

# Optimizing Patients' Expectations: Description of a Brief Preoperative Intervention for Patients Undergoing Coronary Artery Bypass Graft Surgery

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## Keywords

Expectations · Placebo effect · Coronary bypass surgery · Psychological intervention · Clinical trial

## Summary

**Background:** Patients' expectations are considered to be important mechanisms in psychotherapeutic and medical treatments and play a crucial role in recovery. Therefore, a short preoperative psychological intervention targeting patients' expectations was developed to facilitate patients' recovery after heart surgery. This article describes the short psychological intervention (EXPECT) and reports patients' evaluation of the intervention. **Patients and Methods:** 124 heart surgery patients were randomized and assigned to 1 of 3 interventions: a) optimizing expectations, b) supportive therapy, or c) standard medical care only. The expectation intervention incorporated 2 sessions in person and 2 telephone calls to systematically optimize behavior- and treatment-related outcome expectations. Subsequently, patients evaluated the intervention using questionnaires. Mean scores were calculated. **Results:** Patients' satisfaction regarding both interventions was rated high to very high on average. Patients undergoing the expectation intervention felt better informed and expected a more positive recovery process compared to the supportive-therapy group. Most patients rated the interventions as being helpful and expected more positive outcomes due to the interventions, which was supported by the longitudinal study results. Preoperative psychological interventions might be a reasonable add-on in the treatment of heart surgery patients. **Conclusions:** Optimizing patients' behavior- and treatment-related outcome expectations prior to surgery can contribute to more positive treatment outcomes. Such psychological interventions are well accepted by patients and feasible for use in heart surgery settings. Fostering positive expectations and altering negative baseline expectations should be considered in both psychotherapy and treatment of heart surgery patients.

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To enhance readability, only the male form is used throughout this article. However, this always includes both male and female persons.

## Schlüsselwörter

Erwartungen · Placeboeffekt · Koronare Bypass-Operation · Psychologische Intervention · Klinische Studie

## Zusammenfassung

**Hintergrund:** Patientenerwartungen gelten als wichtige Wirkmechanismen bei psychotherapeutischen und medizinischen Behandlungen und spielen für die Genesung eine große Rolle. Vor diesem Hintergrund wurde eine psychologische präoperative Kurzintervention zur Erwartungsoptimierung entwickelt, um den Genesungsprozess nach Herzoperationen positiv zu beeinflussen. Dieser Artikel beschreibt die psychologische Kurzintervention (EXPECT) und stellt Evaluationsergebnisse der Intervention aus Patientensicht dar. **Patienten und Methoden:** 124 herzchirurgische Patienten wurden randomisiert und einer von drei Interventionen zugeteilt: a) Erwartungsoptimierung, b) supportive Therapie oder c) ausschließlich medizinische Standardbehandlung. In der Erwartungsintervention, die 2 Sitzungen und 2 Telefonate vor der Operation umfasst, wurden systematisch verhaltens- und behandlungsbezogene Ergebniserwartungen optimiert. Die Patienten wurden mithilfe von Fragebögen zu ihrer Zufriedenheit mit der Intervention befragt. Mittelwerte wurden berechnet. **Ergebnisse:** Die Zufriedenheit der Patienten mit beiden psychologischen Interventionen war im Mittel hoch bis sehr hoch. In der Erwartungsinterventionsgruppe fühlten sich die Patienten noch besser informiert und erwarteten einen positiveren Heilungsverlauf als die Patienten, die eine supportive Therapie erhielten. Ein Großteil der Patienten erlebte die Interventionen als hilfreich und erwartete durch diese positivere Ergebnisse, was sich auch im längsschnittlichen Verlauf bestätigte. Somit können präoperative Interventionen bei herzchirurgischen Eingriffen das bestehende Behandlungsangebot sinnvoll erweitern. **Schlussfolgerungen:** Die Optimierung von verhaltens- und ergebnisbezogenen Patientenerwartungen vor der eigentlichen Intervention kann zu einer Verbesserung von Behandlungsergebnissen beitragen. Eine solche psychologische Intervention wird gut angenommen und ist im Rahmen eines herzchirurgischen Settings durchführbar. Die Förderung positiver Erwartungen und die Veränderung ungünstiger Ausgangserwartungen von Patienten sollten sowohl bei psychotherapeutischen als auch bei herzchirurgischen Behandlungen stärker berücksichtigt werden.

## Theoretical Background

The relevance of patient expectations in the treatment of both mental and physical illnesses is becoming increasingly apparent from placebo research [Rief and Glombiewski, 2016; Rief et al., 2017]. Approaches to the systematic use of this knowledge, however, are still rare [Enck et al., 2013]. Medical treatment effects combine both specific and non-specific factors. The active pharmacological ingredient of a drug, for example, can be a specific factor, whereas non-specific factors (e.g., patient expectations of the treatment outcome) are crucial for placebo effects. Expectations are considered one of the most important mechanisms of placebo effects, along with doctor-patient interaction and conditioning processes [Schedlowski et al., 2015]. Placebo effects influence not only subjective dimensions (e.g., quality of life), but also objective ones, such as immune parameters [Schedlowski et al., 2015]. Indeed, much of the efficacy of antidepressants is based on the placebo effect [Kirsch, 2016; Shedden-Mora et al., 2011].

Patient expectations also predict the treatment outcome of psychotherapeutic interventions [Constantino et al., 2011] and are considered one of the most important common factors in psychotherapy [Wampold, 2015; Wampold et al., 2005]. For example, a patient is likely to benefit from psychotherapeutic treatment only if he generally expects a change in his current situation based on a credible explanation of his problems (e.g., a comprehensible disease model). More specifically, psychotherapy is only considered likely to succeed if a patient expects his therapist to help him and that the interventions to be performed will be helpful, and if the patient believes that, in the long run, he will be able to positively influence his own problems [Wampold, 2015].

Even with very invasive medical procedures such as coronary artery bypass graft (CABG) surgery, treatment outcomes do not depend solely on surgical skills or medical factors [Hawkes et al., 2006; Jonas et al., 2015]. Studies show that psychological factors also play an important role in the recovery and postoperative quality of life of cardiac patients [Hawkes et al., 2006; Auer et al., 2016]. Already preoperatively, positive expectations independent of medical risk factors (e.g., heart pump function) are important predictors of a superior quality of life, less depression, and less disability after a bypass surgery [Juergens et al., 2010]. This relationship between preoperative expectations and postoperative quality of life – irrespective of the type of surgery and disease severity – was also established in a meta-analysis [Auer et al., 2016]. More optimistic attitudes, i.e., generalized positive outcome expectations, are associated with lower rehospitalization rates after bypass surgery [Scheier et al., 1999], and actually predict long-term survival rates in cardiac patients [Barefoot et al., 2011]. Because heart disease is one of the most common causes of restricted quality of life, disability, and mortality worldwide, and is extremely costly for the health system [Murray and Lopez, 2013; Go et al., 2014], optimizing expectations seems very relevant, with the goal of improving treatment outcome after bypass surgery, irrespective of the medical factors.

Preoperative psychological interventions make it possible to change risk factors, to improve physical fitness and knowledge

about one's disease [Furze et al., 2009], and to change expectations [Broadbent et al., 2009a]. However, the overall effectiveness of preoperative interventions in cardiac surgery patients has not yet been fully elucidated [Guo, 2015], and there are so far hardly any studies that have attempted to optimize specific preoperative expectations in cardiac surgery patients.

In the context of the PSY-HEART study (Psychological Intervention for Cardiac Patients), therefore, a short preoperative psychological intervention was developed, with the primary goal of improving the healing process by optimizing patient expectations [Laferton et al., 2013]. The results of the study were recently published, showing that patients benefited from this additional preoperative psychological intervention in that they were less impaired 6 months after surgery (compared to patients who received only standard medical care), reported a higher quality of life, and even exhibited lower inflammatory parameters than patients in the standard treatment condition [Rief et al., 2017]. It was also possible to reduce the physiological stress response after surgery [Salzmann et al., 2017] and to shorten the length of hospital stay [Auer et al., 2017]. The expectation-optimizing intervention was also superior to an active supportive control group with respect to mental quality of life and ability to work [Rief et al., 2017]. Thus, the manipulation of expectations was considered successful, since, for example, personal control expectation – the expectation of being able to influence one's own heart disease – was significantly higher after the expectation-optimizing intervention than at the baseline measurement [Rief et al., 2017].

In this article, the expectation-optimizing intervention and its development are described in greater detail, and patients' satisfaction with the preoperative psychological interventions is presented and discussed.

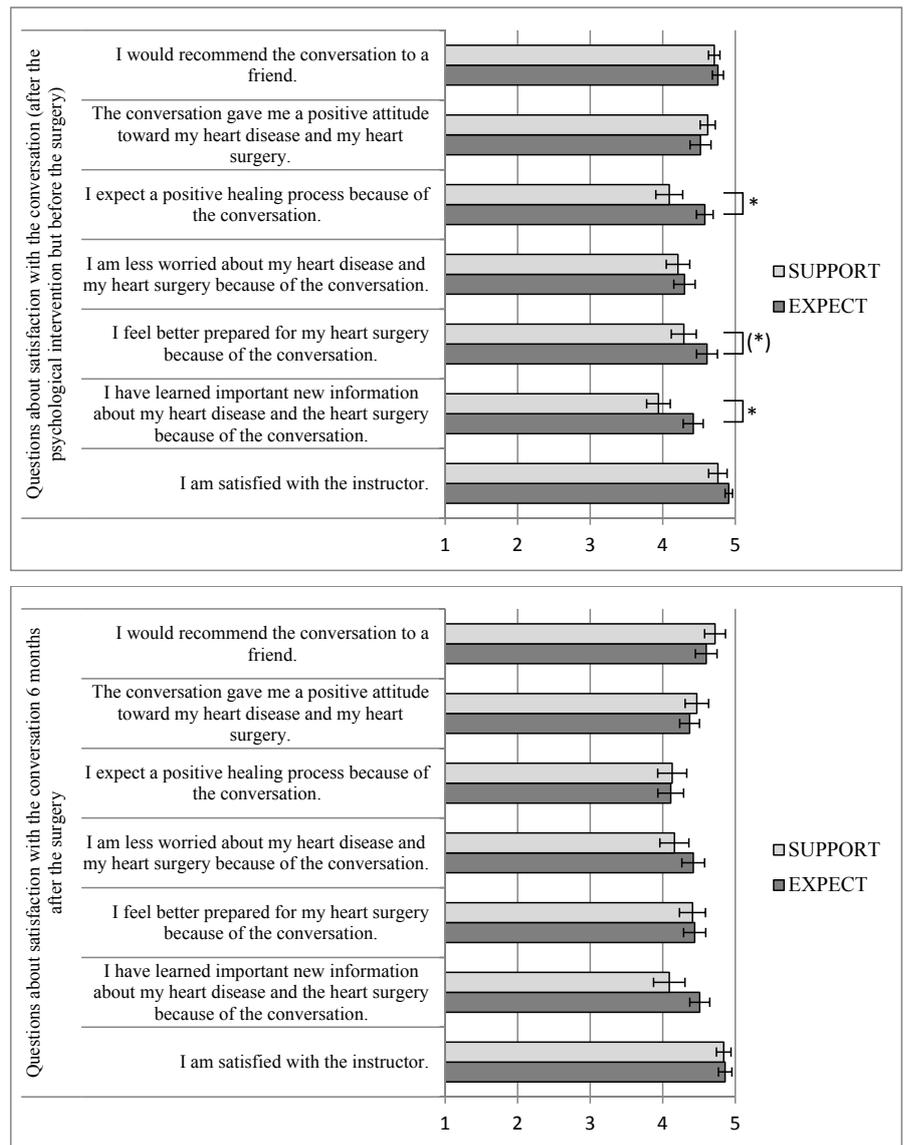
## Method

### *Study Design*

In order to verify whether a short preoperative psychological intervention for optimizing expectations can positively affect the recovery process following CABG surgery, patients were randomized and assigned to 1 of 3 conditions: either solely standard medical care (SMC) or 1 of 2 additional preoperative psychological interventions (the expectation intervention EXPECT or the supportive therapy SUPPORT). Data collection took place between April 2011 and May 2015 at 4 time points at the Hospital for Cardiovascular Surgery at the University Hospital of Giessen and Marburg: at baseline (T0: about 7–10 days before surgery), after the psychological intervention (T1: admission of the patient to the hospital, about 1 day before surgery), postoperatively (T2: about 6 days after surgery), and 6 months postoperatively (T3). Detailed information on the study design can be found in the study protocol [Laferton et al., 2013]. The study was approved by the Ethics Commission of the Philipps University of Marburg and complies with the ethical standards of the Helsinki Declaration in its 1975 expanded form and its amendments of 1983, 1989, and 1996.

### *Outcome Variables*

The primary outcome variable was the patients' disability (Pain Disability Index) [Tait et al., 1990] 6 months after surgery. The results for the primary outcome and other clinical outcome variables (e.g., mental and physical quality of life, anxiety, depression, expectations), biological parameters (e.g., Interleukin-6 or adrenaline) [Rief et al., 2017; Salzmann et al., 2017], and the duration



**Fig. 1.** Assessment of satisfaction with the conversation / the psychological intervention after the intervention, but before the surgery (above), and 6 months after the surgery (below), with mean scores (standard error of the mean) for comparison between the two groups (scale 1–5; 1 = absolutely disagree, 2 = disagree somewhat, 3 = neither agree nor disagree, 4 = agree somewhat, 5 = absolutely agree); \* =  $p < 0.05$ ; (\*) =  $p < 0.1$ .

of the patients' hospital stay have been reported elsewhere [Auer et al., 2017]. Patients were asked about their satisfaction with the intervention at 2 time points: directly after completion of the intervention (before surgery) and 6 months after surgery (follow-up). In each case, 7 questions were asked in a paper-and-pencil questionnaire, which the patients were supposed to answer on a scale from 1 to 5 (1 = absolutely disagree, 2 = disagree somewhat, 3 = neither agree nor disagree, 4 = agree somewhat, 5 = absolutely agree) (fig. 1). Mean scores were calculated from the patients' responses.

#### Recruitment

Patients on the waiting list of the Hospital for Cardiovascular Surgery at the University Hospital of Giessen and Marburg for CABG surgery, with or without heart valve replacement, were contacted by telephone prior to hospital admission. The study participants had to be at least 18 years old and to be scheduled for their first elective coronary bypass surgery with the support of a heart-lung machine. The exclusion criteria were a serious mental or life-threatening (non-cardiac) disease, as well as previous bypass surgery or participation in other studies.

249 patients were eligible to participate. Of these, 72 people (28.9%) declined to participate because they either had no interest in a preoperative psychological intervention or were unable to come to the hospital for the intervention. A total of  $N = 124$  patients were consecutively included in the study; 3 of

these were excluded from the statistical analysis. One patient withdrew his consent for participation in the study, 1 patient turned out not to require bypass surgery, and 1 patient was excluded because there the time between the intervention and the surgery was too long (more than 4 weeks). A detailed overview of the sample characteristics can be found in the publication on the primary outcome [Rief et al., 2017]. The total sample mean was 66.1 years of age (standard deviation (SD) = 8.27 years) (EXPECT = 66.3 years (SD = 7.88 years); SUPPORT = 64.9 years (SD = 8.15 years); SMC = 67.0 years (SD = 8.76 years)), and the sample consisted predominantly of males (EXPECT = 84.6%; SUPPORT = 81.6%; SMC = 86.4%).

#### Procedure and Assessment

With patients who expressed interest in participating in the study, an initial meeting was held at the hospital 7–10 days before the operation, during which they received all relevant information. After they provided their written informed consent, the baseline measurement was performed. Clinical psychologists with advanced skills in cognitive behavioral therapy performed the Structured Clinical Interview according to DSM-IV, in order to assess psychological comorbidities. Socio-demographic data such as age, gender, and education were compiled, and medical data were extracted from the patient files. After the baseline measurement, the patients were randomly assigned to 1 of the 3 study conditions. A research assistant at the hospital assisted in data collection and took

care of organizational aspects. The medical conversations with the patient in preparation for surgery usually took place on the day of admission (1 day before the operation) and consisted of preoperative explanations by a cardiac surgeon and an anesthesiologist. The focus there is on explanation of the medical procedure, education about medical risks, and signing of the consent form. Conversations about patients' expectations, especially with regard to the period after the surgery, are not systematically included in these preoperative conversations. Also, on the day of admission, the patients are admitted and cared for by the staff.

#### *General Framework and Procedure of the Short Psychological Intervention*

Both the expectation-optimizing and the supportive psychological interventions comprised 2 individual sessions (50 min each) on-site and 2 telephone calls (20 min each) between the baseline examination and the surgery (see Online Supplemental Fig. 1., Online Supplemental Material; [www.karger.com/?DOI=485430](http://www.karger.com/?DOI=485430)). The first personal appointment was about 7–10 days before the surgery; then both phone calls with the patients were conducted; then the last appointment took place, usually on the day of hospital admission (about 1 day before the surgery). About 6 weeks after the surgery, a 20-min booster phone call was made. The conversations took place in a room at the Hospital for Cardiovascular Surgery at the University Hospital of Giessen and Marburg, in cooperation with the Department of Clinical Psychology and Psychotherapy, Philipps University of Marburg.

The interventions were conducted by clinical psychologists with advanced knowledge of cognitive behavioral therapy; the psychologists (1 woman, 2 men) were trained in use of the manualized intervention and were regularly supervised (K.W.). All therapy sessions were video-recorded. Adherence to the therapy manual for the different interventions was checked by blinded reviewers. After the last session, the patients were given the recordings of all sessions as an audio CD. The patients in the EXPECT group also received a 'Heart Handbook' at the beginning of the intervention. It summarized the essential points of the intervention in non-technical language and with some vividly illustrated worksheets. Patients were instructed to review and internalize the discussed content between sessions, as homework.

#### *Background: Development of the Expectation Intervention*

A cognitive-behavioral, predominantly psycho-educational intervention was developed with the primary goal of optimizing patient expectations before CABG surgery with respect to the course of recovery afterwards. It was also important that the intervention can be integrated into hospital routine. It was based on the Common-Sense Model of Self-Regulation [Cameron and Leventhal, 2003; Leventhal et al., 1980]. In order to create the intervention, we also took into account our own qualitative patient interviews as well as qualitative work of other authors [e.g., Lindsay et al., 2000], which showed topics such as severe physical limitation, associated restricted activity, dependence on others, as well as fear of death and loss of control over one's own health to be especially relevant. The Common-Sense Model of Self-Regulation assumes that patients have illness beliefs or perceptions that characterize how a patient understands and experiences his illness [Cameron and Leventhal, 2003; Leventhal et al., 1980]. For example, patients develop assumptions about how their illness originated (cause), what symptoms their illness triggers (identity), how long it will last (timeline), what effects certain symptoms will have (consequences), and whether, through their own actions (personal control) or as a result of treatment (treatment control), there will be an improvement. Expectations are an inherent (though not explicit) part of these illness representations [Cameron and Leventhal, 2003], because they tend to represent assumptions about future events or perceptions [Laferton et al., 2017]. Patients' functional treatment expectations are associated with improved treatment outcomes [Cameron and Leventhal, 2003]. According to this model, it also makes sense to address patients' maladaptive assumptions and expectations and to modify them if necessary.

The overall goal of the intervention was to provide patients who are undergoing CABG surgery with the greatest possible confidence in the results of the surgery and the subsequent recovery period and also to meet their expectations in a realistic as well as individualized and functional way. In order to integrate

the multitude of patient expectations recorded in previous studies and to counter a difficulty of the previous expectation research – the heterogeneity of the recorded constructs and their measurement –, Laferton et al. [2017] proposed an integrative model of the expectations of patients undergoing medical treatment. Although the model was only published after we had already designed our intervention, we refer to it below because the expectation concepts integrated there are helpful in understanding our intervention. The terms for the different expectation constructs in the following are based on this model. Expectations are conceived here as subjective, probabilistic statements about the future and are understood especially in contrast to value-based constructs such as wishes or hopes. The Integrative Model of Expectations [Laferton et al., 2017] predicts that patients should obtain a better understanding of their disease and develop a positive outcome expectation for the upcoming surgery (e.g., less disability). These outcome expectations, according to the Integrative Model, include a patient's own illness-related or behavior-related expectations, as well as his treatment-related expectations. With regard to behavior-related expectations, the model also differentiates between self-efficacy and behavior-related outcome expectation, which are collectively referred to as personalized outcome expectancy / personal control expectation. A patient with high self-efficacy will not necessarily do sports if he does not believe that this will have a positive effect on his health, in the sense of a positive behavior-related outcome expectation. Both behavior-related and treatment-related outcome expectations can be further differentiated in terms of expected benefits or side effects, as well as processes within the patient (e.g., expectations about symptoms that will occur) or external factors (e.g., reaction of others in the social environment).

In order to help patients develop a generally positive outcome expectation, expectations should be promoted about personal control of the healing process and the positive consequences of the treatment. Patients' expectations about side-effects of the surgery should be optimized by appropriate information, so that false assumptions (e.g., 'My heart is broken') are corrected. An increase in task and coping self-efficacy was also a goal of the intervention.

The procedure should be identical in structure and principal topics for all patients, but an individual focus should be possible. The integration of patients' partners into the process was also taken into account. Since partners' expectations play an important role for patients [Figueiras and Weinman, 2003; Weinman et al., 2000; Broadbent et al., 2009b], they were invited to participate in the intervention, if the patients agreed.

The contents of individual EXPECT intervention sessions are described in more detail below (for an overview, see Online Supplemental Table 1, Online Supplemental Material; [www.karger.com/?DOI=485430](http://www.karger.com/?DOI=485430)).

#### *Session 1 (7–10 Days before Surgery, Duration: 45–60 min):*

##### *'Bypass Surgery – Newfound Freedom and Life Saver'*

At the beginning of the session, the patient was greeted and informed about the procedure, sequence, and goals of the interventions, before being given the Heart Handbook. He was also informed that a patient's attitudes and expectations play an important role in recovery. The first session focused on the patient's subjective disease model and the upcoming bypass surgery. Informed by the patient's subjective disease/treatment model, we discussed with him the basic understanding of his disease, the associated symptoms, and the medical procedures that would be performed. In order to foster the highest and most positive treatment-related outcome expectation possible, it should be conveyed to the patient that the procedure will result in a cure of the painful and debilitating effects of heart disease. It should especially be made clear that the upcoming surgery will relieve the undersupply of oxygen to the heart, so that associated symptoms (e.g., tightness in the chest) will disappear and physical fitness will increase again. Structural/process expectations were addressed during the conversation of the surgery itself and the time following it. These are an important aspect of the treatment context; thus, for example, the more invasive the methods used with cardiac patients, the more positive are their outcome expectations [Hirani et al., 2008]. Care was taken to make the information easy to understand ('Imagine an engine that is still running well, but is out of gasoline because the fuel line is clogged. With a new fuel line, the engine gets enough fuel and can work normally again. It's the same with your heart. For your heart to work optimally again, a new line is laid to supply the heart with sufficient oxy-

gen.) Wrong ideas and assumptions were also corrected (e.g., 'My heart is broken and will never work properly again').

The therapists emphasized that the surgery is performed frequently and is thus a very safe procedure. Also, the competence of the surgeons and the entire hospital staff was described positively ('These are professionals. They do it every day and have a great deal of experience'). Positive outcome expectations were mainly supported by information on symptom improvement, enhanced quality of life, and a positive-realistic recovery process, which also explicitly addressed timeline expectations. In order to make the information understandable to the patient and to apply it to his individual situation, the advantages of the bypass surgery should also be incorporated into anticipation of the time after surgery. Taking into account expert recommendations from the Society of Thoracic Surgeons [2009], a step-by-step activity plan ('My activities after heart surgery') was developed jointly with the patient; he was supposed to describe activities that he should perform during the first 6 weeks (e.g., light gardening work such as repotting flowers), at the earliest 6 weeks after the surgery (e.g., more intensive gardening such as lawn mowing), and 3 months after the surgery (e.g., very intensive gardening work such as chopping wood) (for examples see Online Supplemental Table 2, Online Supplemental Material; [www.karger.com/?DOI=485430](http://www.karger.com/?DOI=485430)).

Based on these considerations and taking into account the patient's personal interests and wishes, he was guided through an exercise in which he had to imagine a situation 6 months after a successful surgery that expresses its success and his enhanced quality of life. The patient was encouraged in this imagination exercise to picture the time after the surgery, and to think about events that are personally important to him and the emotions associated with them. This imagination exercise was developed jointly, also by elaborating sensory impressions and positive emotions (for a patient example, see Online Supplemental Box 1, Online Supplemental Material; [www.karger.com/?DOI=485430](http://www.karger.com/?DOI=485430)). The patient was encouraged to perform this exercise as often as possible.

In summary, the patient should be encouraged to have positive and adaptive treatment-related outcome expectations with regard to his subjective disease model; maladaptive expectations about side effects of the treatment should be challenged and changed. The core message that the patient should take away from this first session is that cardiac surgery offers a very good chance of success and that his quality of life will improve postoperatively in the long term. At the end of the session, the main points were summarized with an emphasis on the advantages of the surgery, and a perspective was provided for the upcoming appointments. In order to consolidate what had been discussed, the patient was given a homework assignment: to reread the relevant section in the Heart Manual.

Telephone Call 1 (About 5 Days before Surgery, Duration: 20 min):

'The Bypass Operation and My Health Behavior – a Chance for a New Start, I'

At the beginning of the call, the contents of the last session were briefly reviewed. This was followed by a transition to the current topic: raising behavior-related outcome expectations. In order to optimize outcome expectations with regard to the patient's own behavior, the subjective causes of the patient's heart disease were identified and this was then supplemented by psycho-educational elements on causes and risk factors. Here, the focus was mainly on lifestyle habits (e.g., smoking, nutrition, sports) and on aspects that the patient himself can influence, for which change would have a positive effect on his health (behavioral outcome expectations) and which he feels confident that he can implement (self-efficacy). The relationships between lifestyle and heart disease were discussed in order for each patient to find out how he could specifically exercise control over the progression or recurrence of his disease after surgery. By calling this segment 'A chance for a new start', we wanted to highlight this newfound control as an advantage compared to the situation before surgery. The therapist helped the patient change such assumptions as 'I have no control over my heart disease' towards 'I have the ability to positively influence my heart disease'. Finally, the content of the session was recapitulated, the imagination exercise was conducted, including the newly developed content, and a perspective was laid out for the next telephone call. The patient was given homework: to think about where and how he could positively influence his own heart disease in the future.

Telephone Call 2 (About 3 Days before Surgery, Duration: 20 min):

'The Bypass Operation and My Health Behavior – a Chance for a New Start, II'

The second call also began with a review of the content of the last contact. Starting from the renewed emphasis on the importance of healthy behavior for their future health, the patients' personal risk factors were considered. On the basis of the identified personal risk factors in the patient's health behavior, a health contract was 'negotiated', in which the patient was supposed to commit himself to specific steps that would positively influence his risk factors in the future. The therapist and patient together reflected on what specific changes the latter would make in his life. In order to increase motivation, the reasons for a change (e.g., 'What would be the benefits if you had a healthier diet?') were identified and noted down (e.g., 'I want to have a healthier diet to prevent the narrowing of my arteries'). Self-efficacy expectations were raised by specifically recording in the health contract such future healthy behaviors as exercise or a balanced diet (e.g., 'Eat fish twice a week'). In this way, the therapist made sure that only those behaviors were noted down that the patient really had confidence that he could perform. It was also recommended that the patient sign the contract and hang it up where it would be clearly visible to relatives, in order to strengthen his commitment to it. After a review of the content and performance of the imagination exercise, the patients were given a perspective on the next session. The health contract was to be completed as homework.

Session 2 (1 Day before the Operation, Duration: 45–60 min):

'Side Effects of Bypass Surgery – Forewarned is Forearmed'

After a review of the previous content, the second in-person session focused on expected side effects of the treatment and preparation for dealing with unpleasant but non-threatening, 'normal' symptoms after surgery. Negative treatment outcome expectations and self-efficacy in regard to coping methods were highlighted, to enable the patient to deal with unpleasant symptoms in the best possible way. This session occurred on the day of hospital admission and was intended to have a stabilizing effect in addition to its thematic content, as patients often became more tense due to the close proximity of the surgery and the usually grueling procedure on the day of admission. The patient should be given a realistic expectation of unpleasant but non-threatening symptoms and feelings after surgery. This is intended to prevent inappropriate catastrophization (and thus negative expectations) about unpleasant side effects of the surgery. For example, there was discussion of waking up after surgery in the intensive care unit. The expected tubes, sounds, and symptoms were discussed in detail and their function or cause explained. Fears expressed by patients (e.g., of possible complications) were validated and normalized. With regard to appropriate expectations of symptoms to be encountered in the post-operative recovery phase (e.g., pain), coping strategies were developed to increase personal control expectations. The result was recorded in a personal problem-solving schema ('Toolbox for dealing with unpleasant feelings') in which the patient noted his individual coping strategies for expected problems (e.g., to request painkillers if he is in pain). At the end of the last session, the advantages of the surgery compared to the baseline situation were again emphasized (optimized treatment-related outcome expectations) as was regaining control over the heart disease (a behavioral outcome expectation). After a summary of the main points of the intervention and an imagination exercise, the contents were again summarized, the patient was given the audio CD, any remaining questions were clarified, and the therapist said goodbye to the patient.

At the end of this session, the patients had the opportunity to write a 'Letter to myself' in which they could record, as homework, the most important aspects of the intervention. This letter was sent to the study team and then to the patient about 6 weeks after the surgery, to remind him of the most important aspects of the intervention as he had described them.

Booster Call (About 6 Weeks after Surgery, Duration: 20 min)

At the beginning of the booster call, patients were asked about their current health and how things were going after the operation. Then, we addressed the implementation of the intervention content and/or the success in achieving the planned goals (the activities discussed in session 1 for after the heart surgery,

the health contract from phone call 2, the toolbox for dealing with unpleasant feelings discussed in session 2). Depending on their success, the patients were encouraged to continue what they had been doing or, if they had encountered difficulties, they were asked about what they planned to do and the underlying motivation was explored. The therapist thus helped to develop ways to overcome obstacles or how to adapt the plan by addressing both behavioral outcome expectations and self-efficacy expectations. The imagination exercise was also performed, with an emphasis on action plans to achieve the imagined goal. At the end of the call, the therapist highlighted the importance of action plans for the patient's health, mentioned the next procedure (follow-up measurement), and wished the patient a good recovery.

#### *Supportive Intervention*

To test the specificity of the expectation-optimizing intervention, patients in supportive therapy received the same amount of therapeutic attention (identical number of sessions of identical length), without explicitly working on expectations. This intervention focused more on a good therapeutic interaction between the patient and the practitioner and had the goal of using common factors of psychotherapeutic intervention: The therapists listened empathetically, validated the patients' feelings and thoughts, and thus helped them to identify and experience their emotions. The patients in this group could freely decide what topics they wanted to talk about. This type of supportive therapy has been used in previous studies [Cohen et al., 2011].

#### *Statistical Analysis*

Since the data on patient satisfaction were not normally distributed, a Mann-Whitney U-test was performed for each item, comparing the two psychological interventions.

## **Results**

Overall, the mean score of all items, which was used to evaluate the psychological intervention from the patient's perspective, ranged from high to very high, both directly after the intervention (but before the operation) and 6 months after it (fig. 1). The proportion of patients who were not satisfied with the intervention (corresponding to the answers 1 = 'absolutely disagree' or 2 = 'disagree somewhat') varied between 0 and 10.5% for the supportive group (corresponding to 0 to 4 out of 38 patients) and between 0 and 5.1% for the EXPECT group (corresponding to 0 to 2 out of 39 patients), per item, directly after the intervention. Six months after the intervention, this proportion was 2.6 to 13.2% (1 to 5 out of 38 patients) in the supportive group and 2.6 to 5.1% (1 to 2 out of 39 patients) in the expectation intervention.

Directly after the intervention, patients who had received EXPECT had a greater impression that they were receiving new and important information about their disease and the surgery ( $U = 391$ ,  $p = 0.021$ ,  $r = 0.28$  (fig. 1)), and expected a more positive healing process ( $U = 420$ ,  $p = 0.049$ ,  $r = 0.24$ ), than patients who had received the supportive intervention. A trend, although not a significant result, was that the patients felt better prepared for the surgery after the expectation intervention than did patients in the supportive group ( $U = 439.5$ ,  $p = 0.072$ ). With regard to all the other items, there were no significant preoperative differences between the two intervention groups (all  $p \geq 0.462$ ); six months after the intervention, the groups still did not differ for any item (all  $p \geq 0.125$ ).

## **Discussion**

In the context of the PSY-HEART Study (Psychological Intervention for Cardiac Patients), a short preoperative psychological intervention was developed with the primary goal of optimizing patient expectations. Another important criterion was that the intervention be feasible on a cardiac surgery ward. The newly developed expectation-optimizing intervention gave better results 6 months after the surgery, compared with patients who received only standard medical care [Rief et al., 2017]. The present article describes in greater details the expectation-optimizing intervention and describes the satisfaction of the patients with the preoperative psychological interventions. The first face-to-face session focused primarily on raising treatment-related outcome expectations with regard to the advantages of surgery and achieving a better understanding of one's disease, while the two subsequent phone calls dwelt on improving behavioral outcome expectations. In the last face-to-face contact, false assumptions were corrected and the patients were coached on the optimal handling of side effects of the surgery (treatment-related outcome expectation and self-efficacy in terms of coping options). An imagination exercise was used throughout to build up a positive image of the future and thus positive outcome expectations about the long-term consequences of the surgery.

The EXPECT intervention was developed on the basis of recent findings from placebo research, which showed that preoperative expectations are significant predictors of postoperative outcomes [Auer et al., 2016; Juergens et al., 2010; Schedlowski et al., 2015] and expectations are playing an increasingly important role in the treatment of both physical and mental illnesses [Rief and Glombiewski, 2016; Schedlowski et al., 2015]. The expectation-optimizing intervention, for example, significantly raised the patients' behavioral outcome expectations (personal control expectations) [Rief et al., 2017]. Greater personal control expectations are associated with enhanced quality of life and less postoperative depression [Kidd et al., 2016].

Although patient satisfaction for both preoperative interventions can be rated as high, the expectation-optimizing intervention was superior in some respects to the supportive intervention. Thus, the patients in the EXPECT condition felt even better prepared for the surgery. Patients undergoing CABG surgery generally seem to want additional preoperative conversations. There are indications that in preoperative conversations of cardiac surgery, important information about the expected consequences for the patient's quality of life is left out [Hauptman et al., 2013; Pedersen et al., 2017]. The expectation-optimizing intervention that we developed, in addition to optimizing expectations, could at least partially compensate for such inadequate communication.

However, it should be noted that a few patients were not satisfied with the intervention. Even though the number of these patients might be very small, this seems to indicate a need for further research, to provide every patient with the best treatment/intervention. Possibly, the psycho-educational content also occasionally induces additional anxiety or more stress. For example, one participant was unaware that his chest would be opened during the surgery, which visibly frightened him. Future studies should there-

fore take greater account of individual coping dispositions by tailoring the interventions to whether the persons being studied tend to avoid threats cognitively or to overcome their anxiety with the help of additional information [Krohne and El-Giamal, 2008].

Although the expectation-optimizing intervention has shown somewhat better results in certain areas, supportive intervention has also been well received by patients and has also resulted in a significant improvement of disability. This was not the case, however, with standard medical care. Good interaction between patient and practitioner is also considered an important placebo mechanism [Schedlowski et al., 2015]. The superiority of the EXPECT intervention compared to standard medical care could be due to the combination of 2 well-established placebo mechanisms – expectations and good patient/practitioner interaction. To what extent the expectation-optimizing intervention is actually superior to the supportive intervention must be examined in future studies.

The optimization of unfavorable baseline expectations appears to be meaningful in the treatment of mental disorders, since expectations also play a key role in psychotherapy, and nearly all processes in psychotherapy – e.g., the therapist's explanation of the model of a disorder – influence patients' expectations [Wampold, 2015; Rief and Glombiewski, 2016]. Expectations also predict treatment outcomes and are a good predictor of patient adherence to therapy or discontinuation of it [Constantino et al., 2011]. Unfavorable expectations may even contribute to negative effects in psychotherapy [Ladwig et al., 2014]. Since expectations are key in the development and maintenance of mental disorders, an effective therapy should lead to long-term modification of expectations that are relevant to the disorder [Rief and Glombiewski, 2016]. Although some psychological interventions already directly or indirectly optimize patient expectations, the success of psychotherapeutic treatments could be further enhanced if the modification of expectations were given even greater attention [Rief and Glombiewski, 2016].

The great strength of the two preoperative psychological interventions is their feasibility in a clinical setting on a cardiac surgery ward. However, (trained) staff are needed to carry out such an intervention, which at first glance implies additional costs. If we take into account, however, that with the intervention presented here, the length of hospital stays could be shortened [Auer et al., 2017], it becomes clear that preoperative psychological interventions could save costs, in addition to improving the long-term surgical results.

The initial results of the newly developed preoperative psychological intervention are very promising; however, this needs to be verified by multi-center studies. If such studies confirm the positive results of the first study [Rief et al., 2017], preoperative psychological interventions should be offered to all patients who are undergoing CABG surgery.

#### *Limitations*

Despite the positive results of the study and the consistently high level of patient satisfaction, the mechanisms of action remain an open question – i.e., those aspects of the intervention that are actually crucial for the positive effects. Since the intervention for optimizing expectations includes various building blocks that are

already known from approaches to the self-management of chronic diseases, it should be critically examined whether work on expectations alone is sufficient for positive effects. However, a precise distinction between individual constructs seems difficult here, since expectations play such a central role in human experience and behavior. It should also be further investigated which expectations make the greatest contribution to an improved result after a bypass surgery, in order to shorten the interventions or make them even more effective. Despite an increasing number of studies on the importance of expectations for various medical problems, it is difficult to summarize the individual outcomes, because the conceptualization and assessment of expectations are very heterogeneous [Laferton et al., 2017]. The Integrative Expectation Model of Laferton et al. [2017] offers an approach to integrating previous research results, to which this article is already oriented with regard to the names of the expectation constructs.

About one-third of the patients eligible for participation in the study declined to do so because they either were not interested in a preoperative psychological intervention or were unable to come to the hospital for the preoperative intervention. Thus, a possible selection bias cannot be ruled out and may have contributed to overestimation of participants' satisfaction, since it was more likely that people participated in the study who were generally receptive to a preoperative psychological intervention. It might therefore make sense to develop interventions that can be conducted even more independently of location, by telephone or the Internet. On the other hand, there should be further investigation of why patients reject such preoperative interventions.

## **Conclusions**

The present article has shown that a preoperative psychological intervention that focuses on the use of mechanisms of the placebo effect in the form of patient expectations may improve the outcomes of cardiac surgery [Rief et al., 2017] and is associated with high patient satisfaction. Patients undergoing CABG surgery should have the option of using a psychological intervention for optimizing expectations. Patient expectations and the potential of their optimization through suitable interventions should also be explored in other medical settings to further improve patient care.

## **Note**

The documents as well as the treatment manual may be requested from Stefan Salzmann (stefan.salzmann@uni-marburg.de).

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## Online Supplemental Material

**Online Supplemental Material** To access the supplemental material, please refer to [www.karger.com/?DOI=485430](http://www.karger.com/?DOI=485430).

## Disclosure Statement

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