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# Does how you do depend on how you think you'll do? A systematic review of the evidence for a relation between patients' recovery expectations and health outcomes

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## Abstract

**Background:** Most clinicians would probably agree that what patients think will happen can influence what does happen over the clinical course. Yet despite useful narrative reviews on expectancy of therapeutic gain and the mechanisms by which expectancy can affect health outcomes, we were unable to locate a systematic review of the predictive relation between patients' recovery expectations and their health outcomes.

**Methods:** We searched MEDLINE for English-language articles published from 1966 to June 1998 with a title or abstract containing at least 1 of the medical subject headings (MeSH) "self-assessment," "self-concept" or "attitude to health," or the MeSH subheading "psychology," and at least 1 word from each of 3 sets: "patient" and similar words; a form of "expectation," "belief" or "prediction"; and a form of "recover," "outcome," "survival" or "improve." Relevant articles contained original research data, measured patients' recovery expectations, independently measured a subsequent health outcome and analyzed the relation between expectations and outcomes. We assessed internal validity using quality criteria for prognostic studies based on 6 categories (case definition; patient selection; extent of follow-up; objective outcome criteria; measurement and reporting of recovery expectations; and analysis).

**Results:** A total of 1243 titles or abstracts were identified through the computer search, and 93 full-text articles were retrieved. Forty-one of these articles met the relevance criteria, along with 4 additional articles identified through other means. Agreement beyond chance on quality assessments of 18 randomly selected articles was high ( $\kappa = 0.87$ ,  $p = 0.001$ ). Sixteen of the 45 articles provided moderate-quality evidence and included a range of clinical conditions and study designs; 15 of the 16 showed that positive expectations were associated with better health outcomes. The strength of the relation depended on the clinical conditions and the measures used.

**Interpretation:** Consistency across the studies reviewed and the evidence they provided support the need for clinicians to clarify patients' expectations and to assist them in having appropriate expectations of recovery. The understanding of the nature, extent and clinical implications of the relation between expectations and outcomes could be enhanced by more conceptually driven and methodologically sound research, including evaluations of intervention effectiveness.

Clinicians have long been aware of the placebo effect<sup>1</sup> and of the influence of patient expectations in psychotherapy.<sup>2</sup> Patient psychological factors, including expectation of outcome, have been found to be crucial to the success of rehabilitation<sup>3</sup> and linked to levels of postoperative pain and recovery.<sup>4</sup> On the basis of such evidence, most clinicians would probably agree that what patients think will happen (their recovery expectations) can influence what actually happens (their health outcomes).

Yet despite useful narrative reviews on expectancy of therapeutic gain<sup>5</sup> and the mechanisms by which expectancy can affect outcomes,<sup>6</sup> we were unable to locate a systematic review of the predictive relation between patients' recovery expectations and subsequent health outcomes. In this article we report on such a review we conducted using accepted procedures for locating, selecting and evaluating the quality of evidence.<sup>7</sup> We summarize qualitatively the results of studies in the medical literature that provide at least moderate-quality evidence, comment on approaches to utilization of existing evidence and suggest fruitful research avenues.

## Methods

We searched the MEDLINE database for English-language articles published from 1966 to June 1998 that contained in the title or abstract each of the following: (a) at least 1 of "patient," "survivor," "client," "self-," "subject," "participant" or "outpatient"; (b) a form of at least 1 of "expectation," "belief" or "prediction"; and (c) a form of "recover," "outcome," "survival" or "improve." In addition, the word from (a) had to appear within 4 words of the word from (b), and the citation had to have at least 1 of the medical subject headings (MeSH) "self-assessment," "self concept" or "attitude to health" or the MeSH subheading "psychology." The titles

and abstracts identified by this search strategy were perused by one of us (M.V.M.) to determine whether the articles contained original research results (i.e., were primary studies), measured patients' recovery expectations, independently measured a health outcome at a later point and analyzed the relation between these measures. If these relevance criteria were all met or there was some uncertainty as to whether they were met, the full-text article was obtained. A few additional relevant articles were identified through other means (e.g., reference lists, suggestions by colleagues). A review of the full articles by 2 of us (M.V.M. and D.C.C.) permitted consensus agreement on the application of the relevance criteria. We subsequently conducted a parallel search of the PsychInfo database, which unearthed equivalent numbers of potentially relevant abstracts. We decided not to pursue retrieval and inclusion of them for this report because the abstract contents corroborated the findings from our MEDLINE search.

A quality assessment modelled after approaches described elsewhere<sup>8,9</sup> was used to assess the internal validity of the identified studies (Table 1). To be considered as providing moderate-quality evidence, the studies had to have a follow-up of 80% of the total sample, have outcome criteria appropriate to the research question, clearly describe the instrument used to measure recovery expectations, and have a stratified analysis, adjustment for a single confounder or presentation of data in a manner that would allow analysis of subsets. One of us (M.V.M.) assessed the validity of each of the selected articles. Another (D.C.C.), who was blind to

**Table 1: Criteria used to assess internal validity and strength of evidence of identified studies**

Criterion	Score	Criterion	Score
<b>Case definition</b>			
Operational definition of cases including exclusion criteria	2	Cross-sectional study, or follow-up of < 80% of total sample	1
Operational definition of cases but no exclusion criteria	1*	Follow-up unclear or inadequate information to judge criterion	0
No explicit definition of cases or inadequate information to judge criterion	0†	<b>Outcome</b>	
<b>Patient selection</b>			
Controlled trial with evidence that experimental manipulation of recovery expectations was effective (e.g., experimental group had higher recovery expectations than control group)	3	Patient-reported or blinded outcome criteria appropriate to the research question, with potential for replicability of ≥ 1 outcome	1*
Inception cohort defined in relation to: acute conditions (within 2 wk of precipitating event [e.g., fracture, myocardial infarction]); chronic conditions (within 2 wk of diagnosis); and initial elective treatment (before start of treatment)	2	Outcome criteria appropriate to the research question	0†
Survival cohort, with common starting point relative to onset of condition or with statistical analysis that addresses various starting points or history (e.g., stratified analysis or statistical adjustment)	1*	<b>Recovery expectations</b>	
Survival cohort, with various starting points or history, but no statistical adjustment, or inadequate information to judge criterion	0†	Clear description of instrument used to measure recovery expectations (e.g., questions, response categories), with reporting of recovery expectations data (e.g., raw data, descriptive statistics)	2*
<b>Follow-up (extent and length)</b>			
Follow-up of ≥ 80% of total sample to 1 year from the measurement of recovery expectations	3*	Clear description of instrument used to measure recovery expectations (e.g., questions, response categories), without reporting of recovery expectations data	1†
Follow-up of ≥ 80% of total sample for duration of treatment or up to 1 year from the measurement of recovery expectations. Alternatively, patient's followed up for various lengths of time (some > 1 yr)	2†	Measurement of recovery expectations not described in sufficient detail	0
		<b>Analysis</b>	
		Statistical adjustment for multiple prognostic factors (e.g., by use of Mantel-Haenzel or appropriate multivariate technique)	2*
		Stratified analysis, adjustment for a single confounder or presentation of data in a manner that would allow for analysis of subsets	1†
		No statistical consideration given to other prognostic factors	0

\*Minimum level required to be judged as providing strong evidence.

†Minimum level required to be judged as providing moderate evidence.

the assessment of the first author, independently evaluated 18 randomly selected articles for quality of evidence. Agreement beyond chance between assessors on a dichotomous classification of moderate versus weak quality was calculated using Cohen's kappa statistic.<sup>10</sup> The second reviewer subsequently assessed the validity of all the articles deemed by the first author as having provided moderate-quality evidence. Disagreements in assessments of quality of evidence at this stage were resolved by consensus.

Substantial differences in conditions, questions, outcomes and analytic strategies prevented more formal quantitative summation of effect sizes. Qualitative interpretation of effect sizes was done in keeping with Cohen's approach.<sup>11</sup> Synthesis thus relied on the qualitative approach of reflecting on commonalities and differences, and on linking with conceptual work and research findings.<sup>12</sup>

## Results

The MEDLINE search identified 1243 titles and abstracts, and 93 full-text articles were retrieved. Forty-one of these articles met the relevance criteria, along with 4 additional articles identified by other means. Agreement beyond chance between the 2 reviewers on quality assessments of the randomly selected articles produced a kappa value of 0.87 (17 of 18 studies,  $p = 0.001$ ). Although weak studies provided a wider range of interesting examples of expectations predicting outcomes, they raised sufficient validity concerns that we elected not to rely on them further (the list and quality assessments of these 29 articles are available from the authors upon request). The lack of statistical control for the effects of other potential prognostic factors (e.g., severity of condition) either through stratified or multivariate analysis was the most common weakness (19 of the 29 studies). Incompleteness of follow-up or cross-sectional character (6 studies) and unclear descrip-

tions of the measurement of recovery expectations (5 studies) were the other weaknesses; 8 weak studies had more than one problem. Sixteen articles were deemed by both reviewers to provide evidence of at least moderate quality (Table 2). Although each study presented different strengths and weaknesses, the lack of exclusion criteria in case definition, the reliance on survival cohorts, the limited duration of follow-up and the limited reporting of data on recovery expectations were the most common problems that prevented an assessment of strong evidence in these 16 studies.

Table 3 describes the questions, results and effect sizes for the different clinical conditions in the 16 studies that provided moderate-quality evidence. Fifteen of the studies were observational, and 1 was experimental.<sup>15</sup> Myocardial infarction was the most commonly studied condition (in 3 of the studies);<sup>13,17,25</sup> the next most commonly studied conditions were cardiac surgery,<sup>18,22</sup> chronic pain<sup>14,26</sup> and psychiatric conditions<sup>15,27</sup> (each in 2 studies). Only 2 studies shared a common question regarding expectations (anticipation of postoperative pain on a scale ranging from "not at all" to "extremely").<sup>16,23</sup> Studies tended to include a minimum of 1 variable covering at least 2 of the biologic and physiologic, psychological or social domains (e.g., peak creatinine kinase and mental health index in myocardial infarction patients,<sup>25</sup> or Nottingham Health Profile and occupation in prostatectomy cases<sup>6</sup>).

Simultaneous control for the effects of biologic and physiologic variables or of psychological or social variables<sup>6,13,15-17,19,22,25</sup> usually had little effect on the strength of the relation between expectations and outcome, which indicated an independent influence of recovery expectations on health outcomes. Maximum effect sizes within a study

**Table 2: Validity assessment scores for articles providing evidence of moderate quality**

Study	Criterion; score					
	Case definition	Patient selection	Follow-up	Outcome	Recovery expectations	Analysis
Diederiks et al, 1983 <sup>12</sup>	2	2	2	1	2	2
Sandstrom et al, 1986 <sup>13</sup>	2	1	3	1	1	2
Hansson et al, 1987 <sup>14</sup>	1	3	2	1	2	2
Jamison et al, 1987 <sup>15</sup>	1	2	2	1	1	2
Maeland et al, 1987 <sup>16</sup>	2	2	2	1	1	2
Allen et al, 1990 <sup>17</sup>	2	2	2	1	1	2
Major et al, 1990 <sup>18</sup>	2	2	2	1	1	2
Carver et al, 1991 <sup>19</sup>	2	0	3	1	2	2
Borkan et al, 1992 <sup>20</sup>	2	2	2	1	1	2
Ruiz et al, 1992 <sup>21</sup>	1	1	2	1	1	2
Flood et al, 1993 <sup>6</sup>	1	0	3	1	2	2
Jamison et al, 1993 <sup>22</sup>	1	2	2	1	1	2
Karlsson et al, 1994 <sup>23</sup>	2	0	2	0	1	2
Petrie et al, 1996 <sup>24</sup>	1	2	2	1	2	2
Galer et al, 1997 <sup>25</sup>	1	0	2	1	2	1
Safren et al, 1997 <sup>26</sup>	2	2	2	1	2	0.5

for differences in recovery expectations, estimable for all but one of the studies, ranged from small (4 of 15 studies) through medium (5 studies) to large (6 studies). Little differentiation in effect size by type of condition was apparent, although smaller effect sizes tended to be more common for psychological conditions (e.g., social phobia), and larger effect sizes for medical conditions (e.g., obesity). Measures of the predictive utility of measurements of recovery expectations were minimal (only 1 study reported on the sensitivity and specificity of a question [68% and 71% respectively], which asked patients with chronic low-back pain to predict the outcome of a vocational rehabilitation program<sup>14</sup>). Estimates of relative risks of a given outcome for various levels of recovery expectations were absent. Emphasis was on statistical inference testing rather than on predictive utility.<sup>28,29</sup>

## Interpretation

The 16 studies providing moderate-quality evidence invoked a variety of explanations for the role of patients' recovery expectations in predicting outcome. Bandura's concept of self-efficacy<sup>30</sup> was the most common theoretical framework (in 4 of 16 articles). Previous experience, vicarious learning, verbal persuasion and social support were all thought to contribute to recovery expectations.<sup>19</sup> Flood and colleagues<sup>6</sup> summarized 5 mechanisms by which expectations can affect outcomes: "triggering of a physiologic response, acting to help motivate patients to achieve better outcomes, conditioning the patient psychologically to observe certain types of symptoms and ignore others, changing the understanding of the disease, or acting in concert with anxiety to heighten or reduce symptoms." Such alter-

**Table 3: Effect of patients' recovery expectations on outcomes for different clinical conditions in studies providing moderate-quality evidence**

Condition	Measure of patients' expectations	Effect of measure	Effect size(s)
Abdominal hysterectomy <sup>22</sup>	Question regarding patients' expectation of pain after surgery (responses measured using 5-point scale ranging from "not at all" to "extremely")	Predictive of postsurgical analgesic use	Medium
Abortion <sup>18</sup>	Ability to engage in 10 post-abortion behaviours, each rated from 0 ("couldn't do it at all") to 10 ("completely sure I could do it")	Predictive of psychological adjustment	Large
Alcoholism <sup>19</sup>	"In all honesty, do you think your problems will be working themselves out all right during the next 6 (2) months?" (responses measured using 4-point scale ranging from "very likely" to "very unlikely")	Predictive of remaining abstinent for the next 6 months	Small
	"In all honesty, what do you think is the likelihood that you can keep from having a single drink, or any other drugs, during the next 2 (6) months?" (responses measured using 4-point scale ranging from "very likely" to "very unlikely")	Not predictive of remaining abstinent for the next 6 months	
	"What are the chances that within the next 2 (6) months you will return to the level of drinking and drug use that you were maintaining before entering treatment?" (responses measured using 4-point scale ranging from "very likely" to "very unlikely")	Not predictive of remaining abstinent for the next 6 months	
Benign prostatic hyperplasia <sup>9</sup>	Question regarding patients' expectations of improvement after surgery (responses measured using 5-point scale ranging from "a lot" to "not at all")	Predictive of symptoms Predictive of feeling better after surgery, over an extended period of time	Small Medium
Cardiac surgery <sup>21</sup>	Single score based on responses to 17 questions regarding patients' confidence in their ability to carry out general activities (responses measured using 11-point confidence scale [0 = not at all, 10 = total confidence])	Predictive of recovery of general activities	Small
Coronary artery bypass surgery <sup>17</sup>	Two self-efficacy scale scores based on confidence to perform intermediate activities of daily living (5 items) and confidence to perform social and leisure activities (5 items) (responses measured using 5-point scale [1 = definitely cannot do, 5 = definitely can do])	Predictive of 6-month physical, social and leisure functional status	Medium
Chronic pain <sup>25</sup>	"How much pain relief do you expect this treatment will give you?" (responses measured using box scale [0 = "no pain relief," 10 = "complete pain relief"])	Not significantly correlated with subsequent ratings of pain relief	Small
Hip fracture <sup>20</sup>	Ethnographic interview designed to elicit descriptions of expectations of recovery (responses separated into 3 categories: full recovery, partial recovery and don't know)	Predictive of recovery of ambulation	Could not be determined

Table 3 continued

Condition	Measure of patients' expectations	Effect of measure	Effect size(s)
Laparoscopic surgery <sup>15</sup>	4 items measuring anticipation of pain, physical discomfort, weakness and disorientation following surgery (responses measured on scale ranging from "not at all" to "extremely")	Accounted for significant proportion of the variance in psychological and physical reactions	Large
Low-back pain <sup>13</sup>	"I am afraid to start working again, because I don't think I will be able to manage" (responses measured using 7-point Likert scale)	Differentiated between those at work or work training and those still off work 1 year after treatment Differentiated between patients sick listed* more than and those sick listed less than 6 months during the fourth year	Medium Large
Myocardial infarction <sup>24</sup>	Illness perception scales used to assess time-line (e.g., "My heart problems will last a long time"), consequences (e.g., "My illness will have major consequences for my life") and cure or control (e.g., "My treatment will be effective in curing my illness"); 3-6 questions used for each scale (responses measured using 5-point scale ranging from strongly agree to strongly disagree)	Differentiated between patients who did and those who did not return to work within 6 weeks (time-line and consequences measures) Accounted for 4%-20% of the variance in 4 Sickness Impact Profile subscales measured at 3 and 6 months	Medium Small to medium
Myocardial infarction <sup>16</sup>	Four scales derived from a 29-item questionnaire measuring patient's perceived consequences of the myocardial infarction for future functioning (reduced autonomy, reduced physical ability, reduced work capacity and reduced emotional stability)	Predictive of work status at 6 months	Medium to large
Myocardial infarction <sup>12</sup>	Measure based on a presumption that the patient has a fair chance of returning to work in the future. Scored on 2-point scale (0 = pessimistic, 1 = optimistic)	Predictive of exercise tolerance and return to work 1 year after myocardial infarction	Large
Obesity <sup>23</sup>	"What are your chances of succeeding with this program, i.e., really losing weight without regaining?" (responses measured on scale ranging from 0% (no chance at all) to 100% (will definitely succeed))	Predictive of maximum weight loss	Large
Psychiatric conditions <sup>14</sup>	"How do you think you will feel at the end of hospital treatment compared with how you feel now?" (responses measured using 7-point scale ranging from "much better" to "much worse")	Predictive of global improvement and symptoms	Medium
Social phobia <sup>26</sup>	Four items measured credibility of treatment and 9 items measured confidence in treatment efficacy. Each item scored on 10-point scale (higher scores = more confident, logical, successful, etc.)	Accounted for significant variance in post-treatment severity of social phobia	Small

\*Listed as "off work" on Scandinavian register.

native explanations are consistent with evidence that feelings and perceptions may profoundly affect biological disease processes through behavioural and nonbehavioural mechanisms.<sup>31,32</sup> Studies in psychoneuroimmunology and psychoneuroendocrinology have documented mechanisms by which negative-affect states, and the experiences that cause them (e.g., recovery slower or less complete than one expects), can translate into pathogenetic processes.<sup>33-36</sup> Hence "recovery disappointment" may act through mind-body pathways and result in less than optimal outcomes across illness or injury processes.

Most authors suggested ways to apply their research; for example, patients who expect complications should be "targeted for psychological support and patient education prior to surgery,"<sup>16</sup> and the assessment of illness perceptions may help to identify which patients "may benefit

from another intervention before attending a rehabilitation programme."<sup>25</sup> Uncertainty about the causal versus the predictive role of patients' recovery expectations, hesitation in deliberately manipulating expectations, and limited rigorous evaluation of interventions to modify expectations (in 1 of the studies we reviewed) may limit such suggestions. Yet the consistency across studies and the supporting body of corroborative evidence argue for more confidence in the research findings. While avoiding the generation of false hopes and assisting patients with appropriate recovery expectations, physicians may improve adherence to treatment regimens and foster patient behaviours that "not only require positive motivation but also the knowledge and skills to pursue the desired goals."<sup>17</sup>

Considerable scope exists for improving the validity and utility of research into the effect of recovery expectations

on health outcomes. Ways to achieve this could include working toward a core set of reliable and valid measures of recovery expectations, bearing in mind that "the best prediction of outcome would be an expectancy-measure whose domain of behaviour matches that of the outcome";<sup>17</sup> including such measures in prognostic models<sup>37-40</sup> while articulating better the effect size associated with such measures for clinical audiences;<sup>8,41,42</sup> and incorporating such measures into trials that treat recovery expectations as an intermediate variable, measured at baseline and modified through interventions. Such research should improve treatment recommendations for effective methods of fostering more positive recovery expectations and of ultimately improving patient health outcomes.

*Competing interests:* None declared.

*Contributors:* Drs. Mondloch and Cole were responsible for the concept and design of the study, the analysis and interpretation of the data, and the writing and revising of the manuscript; Dr. Mondloch was also responsible for data collection. Dr. Frank was responsible for the design of the study, the analysis and interpretation of the data, and the revising of the manuscript.

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