



## Introducing an EXperimental Paradigm to investigate Expectation Change (EXPEC)

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### ABSTRACT

**Background and objectives:** Dysfunctional expectations are considered to be core features of various mental disorders. Clinical observations suggest that people suffering from mental disorders such as major depression tend to maintain dysfunctional expectations despite expectation-disconfirming evidence. Surprisingly, this clinically relevant phenomenon has not yet sufficiently been investigated in empirical studies. Therefore, we developed an experimental paradigm to investigate expectation change vs. maintenance, and the first step to test its validity is to apply it in healthy individuals.

**Methods:** After conducting two pilot studies ( $n = 28$ ;  $n = 37$ ), the present study systematically examined whether it is possible to change healthy individuals' ( $n = 102$ ) task-specific and generalized performance expectations through expectation-disconfirming experiences. Using a standardized instruction, we initially induced non-positive expectations regarding participants' ability to successfully work on an unknown test. Then, participants received standardized performance feedback that either confirmed or disconfirmed their expectations before assessing participants' expectations again after completing the Test for the Measure of Emotional Intelligence.

**Results:** Results indicate that expectation-disconfirming feedback led to a significant change of both task-specific and generalized performance expectations. There was no expectation change in the expectation-confirming condition.

**Limitations:** As the present study examined expectation change among healthy individuals, the next step is to apply this paradigm in a clinical sample and to examine whether expectation change is less likely among people suffering from depression or other mental disorders characterized by dysfunctional expectations.

**Conclusions:** Focusing more rigorously on expectation maintenance among people with mental disorders could enable therapists to develop expectation-focused interventions aiming at enhancing expectation change.

### 1. Introduction

Inspired by findings from placebo research (Beecher, 1955; Benedetti, 2008; Kirsch & Sapirstein, 1998), patients' expectations<sup>1</sup> have become a well-studied construct in the field of physical and mental health problems (Laferton et al., 2017; Rief, Hofmann, & Nestoriuc, 2008). A growing body of research has revealed that patients' expectations have a great impact on the course and treatment success of a variety of medical conditions, such as coronary heart disease (Auer et al., 2016; Barefoot et al., 2011; Juergens et al., 2010; Sears et al., 2004; Stafford, Berk, & Jackson, 2009), chronic pain (Cormier et al., 2016; Vlaeyen et al., 2004), or breast cancer (Nestoriuc

et al., 2016). Given this impact of patients' expectations, research has aimed at modifying patients' expectations via brief psychological interventions, and it has been shown that such expectation modifying interventions indeed substantially enhance treatment success (Broadbent et al., 2009; Petrie et al., 2002; Rief et al., 2017).

Over the past years, patients' expectations have also received increasing attention in the context of mental disorders (Rief et al., 2015). In a clinical psychology framework, expectations have been defined as future-directed cognitions that focus on the incidence or non-incidence of a specific event or experience (Kube et al., 2017), and according to Kirsch's response expectancy theory (Kirsch, 1985, 1997), expectations can refer to either external/environmental outcomes (*stimulus*

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<sup>1</sup> The terms 'expectation' and 'expectancy' are often used in an interchangeable way. However, 'expectation' is more frequently used as a specific, verbalized construct whereas 'expectancies' may be present without full awareness (i.e., implicit expectancies). In this manuscript, we only use the term 'expectation'.

expectancies) or to non-volitional internal outcomes (*response expectancies*). More specifically than other cognitions, expectations refer to future events or experiences, and therefore we argue that particularly negative future expectations may lead to increased suffering among people with mental disorders. To illustrate this, consider the following example: while everyone may have negative automatic thoughts like “Today I’m feeling sad” in certain situations, the future-directed expectation “In the future, I will constantly feel sad” might be much harder to bear. If this expectation coincidentally occurs with the helplessness-related expectation “When I’m feeling sad, I will not be able to do anything to feel better”, suffering may further increase. This clinical relevance of expectations additionally increases if dysfunctional expectations are maintained despite continued experiences that are expectation-disconfirming. Indeed, clinical observations suggest that among people suffering from mental disorders dysfunctional expectations are maintained even in case of disconfirming evidence (Rief & Glombiewski, 2016). For instance, unexpectedly positive experiences are considered to be an exception, or the credibility of the disconfirming evidence is called into question (Kube, Rief, & Glombiewski, 2017). Of note, the phenomenon of expectation persistence has conceptual similarities to Jerome Frank’s models of demoralization and remoralization (Frank, 1973, 1974; Frank & Frank, 1991). According to this theory, distressed people are characterized by the diminished ability to respond to stressful events resulting in negative consequences for the individual, such as isolation and despair (Connor & Walton, 2011; Frank, 1974). More specifically, demoralization has been conceptualized as a combination of stressful events and subjective incompetence, and it has been argued that demoralization occurs when ‘the person’s assumptions relevant to self-esteem are disconfirmed by the stressful situation’ (de Figueiredo & Frank, 1982).

However, the phenomenon of expectation persistence has not yet sufficiently been investigated in empirical studies. To our knowledge, there is up to now no experimental paradigm that enables to systematically examine differences between healthy individuals and individuals suffering from mental disorders with regards to expectation change vs. maintenance after expectation-disconfirming experiences. Therefore, the primary aim of the present study is to introduce an experimental paradigm that can be used to investigate expectation change after expectation-violating experiences among people with mental disorders (EXperimental Paradigm to investigate Expectation Change; EXPEC). For this purpose, we primarily focus on people suffering from major depressive disorder (MDD) as clinical example. We do so for three reasons.

First, according to the cognitive model of depression, depressive symptoms are caused by maladaptive information processing and dysfunctional cognitions including dysfunctional expectations about future events (Beck et al., 1979). In particular, research has shown that individuals suffering from MDD hold different kinds of negative expectations, such as low self-efficacy expectations (Gopinath et al., 2007; Gordon, Tonge, & Melvin, 2011; Ludman et al., 2003), negative global expectations about future events (Strunk, Lopez, & DeRubeis, 2006; Vilhauer et al., 2012), or dysfunctional situation-specific expectations (Kube et al., 2017). Second, clinical observations have suggested that dysfunctional expectations in MDD are particularly persistent despite disconfirming evidence (Kube et al., 2017). Thus, it appears that people suffering from MDD are not able to utilize environmental information to update their expectations, hence leading to a disconnection from their environment and a maintenance of depressive symptoms (McCullough, 2003). Third, MDD is a highly prevalent mental disorder (Kessler et al., 2010), and recent meta-analyses have suggested that treatment of MDD should be optimized (Cuijpers et al., 2013, 2014).

However, beyond Beck’s cognitive model (Beck et al., 1979), other explanatory models have been developed, stressing the importance of factors different from dysfunctional cognitions for the development and maintenance of MDD, such as learned helplessness (Miller & Seligman, 1976), loss of positive reinforcement (Lewinsohn et al., 1974), or

genetic aspects (Zalsman et al., 2006). Recently, it has been revealed that also deficits in emotion regulation predict symptoms of depression (Berking et al., 2014). Since depressive symptoms are associated with negative expectations regarding the ability to regulate emotions (Backenstrass et al., 2006; Kube et al., 2016), the relevance of dysfunctional expectations for MDD further increases.

Only very few studies from the 1970s and ‘80s have examined to what degree people suffering from MDD relative to healthy individuals can utilize environmental information to update their future expectations. These studies have yielded inconsistent results: while two studies have found that individuals experiencing depressive symptoms could utilize feedback to change their expectations concerning future performance (Loeb, Beck, & Diggory, 1971; Post, Lobitz, & Gasparikova-Krasnec, 1980), another study has revealed the opposite (Hammen & Krantz, 1976). More specifically, Cane and Gotlib (Cane & Gotlib, 1985) have found that negative performance feedback lowered the achievement expectations of both people with MDD and healthy individuals, while positive feedback did not influence future expectations of both groups.

In our view, a major limitation of the studies cited above and a possible reason for their inconsistent findings could be the lack of a differentiation between task-specific and generalized expectations when examining the effect of performance feedback on individuals’ future expectations. Generalized achievement expectations can be conceptualized as the degree to which an individual expects to perform successfully across a variety of situations. By contrast, task-specific expectations refer to the expectation to work successfully on a particular task. From a clinical perspective, generalized expectations are more important than task-specific expectations for two reasons. First, task-specific expectations (e.g., “I will not be able to get done with this task”) may result from generalized expectations (e.g. “I will not be able to get anything done”). Second, psychotherapeutic interventions with the aim of disconfirming patients’ expectations (such as behavioral experiments or exposure therapy (Craske et al., 2014; Rief & Glombiewski, 2016; Vlaeyen et al., 2004)) put effort into emphasizing the general relevance of expectation-violating experiences for various future situations to ensure symptom relief.

We address this issue by developing an experimental approach to investigate the change or maintenance of both task-specific and generalized future expectations. For this purpose, we focus on expectations concerning personal achievement vs. personal failure. We do so for two reasons: first, people experiencing depressive symptoms tend to generally expect themselves to fail in performance-related situations (Kube et al., 2017); second, it is plausible that also healthy individuals report expectations of failure in certain situations, e.g. when confronted with an unknown difficult task. This is important because only when focusing on pessimistic expectations that also healthy individual hold in certain situations, it is possible to investigate whether their maintenance despite contradicting experiences is a core feature of MDD.

### 1.1. Overview of the present study and hypotheses

The first step in the EXPEC is to systematically induce non-positive expectations among participants in order to minimize possible baseline differences in participants’ expectations. For this purpose, we use a standardized instruction suggesting that participants would have to deal with an unknown test which is told to be very difficult. After working on the test, participants receive standardized performance feedback that either confirms or disconfirms their prior expectations. By measuring both the task-specific expectation and the generalized expectations twice – first at baseline before working on the test and second after receiving the feedback – we can examine intra-individual changes in expectation concerning future tasks after receiving either expectation-violating or expectation-confirming performance feedback.

In the present study, we investigated the validity of this novel paradigm. For this purpose, we first focus on healthy individuals in

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