the multivariate analyses with that outcome measure.

We then analyzed 2 multivariate models. To test whether outcome expectancies predicted symptom changes, we first evaluated a full model with 3-month shoulder function, as measured by FLEX-SF, as the dependent variable. Independent variables included baseline shoulder function and demographic and independent variables that demon-

strated a univariate relation with changes in shoulder function: baseline shoulder outcome expectancies, existing chronic conditions, and surgery during study. We assessed and compared the unique contribution of each of the independent variables by examining their partial eta-squared values. These values represent the proportion of total variability in outcome attributable to the variable or the proportion of variance in shoulder function uniquely accounted for by each of the independent variables.

To better understand determinants of expectancy fulfillment, we evaluated a second set of general linear models in which expectancy fulfillment, as measured by the PSEF, was the dependent variable. In the full model, the independent variables were those demographic and independent variables that demonstrated a univariate relation with expectancy fulfillment (age, change in shoulder function from baseline to 3 months, outcome expectancies, and previous surgery) and the interaction between change in shoulder function and outcome expectancies. If the interaction term was not statistically significant, it was dropped from the model and a restricted model was assessed. To assess the magnitude of the effects of each of the independent variables on expectancy fulfillment, we examined the partial eta-squared values.

RESULTS

The mean age of participants was 51.6 (\pm 15.7) years with a range of 18 to 87 years. Of the 199 participants, 94 (47%) were female. The means and standard deviations for patients' baseline SF-12 physical and mental summary health status scores were 39.0 (8.6) and 45.6 (9.5), respectively. Compared with the general population norms, which are reported as 50.1 (9.9) and 50.0 (10.0) for the physical and mental components,³⁷ participants had significantly poorer physical and mental health status scores ($P < 0.01$). The most common primary diagnosis for these patients was musculoskeletal sprain (34%) and rotator cuff tear or tendonitis (30%). Of the sample, 67% reported existing chronic shoulder-related conditions, 44% had previously undergone physical therapy for shoulder-related conditions, and 73% had taken medications for shoulder-related problems. A small number (16%) underwent shoulder surgery during the study, 40% started a new regimen of physical therapy, and 45% began a new course of medications for their shoulder problems.

Missing Data

Of the 199 study participants, 122 (61%) had complete FLEX-SF data at the end of the study. Incomplete data were primarily the result of participant failure to mail back completed surveys. Although our response rate could have been higher, it exceeded the 47% average response rate found for mail surveys reported by Yu and Cooper in a meta-analysis.⁴⁰ To better understand the nature of the missing data, we

assessed whether participants with complete and incomplete data differed on their demographic and clinical variables using *t* tests for continuous variables and chi-squared tests for categorical data. We considered tests with associated *P* values larger than 0.20 as evidence of no difference. Results indicated that participants with complete data did not differ from those with incomplete data on baseline shoulder function, physical and mental health status, the existence of chronic shoulder conditions, previous shoulder surgery, previous physical therapy, previous medications for shoulder problems, surgery during the study, physical therapy during the study, or a new course of medications during the study ($P > 0.20$ for all). Comparisons of participants with complete and incomplete data did indicate differences on gender, age, and outcome expectancies ($P < 0.20$ for all). Specifically, participants with complete data were more likely to be female, were 10 years younger on average, and reported 1 point lower outcome expectancies (on a 0- to 18-point scale).

Univariate Analyses

The univariate analyses revealed that the following variables did not demonstrate a relationship to changes in shoulder function: age ($P = 0.95$), gender ($P = 0.96$), physical health status ($P = 0.74$), mental health status ($P = 0.74$), primary diagnosis ($P = 0.72$), previous physical therapy ($P = 0.87$), previous shoulder surgery ($P = 0.95$), prior uses of medications for shoulder-related conditions ($P = 0.31$), physical therapy during study ($P = 0.46$), and new medications during study ($P = 0.50$). Variables that did demonstrate a relationship to changes in shoulder function included outcome expectancies ($P = 0.001$), preexisting chronic shoulder conditions ($P = 0.01$), and surgery during the study ($P < 0.001$).

Univariate analyses revealed that the following variables did not demonstrate a relationship to expectancy fulfillment: gender ($P = 0.63$), physical health status ($P = 0.46$), mental health status ($P = 0.42$), diagnosis ($P = 0.42$), existing chronic conditions ($P = 0.40$), previous physical therapy ($P = 0.74$), previous medications ($P = 0.60$), surgery during the study ($P = 0.84$), physical therapy during study ($P = 0.46$), and start of a new course of medications during the study ($P = 0.30$). Variables that did demonstrate a univariate relationship to expectancy fulfillment included age ($P = 0.06$), outcome expectancies ($P < 0.001$), shoulder function changes ($P < 0.001$), and previous surgery ($P = 0.10$).

Outcome Expectancies and Functional Changes

Means and standard deviations for the continuous variables included in the multivariate models are presented in Table 1. Results of the full general linear model examining variables related to changes in shoulder function are presented in Table 2. Three-month shoulder function was the dependent variable, and independent variables were baseline

TABLE 1. Sample Characteristics

Variables	Mean (SD) for Continuous Variables Percentage for Categorical Variables
Demographics	
Age (yr)	51.6 (15.7)
Gender (% female)	47%
Health status	
Physical Health Status (PCS)	39.0 (8.6)
Mental Health Status (PCS)	45.6 (9.5)
Clinical features	
Diagnoses	
Arthritis	11%
Dislocation	16%
Nerve injury	5%
Rotator cuff	30%
Sprain	34%
Other	4%
Existing chronic condition	67%
Previous physical therapy	44%
Previous shoulder surgery	35%
Previous medications	73%
Surgery	16%
Physical therapy	40%
New course of medications	45%
Patient self-report variables	
Baseline shoulder function	26.2 (5.4)
Three-month shoulder function	29.6 (7.9)
Expectancy fulfillment	11.4 (4.7)
Outcome expectancies	11.7 (4.3)
Shoulder function changes	3.4 (7.5)

Note: PCS and MCS scores range from 0 to 100 with higher scores indicating better physical and mental health. Shoulder function was assessed with the Flexilevel Scale of Shoulder Function (FLEX-SF) with scores ranging from 1 to 50 and higher scores indicating better function. Expectancy fulfillment and outcome expectancies were measured using the Patient Shoulder Expectancy Fulfillment (PSEF) and Patient Shoulder Outcome Expectancies (PSOE) measures, respectively. Scores on both expectancy measures ranged from 0 to 18, with higher scores indicating greater expectancy fulfillment and more positive expectancies, respectively.

shoulder function, outcome expectancies, preexisting chronic shoulder conditions, and surgery during study. A total of 117 patients were included in this analysis. Results indicated that the independent variables and covariates in the full model accounted for a substantial amount of variance (adjusted $R^2 = 0.42$) in 3-month shoulder function. Interpretation of the coefficients revealed that patients with better shoulder function at baseline and higher outcome expectancies reported better 3-month shoulder functioning. Patients who did not receive surgery during the study and those who did not have

preexisting chronic shoulder conditions reported significantly higher functioning at 3 months. The variability in shoulder function at 3 months accounted for by baseline shoulder function was 17%, outcome expectancies was 10%, preexisting chronic shoulder conditions was 5%, and surgery during the study was 10%.

To better understand the effect of outcome expectancies on functional changes, we created 2 groups of patients. One group expected that their shoulder would get better (PSE scores greater than or equal to 10, $n = 72$). The other group expected that their shoulder would get worse or stay the same (PSE scores less than 10, $n = 45$). The high expectancy group's shoulder function score increased 5.06 (± 6.2) points over the study, whereas the low expectancy group's score increased 0.49 (± 8.3) points. This difference in score improvement was greater than the minimal clinically important difference for the FLEX-SF, indicating the change difference was clinically important.

Outcome Expectancies, Functional Changes, and Expectancy Fulfillment

To better understand determinants of expectancy fulfillment, we calculated a full general linear model with expectancy fulfillment, as measured by the PSEF, as the dependent variable. The independent variables included age, baseline to 3-month shoulder function changes, outcome expectancies, previous surgery for shoulder problems, and the interaction between shoulder function changes and outcome expectancies. Data from 105 participants were used in this analysis. Results from the initial model (with the interaction term) revealed that the interaction term was not statistically significant ($P = 0.21$, partial eta-squared = 0.02); therefore, we dropped the interaction term from the model and assessed a restricted model. Results from this restricted model are presented in Table 3. As the results show, functional changes and outcome expectancies significantly predicted expectancy fulfillment. The coefficients indicate that larger function changes and more positive outcome expectancies related to greater perceptions of expectancy fulfillment. Age and previous shoulder surgery were not significantly related to expectancy fulfillment in the multivariate model.

The set of predictors accounted for 25% of the total variance in expectancy fulfillment. Partial eta-squared values indicated that outcome expectancies accounted for the greatest amount of variability in expectancy fulfillment (11%). Shoulder changes accounted for approximately 6% of the variance, and age and previous surgery each accounted for less than 1% of the variance.

DISCUSSION

Our findings imply that outcome expectancies play an important role in symptom improvement. Specifically, we found that higher outcome expectancies are associated with

TABLE 2. General Linear Model With 3 Month Shoulder Function as Dependent Variable

Independent Variables	Coefficient	Standard Error	t Value	P Value	Partial Eta-Squared
Intercept	3.26	3.57	0.91	0.36	0.01
Baseline shoulder function	0.54	0.12	4.64	<0.001	0.17
Outcome expectancies	0.46	0.14	3.19	0.002	0.10
Preexisting chronic shoulder condition	3.23	1.39	2.33	0.02	0.05
Surgery during study	6.76	1.71	3.96	<0.001	0.13
Sample size	117				

Note: The coefficients for preexisting chronic conditions and surgery during study represent the effects of no existing chronic conditions and no surgery, respectively.

greater perceived improvements in shoulder function. These results are consistent with Social Learning Theory, which emphasizes the role of outcome expectancies on outcomes,^{1,2} and with other studies that have reported that expectancies are predictive of symptom changes.^{10,12,19,20} Furthermore, we found that expectancy fulfillment is uniquely influenced by patients' functional changes and outcome expectancies, and that outcome expectancies account for almost twice the amount of variance in expectancy fulfillment compared with functional changes. We found no evidence to support that an interaction between functional changes and outcome expectancies predicts expectancy fulfillment. The lack of evidence for the interaction's effect on expectancy fulfillment stands in contrast to what we expected from Fulfillment Theory, which posits that expectancy fulfillment is the agreement between outcome expectancies and functional changes.²³⁻²⁵

The finding that outcome expectancies influence functional improvements has several implications for researchers and clinicians. The results emphasize the importance of psychologic factors in biologic outcomes. If we want to develop interventions that will maximize functional improvements, we should devise interventions that address both biologic and psychologic aspects of health. Given the results of this study and others,^{7-10,30} it could be that psychologic

interventions should focus on outcome expectancies. Our findings do not inform about the content of such interventions, however. Should interventions attempt to align patient expectancies with those of clinicians or some other referent group? Should they attempt to heighten baseline expectancies regardless of baseline values? Further thought and empiric research is needed to define how outcome expectancies could be manipulated in ways that are ethical, effective, and in the best interest of patients.

A clinical implication of our study relates to the patient-physician relationship. In this era of relationship-centered care and partnership-building between physicians and patients,⁴¹⁻⁴³ our findings highlight the need for patient-physician discussions about patients' outcome expectancies. Research has shown that when patients actively participate in decisions related to their care, they have better outcomes, adhere more closely to recommendations, and are more satisfied.⁴⁴⁻⁴⁶ Our results suggest that discussions between patients and their physicians regarding the patients' outcome expectancies could be an effective method for increasing patients' active participation. Because many treatment options are available for treating shoulder problems,³⁰⁻³⁵ patients' active participation in treatment discussions is particularly important.

TABLE 3. Full General Linear Model Results With Expectancy Fulfillment as Dependent Variable

Independent Variables	Coefficient	Standard Error	t Value	P Value	Partial Eta-Squared
Intercept	5.56	2.04	2.73	0.007	0.07
Age (yr)	0.03	0.03	1.07	0.29	0.01
Baseline to 3-month shoulder function change	0.14	0.06	2.59	0.01	0.06
Outcome expectancies	0.35	0.10	3.55	0.001	0.11
Previous shoulder surgery	-0.24	0.81	-0.30	0.77	0.001
Sample size	105				

Note: The coefficient for previous shoulder surgery represents the effect of no surgery.

Our finding that outcome expectancies and symptom changes, but not their interaction, predict expectancy fulfillment begins to inform about determinants of expectancy fulfillment. Because, by definition, expectancy fulfillment denotes the match between expectancies and occurrences,²³ the interaction between the variables was expected to predict expectancy fulfillment. We did find that higher expectancies predicted greater expectancy fulfillment and that larger function changes predicted greater expectancy fulfillment. A possible explanation for our findings might be that expectancy fulfillment is a positive perception that requires positive expectancies and positive events and that negative expectancies will not lead to expectancy fulfillment, even if those expectancies are met. Because so few health services research studies have examined determinants of expectancy fulfillment, this finding will hopefully encourage more research in the area. Given that the link between expectancy fulfillment and satisfaction has been demonstrated in past research^{11,26,27} and patient satisfaction is often a primary goal of therapy, understanding determinants of expectancy fulfillment deserves further study.

Certain limitations of our study should be taken into account when interpreting our results. We recruited patients from only one physician's practice, standardizing treatment and physician characteristics across patients. However, the generalizability of our findings to other physicians is unknown. Furthermore, our participants reported poorer physical and mental health compared with the general population. Future studies examining outcome expectancies, functional outcomes, and expectancy fulfillment with healthier populations is needed. Our 61% response rate is also a limitation. Those participants who completed our study were younger, more likely to be female, and reported slightly lower outcome expectancies. This study should therefore be replicated to help determine the generalizability of our findings. Another limitation is that all of our data were from patient self-report. Although self-report is necessary for assessing outcome expectancies and expectancy fulfillment, a stronger design would have included more objective measures of shoulder function.

The development and testing of outcome expectancies and expectancy fulfillment measures is a critical step toward understanding these variables.^{3,4} A limitation of our study was that we used measures created in the context of our study. A stronger design would have been to use measures developed and tested in prior studies and crossvalidate the measures' psychometric properties in the current sample. Studies designed to fully develop the outcome expectancy and expectancy fulfillment constructs and, subsequently, to develop measures of these constructs would be beneficial. In fact, most previous studies examining outcome expectancies have used underdeveloped measures of expectancies such as single-item measures^{9,11} and lists of expectancies from open-

ended questions.⁸ Many have only assessed expectancies indirectly.^{11,28,47}

Robert DeVos is quoted as saying, "Life...It tends to respond to our outlook, to shape itself to meet our expectations." The findings of our present study suggest that, at least with regard to shoulder functioning, DeVos' emphasis on the role of outcome expectancies in predicting outcomes is correct. If we want to improve patients' outcomes, we must not forget to pay attention to their outcome expectancies.

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Appendix A. Items and Response Options for the Patient Shoulder Expectancy Fulfillment (PSEF) and Patient Shoulder Outcome Expectancies (PSOE) Measures

Item	Response Options
Patient Shoulder Expectancy Fulfillment (PSEF)	
1. My expectations for my shoulder problem overall were perfectly met.	Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree
2. My expectations for my shoulder <i>pain</i> were perfectly met.	Same options
3. My expectations for my ability to <i>move and use</i> my shoulder were perfectly met.	Same options
Patient Shoulder Outcome Expectancies (PSOE)	
1. Compared with now, I think my shoulder problem overall <i>next month</i> will be	Much worse Worse A little worse The same A little better Better Much better
2. Compared with now, I expect my shoulder <i>pain</i> next month will be	Same options
3. Compared with now, I expect my ability to <i>use and move</i> my shoulder next month will be	Same options