Mental Contrasting of a Negative Future and the Regulation of Anxiety

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Table of Contents

Abstract 6

Anxiety 7

Fear and Anxiety 8

Dimensions of Anxiety 9

State and Trait Anxiety 9

Measuring Anxiety 10

Anxiety Regulation 13

Mental Contrasting: A Self-Regulatory Mode of Thought 14

Cognitive and Motivational Processes of Mental Contrasting 16

Empirical Evidence 18

Mental Contrasting of a Negative Future 20

Mental Contrasting of a Negative Future and the Regulation of Anxiety 21

The Present Research 22

Study 1: Regulation of the Fear of E. coli 23

Method 23

Results 26

Discussion 28

Study 2: Regulation of Idiosyncratic Fears 30

Method 31

Results 33

Discussion 37

Pilot Study for Study 3: Mood Manipulation Procedure 39

Method 40

Results and Discussion 41

Study 3: Regulation of Test Anxiety 42

Method 43

Results 46

Discussion 52

General Discussion 55

Limitations and Future Research 56

Implications and Future Directions 58

Conclusion 61

References 63

Appendix 71

Figures and Tables

Figure 1 16

Figure 2 36

Figure 3 42

Figure 4 48

Figure 5 50

Figure 6 51

Table 1 27

Table 2 28

Table 3 34

Table 4 35

Abstract

Mental contrasting of a desired future with the impeding reality has proven to be an effective self-regulatory strategy to foster selective goal pursuit (Oettingen, 2012). However, not a lot of research exists in which a negative future is contrasted with a positive reality. We conducted 3 studies to investigate the effects of mental contrasting of a negative future with a positive reality on state anxiety. In the first 2 studies, we found that participants who mentally contrasted a negative future regarding a bacterial epidemic (Study 1) and regarding an idiosyncratic negative future event (Study 2) showed less state anxiety with regard to that negative future than participants who imagined the negative future only or who reverse contrasted; participants who mentally elaborated on the positive reality only exhibited a pattern of results similar to participants who mentally contrasted. In Study 3, we demonstrated that mental contrasting of a negative future with a positive reality leads to expectancy-dependent calmness in an anxiety evoking test situation. Taken together, our findings suggest that mental contrasting of a negative future with a positive reality helps people reduce anxiety in everyday life situations.

Mental Contrasting of a Negative Future and the Regulation of Anxiety

Whether it be an important job interview, an exam, or a flight over the Atlantic: From time to time, we all find ourselves facing a future event in our everyday life that may evoke fear or anxiety. Even if the likelihood of potential harm is very low, our thoughts revolve around this event, getting us worried and tense. Very rarely, it is reasonable to give in to our anxieties and to avoid that future event. Quite the contrary, in most cases overcoming our fears and approaching the future would be much more effective for our well-being. In other words, we need to cope with our unfounded fears. However, when spontaneously engaging in emotion regulation, people often tend to draw on passive coping strategies such as avoidance or merely waiting instead of actively regulating their fears (Thayer, Newman, & McClain, 1994). We sought to investigate if a self-regulatory strategy called mental contrasting (Oettingen, 2000, 2012) may help people actively regulate their unfounded fears in everyday life situations. Whereas most research on mental contrasting refers to a desired future and a negative present reality standing in the way of that future, we had people mentally contrast their unfoundedly feared future with a positive present reality. Specifically, we wanted to find out, if mental contrasting of a negative future enables people to reduce their state of anxiety regarding that future.

Anxiety

Anxiety is an extensively explored and yet still elusive emotional construct with a complex pattern of reactions (e.g., Brühl, Herwig, Rufer, & Weidt, 2015). A crucial characteristic of clinical and nonclinical anxiety is the anticipation of negative events in the near or far future (Hoerger, Quirk, Chapman, & Duberstein, 2012). In other words, anxiety is a specific emotional state in response to perceived threat and leads to a shift in cognitive and physiological processes (Bijsterbosch, Smith, Forster, John, & Bishop, 2014). Years ago, Ekman, Friesen, and Ellsworth (1982) classified anxiety as a basic emotion, postulating that

one can identify the facial expression of anxiety across cultures. Scientists agree that anxiety plays an important role in evolution: it activates the autonomic nervous system and thus prepares the organism to react appropriately to threat. In other words, it is an essential part of the organism's defense system (Öhman, 2008). However, anxiety often involves learning processes and may result in anxious reactions in everday life that are exaggerated in relation to actual threat. For example, anxiety reactions may be learned and consolidated due to classical conditioning (e.g., Mineka & Zinbarg, 2006), observational learning (e.g., Rachman, 1977), and learning through transmission of verbal infromation (e.g., Field & Lawson, 2003). As a consequence, in a harmless situation a great extent of anxiety is considered problematic in that it prevents people from dealing constructively with future events (Rapee, 1991). Importantly, people often recognize that their extent of anxiety is unreasonable; however, behavior is often more determined by emotion-based thoughts and feelings than by the awareness that the perceived threat is unfounded (Welch, Osborne, & Pryzgoda, 2009). Although findings of empirical research on the relationship between anxiety and performance are inconsistent, people mostly perceive anxiety as uncomfortable and debilitating (e.g., Hembree, 1988; Williams, 1991).

Fear and Anxiety

In our research we refer to both fear and anxiety. Both terms are often used to describe the same construct. Indeed, they are closely related and overlapping concepts. Both fear and anxiety include an aversive feeling and bodily tension, related to perceived threat (Öhman, 2008). Initial attempts to distinguish fear and anxiety refer to external stimuli: fear has been suggested to be clearly related to an eliciting stimulus, whereas anxiety has been suggested to involve a more undefined foreboding of threat (see Öhman, 2008). However, Epstein (1972) pointed out that the presence of external stimuli is insufficient to distinguish fear and anxiety. He argued that fear refers to the organism's attempt to cope with perceived

danger, typically by avoidance behavior or flight. If a fear remains unresolved (i.e., coping attempts fail), it turns into anxiety. Both fear and anxiety "have a joint origin in an unconscious mobilization to an as yet poorly defined threat" (Öhman, 2008, p. 724). When it comes to measure the extent of people's emotional state in empirical research, it is much more common to assess an anxiety score than a fear score. Consequently, it is also widely shared to refer to anxiety regulation instead of fear regulation. In our research we take these theoretical considerations into account. When directing attention to an eliciting situation we refer to fear (e.g., fear of E. coli). Accordingly, we refer to unfounded fears as not proportional to the actual threat elicited by a future event or scenario. Regarding the assessment of people's emotional state after applying a regulatory strategy we refer to anxiety and therefore to anxiety regulation.

Dimensions of Anxiety

Symptoms of anxiety are not only numerous, but also multidimensional: Liebert and Morris (1967) initially described a *worry* and an *emotionality* component of anxiety. The worry component includes negative thoughts and images, a lack of concentration, and other cognitive impairments. The emotionality component, on the other hand, is specified by physiological shifts like bodily tension, sweat, or shiver. Although authors use different terms, the contentual distinction between these two components is widely shared in the literature. One will basically find the terms *cognitive* and *somatic anxiety* (Davidson & Schwartz, 1976; Jones & Hardy, 1990; Martens, Burton, Vealey, Bump, & Smith, 1990). Besides these two dimensions anxiety might manifest in noticeable behavior like changes in gesture, facial expression, or rigidity and avoidance behavior (e.g., Borkovec, 1976).

State and Trait Anxiety

For decades researchers have been distinguishing between anxiety as an actual state and an individual trait. This distinction, finding its origin in work by Cattell and Scheier

(1961), is the primary proposition in Spielberger's model of state and trait anxiety (Spielberger, 1966, 1972) and it provides an important theoretical framework for the present research. Spielberger pointed out that state anxiety is "characterized by subjective, consciously perceived feelings of apprehension and tension, accompanied by or associated with activation or arousal of the autonomic nervous system“ (1966, p. 17). In other words, state anxiety refers to the actual extent of anxiety at a specific moment in time. On the contrary, trait anxiety is defined it as a "motive or acquired behavioral disposition that predisposes an individual to perceive a wide range of objectively nondangerous circumstances as threatening and to respond to these with state anxiety reactions disproportionate in intensity to the magnitude of the objective danger“ (Spielberger, 1966, p. 17). In other words, trait anxiety is the stable tendency of an individual to be likely to react anxiously. In our research we sought to investigate the proximate effects of mental contrasting. Consequently, we focused on state anxiety.

Measuring Anxiety

The distinction between state and trait anxiety has implications for the empirical assessment of anxiety. When focusing on trait anxiety, researchers must consider that it may be devided into domain specific trait anxiety (e.g., test anxiety, spider phobia) and general trait anxiety (i.e., one's general tendency to react with state anxiety in different situations across domains). Accordingly, there are various questionnaires assessing (1) trait anxiety relating to a specific domain and (2) trait anxiety independently from the content. For example, an individual with spider phobia will score high in a spider phobia questionnaire, but will not necessarily score high in a general trait anxiety questionnaire.

By contrast, when focusing on state anxiety, researchers do not need to consider the specific content because they will ask people for their actual state of anxiety in a present situation (e.g., in an anxiety evoking test situation), for example by asking them "how do you

feel now?". Thus, one may use the same state anxiety questionnaire in different domains, assessing typical symptoms of anxiety at present. For example, items like "I am nervous", or "I am worried" are not linked to a specific domain.

Since anxiety is multidimensional, there are different approaches to assess an individual's extent of anxiety. (1) One option is to monitor and rate participants' objective behavioral responses. For example, people high in anxiety typically show an avoidance tendency in their behavior. (2) Another objective measure of anxiety refers to people's physiological responses. For example, by assessing participants' heart interbeat interval, blood pressure, or skin conductance it is possible to measure the somatic symptoms of anxiety. Due to methodological requirements, these measures are especially used in laboratory settings. (3) Self-report is a widely shared approach to assess different components of anxiety. In anxiety self-report scales, participants themselves indicate their extent of anxiety. There is a huge variety of self-report scales that focus on (1) populations with specific anxiety disorders (e.g., Liebowitz Social Anxiety Scale; Liebowitz, 1987), (2) populations at a specific age (e.g., Spence Children's Anxiety Scale; Spence, 1998), or (3) a specific component of anxiety (e.g., Beck Anxiety Inventory; Beck, Epstein, Brown, & Steer, 1988). A classic and well established instrument that we used in our research is the State-Trait-Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970). The STAI includes two subtests: (1) the Trait Anxiety Scale (STAI-T) is designed to assess trait anxiety. It is not limited to a specific domain, but measures an individual's general anxiety as a trait. Thus, it entails the following instructions:

> A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do

> not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

The STAI-T consists of 20 items (e.g., " I worry too much over something that really doesn't matter") with a 4-point response scale from 1 (*not at all*) to 4 (*very much so*).

(2) The State Anxiety Scale (STAI-S) is designed to assess an individual's state anxiety at a certain moment of time. The instructions read:

> A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

Like the STAI-T, the STAI-S consists of 20 items (e.g., "I am worried") with a 4-point response scale from 1 (*not at all*) to 4 (*very much so*). Both the STAI-T and the STAI-S may be used in the same research (e.g., to correlate trait and state anxiety); however, they may also be used independently of one another (e.g., if one is only interested in state anxiety). As a consequence, analyses of the STAI-T and STAI-S are made separately.

Item scores are added to obtain total scores for state and trait anxiety. Thus, the range of possible scores is 20 to 80, a higher score indicating greater anxiety. Normative values are available in the test manual for different samples, including adults, college students and psychiatric samples. A critical cut point of clinically relevant anxiety has been suggested inconsistently. Several studies have suggested a score of 40 (Addolorato et al., 1999; Knight, Waal-Manning, & Spears, 1983); others have suggested a higher cut point of 54 Kvaal, Ulstein, Norhus, & Engedal, 2005). Test-retest reliability ranging from .31 to .86 with intervals from 1 hour to 104 days (Spielber, 1983), it is not surprising that test-retest coefficients were lower for the STAI-S as it assesses the actual state. Internal consistency for

the two subtests is high, ranging from .86 for high school students to .95 for military recruits (Spielberger, 1983). Content validity of the STAI is high, providing correlations from .73 to .85 with the Taylor Manifest Anxiety Scale (Taylor, 1953), and the Anxiety Scale Questionnaire (Cattell & Scheier, 1963).

Anxiety Regulation

We wanted to investigate the effects of mental contrasting of a negative future with regard to the regulation of anxiety. Emotion regulation in general refers to "the processes by which we influence which emotions we have, when we have them, and how we experience and express these emotions [...]" (Gross, 2008, p. 500). With regard to anxiety, people use different strategies to reduce its extent. Gross and Thompson (2007) postulated a process model of emotion regulation and highlighted five families of regulation strategies that refer to different stages of the emotion regulation process. In (1) situation selection and (2) situation modification one indirectly modifies an emotion by either selecting or changing the environment. For instance, a person may choose the situation to be exposed to and thus shapes the emotional consequences as early as possible. Or a person may modify a situation by starting an interaction with others. In (3) attentional deployment, people redirect their attention which affects their emotional response in a given situation. For instance, one may distract attention from the current situation or from specific emotional aspects. In (4) cognitive change, the individual appraisal of a given situation is essential. Changing the subjective meaning of the situation will dramatically influence a person's emotional response. For example, reappraisal is an attempt to change the situation's meaning and thereby leading to a shift in the corresponding emotions. Reappraisal is a widespread strategy that is also a primary feature in cognitive therapy. Finally, (5) response modulation occurs as the last step in the emotion-generating process and consists of a direct modulation of the emotional response. For example, a person may use relaxation techniques to reduce tension.

In everyday life the choice between one of these regulatory strategies is often limited. On the one hand, people might find themselves in a given situation that cannot be easily changed. On the other hand, response modulation, being very late in the regulation process might be unsuitable because people seek to act beforehand (especially with regard to negative emotions). More importantly, there is much empirical research providing evidence that some strategies are more beneficial than others. Strategies such as avoidance or suppression are considered maladaptive (Hayes et al., 1999; Hayes et al., 2004; Wenzlaff & Wegner, 2000). Especially with regard to long-term effects these strategies will be less effective in reducing negative emotions and physiological arousal (Gross & Thompson, 2007; John & Gross, 2004). On the contrary, problem solving and reappraisal are supposed to be more adaptive strategies (Gross, 1998; John & Gross, 2004). However, in everday life these strategies are often difficult to apply. Not only does the process of reappraisal require practical knowledge and experience, it also presumes that people already find themselves in a specific situation at hand. But if there is a fear evoking scenario in the future it is much more difficult to reappraise the situation because it it the anticipation of threat instead of a present situation that evokes anxiety. Thus, people would benefit from a strategy that allows active coping and directly addresses the feared future. Mental contrasting would allow such active coping by linking future and reality. Furthermore, it is a simple, content-free and time- and cost-effective strategy. Therefore, we assume that people may benefit from mental contrasting of a negative future with regard to anxiety in everyday life.

Mental Contrasting: A Self-Regulatory Mode of Thought

Attaining a desired future plays an essential role in everyday life. Whether it is the wish to eat healthier, to pass an exam successfully, or to accommodate a conflict with a loved one: We all have wishes we would like to fulfill. *Fantasy Realization Theory* (Oettingen, 2000, 2012) illustrates four different modes of how people may think about their wishes:

mental contrasting, indulging, dwelling, and reverse contrasting. In mental contrasting, people first think about the very best outcome they associate with fulfilling their wish (e.g., for the wish to pass the exam successfully, the best outcome might be a good chance of a job). Then they reflect on the present reality that stands in the way of wish fulfillment (e.g., sluggishness). As a result, expectations of success (i.e., how likely it is to fulfill one's wish) are activated which in turn leads to expectancy-dependent goal pursuit: when expectations are high, people will provide strong goal commitment and thus invest into attaining the desired future. On the contrary, when expectations of successfully reaching the desired future are low, people will disengage from attaining that future and invest into more promising endeavors. In other words, mental contrasting fosters selective goals pursuit. People who mentally contrast invest more energy in feasible goals and do not waste energy in unattainable ones.

Fantasy Realization Theory describes three more modes of thought: in indulging, people only imagine the desired future. In dwelling, people only reflect on the present reality. In reverse contrasting, people think about both the desired future and the present reality; however, unlike in mental contrasting, in reverse contrasting people start with the present reality and only after that envision the desired future. To point out, only in mental contrasting the future serves as an anchor for the present reality. Therefore the three other modes of thought do not result in an activation of expectations of success. People do not perceive the present reality as an obstacle that they have to overcome. As a consequence, goal commitment remains unchanged (see Figure 1).

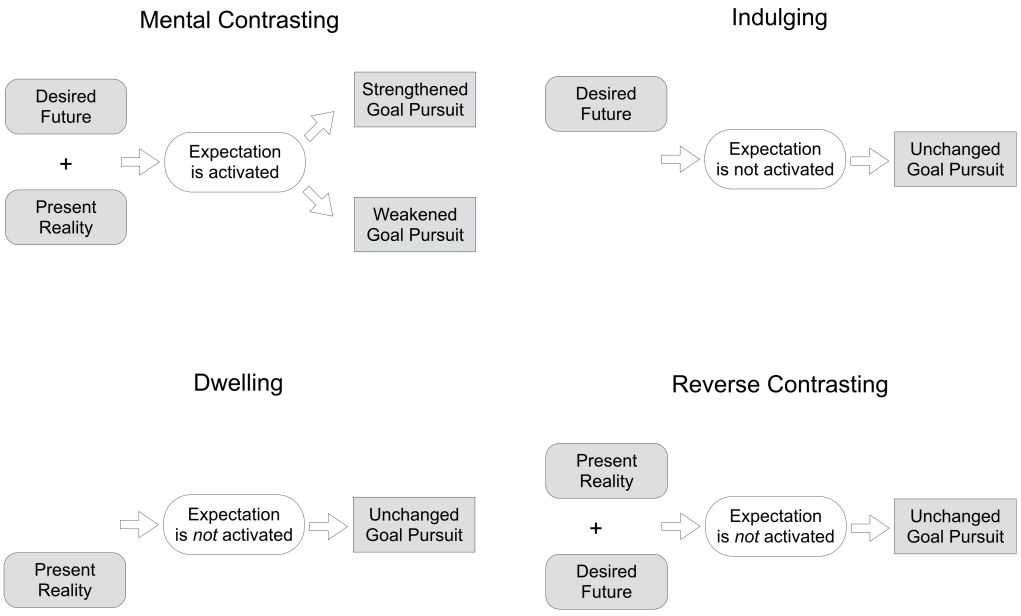

Figure 1. Self-regulatory modes of thought specified by Fantasy Realization Theory. Adapted from Oettingen (2012, p. 21). Copyright 2012 by European Association of Social Psychology.

Cognitive and Motivational Processes of Mental Contrasting

As outlined above, mental contrasting strengthens expectancy-dependent goal pursuit. Importantly, it does not change expectations of success or incentive value. During mental contrasting expectations are activated and hence, people realize if their goal is or is not feasable. If they perceive a goal as feasible, people will strive for it; if they perceive it as unattainable, people will be more likely to disengage. Research has identified cognitive and motivational processes that are responsible for the effect on goal pursuit in mental contrasting.

Cognitive processes. There are three cognitive processes involved in the effectiveness of mental contrasting. First, mental contrasting leads to a mental associative link between future and reality (Kappes & Oettingen, 2014). By contrasting a desired future

with a present reality, the future serves as an anchor for the reality. The reality, in turn, only appears in the context of the future. This association between future and reality is based on an individual's expectations: Only when expectations are high, future and reality are linked tightly. In other words, when providing high expectations of success, thoughts about the future will activate thoughts about the impeding present reality.

Second, mental contrasting leads to a mental associative link between reality and instrumental behavior (Kappes, Singmann, & Oettingen, 2012). When expectations of success are high, thoughts about the present reality activate thoughts about instrumental means to act. In other words, mental contrasting leads to a strong reality-behavior connection which mediates the effects on goal commitment.

Third, mental contrasting leads to a change of the meaning of reality (Kappes, Wendt, Reinelt, & Oettingen, 2013). When expectations of success are high, mental contrasting leads to a perception of the present reality as an obstacle. Thus, they identify the reality as standing in the way of their desired future.

Motivational process of energization. Energization is essential to initiate goal-directed behavior (Locke & Latham, 2002). In an important research, Oettingen, Mayer, Sevincer, Stephens, Pak, and Hagenah (2009) found that energization mediates the effect of mental contrasting on goal commitment. When expectations are high, mental contrasting leads to high energization; the higher expectations are, the higher is energization. Energization, in turn, leads to strong goal commitment. Oettingen et al. (2009) assessed energization by self-report (i.e., how engergized people felt) as well as by a physiological measure (systolic blood pressure). In other words, mental contrasting provides the energy for effective goal-directed behavior.

Importantly, all cognitive and motivational mediating processes are only found in mental contrasting, but not in one of the control conditions (i.e., indulging, dwelling, reverse

contrasting). For instance, when people only dream about an important wish, future and reality as well as reality and instrumental behavior will not be linked; the reality will not be perceived as standing in the way of the future, and lastly, people will not gain the energy to act. In other words, the order by which people think about future and reality is vital for effective wish fulfillment.

Empirical Evidence

Research on mental contrasting provides evidence for its beneficial effects on goal pursuit and behavior change. Thereby, researchers have experimentally varied domains of application, methodological implementations, and samples. In a classic research, Oettingen, Pak, and Schnetter (2001) asked college students to name their most important interpersonal wish (e.g., participants named "to get to know better someone I like"). To assess participants' expectations of success they were asked "How likely do you think it is that the named problem will have a happy ending?" on a 7-point response scale from 1 (*very unlikely*) to 7 (*very likely*). The authors also measured participants' incentive value by asking "How important is it to you that the named problem will have a happy ending?", again using a 7-point scale from 1 (*not at all important*) to 7 (*very important*). Participants were randomly assigned to one of three experimental conditions: In (1) the mental contrasting condition participants were instructed to think about the most important positive aspect they associated with their interpersonal problem coming to a happy ending. They were asked to write down all their thoughts and images in order to ensure a deep elaboration. Subsequently, they were instructed to think about the most important negative aspect of the present reality that was standing in the way of a happy ending of their named problem. Again, they were asked to write down all thoughts and images. They repeated this procedure with the second most important positive and negative aspects. Taken together, participants mentally contrasted their desired future with the impeding present reality. In (2) the indulging condition,

participants should only think about their desired future. To keep the conditions experimentally equivalent, participants should pass the procedure with the four most important positive aspects they associated with their named problem coming to a happy ending. In (3) the dwelling condition, participants should only reflect on the present reality. Thus, they were asked to name and elaborate on the four most important aspects of the present reality that were standing in the way of their problem coming to a happy ending. With regard to various dependent measures in a series of four studies, the authors found a significant interaction effect between condition and expectations: Participants who mentally contrasted and who had high expectations formulated plans more frequently, took more responsibility, showed higher anticipated disappointment if the problem had not come to a happy ending, felt more energized, and initiated action more promptly.

Importantly, in more recent studies (e.g., Duckworth, Kirby, A. Gollwitzer, & Oettingen, 2013; Johannessen, Oettingen, & Mayer, 2012) the procedure of the manipulation of self-regulatory thought is shortened and has become even more time-effective. To point out, investigators do not have participants write down four future and four reality aspects any more. Instead, after naming their most important wish and indicating their expectations of success and incentive value, participants only write down and elaborate on two aspects in total. In mental contrasting participants name and elaborate on the most important aspect of their desired future followed by the most important aspect of the present reality. In reverse contrasting the procedure is vice versa; thus, participants start with the present reality. In indulging, participants name and elaborate on their most important future aspect, followed by their second most important future aspect. In dwelling, participants name and elaborate on their most important reality aspect, followed by their second most important reality aspect.

In a wide variety of research, this pattern of mental contrasting has been replicated across different life domains (e.g., health, academic, and interpersonal domains), with

participants of different age, socioeconomic status, and cultures, and with short- and long-term effects (for an overview, see Oettingen, 2012).

Mental Contrasting of a Negative Future

Most research on mental contrasting refers to the contrasting of a desired future. However, since anxiety involves thoughts of a negative future, we sought to directly address this negative future and to use it as an integral part of the regulation process. Indeed, research has shown that mental contrasting is not limited to a positive future. One may also mentally contrast a negative, feared future with the positive present reality. Oettingen, Mayer, Thorpe, Janetzke, and Lorenz (2005) conducted a study with a group of xenophobic high school students. Participants were randomly assigned to one of three experimental conditions: Participants in (1) the mental contrasting condition first elaborated on their feared future of foreign youth moving into the neighborhood. More specifically, they were instructed to think about repercussions they might suffer from and how this might interfere with their everyday lives. Subsequently, they mentally elaborated on the positive present reality standing in the way of the feared future (e.g., statements about great soccer matches with foreign youth). Participants in (2) the negative future only condition should only elaborate on the feared future. Participants in (3) the positive reality only condition should only elaborate on the positive reality. Expectations and incentive value of integrating foreign youth were assessed prior to the manipulation. Oettingen et al. (2005) found an expectancy-dependent effect only in the mental contrasting condition: Even two weeks after the experiment, participants who had high expectations showed a greater tolerance towards foreign youth and were more willing to invest time and effort in integrating them. Thus, mental contrasting of a negative future may help people approach that feared future.

However, one might argue, that it is not always sensible to have people turn their negative fantasies into approach goals. For instance, in a truly dangerous situation fears and

negative fantasies might prevent one from real harm. As a consequence, the paradigm Oettingen et al. (2005) used in their xenophobia study should only be applied in situations with no real threat and thus in the context of fears that are perceived as unreasonable or unfounded. For example, it would be counterproductive to approach a bad habit's negative consequences for one's health. In this case, you would intend to have people avoid the negative future. Importantly, even with regard to avoidance one may use mental contrasting of a negative future with positive reality, but has to vary the specific experimental manipulation. In other words, mental contrasting of a negative future may also be used to facilitate an evasion of a negative future. Oettingen, Thorpe, and Mayer (2010) conducted an influential study using mental contrasting of a negative future with positive reality to foster smokers' commitment to reduce cigarette consumption. Thereby, the implementation of the positive reality is the crucial point: Whereas in the previously presented xenophobia study the positive reality was standing in the way of the feared future, in this study, participants should think about positive aspects of the present reality that they could lose due to continued smoking. The authors found an expectancy-dependent commitment to reduce smoking in the mental contrasting condition, but not in the control conditions (i.e., negative reality only and positive reality only conditions). To sum up, mental contrasting of a negative future is an effective strategy to either approach or avoid a negative future. In our research, we focused on unfounded fears in people's everyday lives and thus wanted to achieve people down-regulating anxiety and constructively coping with their feared future. Therefore, we drew on a negative future that was contrasted with the present reality standing in the way of the feared future, like in Oettingen et al. (2005).

Mental Contrasting of a Negative Future and the Regulation of Anxiety

As illustrated above, mental contrasting has proven to be an effective self-regulatory strategy in a huge variety of domains. In most research mental contrasting is used to foster

expectancy-dependent goal pursuit, so that people are more likely to achieve their goals (see Oettingen, 2012). To date, there is little research on mental contrasting of a negative future. However, by finding that mental contrasting of a negative future led to enhanced tolerance and integrative behavior, Oettingen et al. (2005) demonstrated that one may use the strategy to approach a feared future. Since people would only approach a feared future if overcoming their fears, this result underlines the assumption that mental contrasting of a negative future also has an emotion-regulatory effect. Especially with regard to an unfounded fear, mental contrasting of a negative future seems an effective strategy: by mentally contrasting a negative future with a positive present reality standing in the way of that future an individual should be likely to realize that one's anxiety is not reasonable in relation to actual threat. As a consequence, the state of anxiety should decrease. Therefore we expected a main effect of mental contrasting on state anxiety. Thus, people might benefit from mental contrasting whenever facing a future event that evokes such unfounded fears.

The Present Research

In the present research, we sought to contribute to a better understanding of the effectiveness of mental contrasting of a negative future. More specifically, we wanted to investigate if mental contrasting of a negative future may serve as a strategy to regulate state anxiety in everyday life situations. To address this question we conducted three studies in which participants should apply either the strategy of mental contrasting of a negative future or one of several control strategies. In Study 1, we investigated the effects of mental contrasting on the fear of an E. coli epidemic. In Study 2, we sought to extend the findings of Study 1 and investigated the effects of mental contrasting on an idiosyncratic fear. In Study 3, we investigated the effects of mental contrasting on anxiety in a specific test situation we created in the lab. In each study we experimentally manipulated participants' self-regulatory mode of thought. Specifically, participants were randomly assigned to (1) a mental

contrasting condition, (2) a negative future only condition, (3) a positive reality only condition, (4) a reverse contrasting condition, or (5) a no treatment condition. In all three studies we assessed state anxiety as our primary dependent variable.

Study 1: Regulation of the Fear of E. coli

We sought to investigate the effects of mental contrasting of a negative future on a specific fear, namely the fear of a bacterial epidemic caused by E. coli. E. coli (i.e., Enterohemorrhagic Escherichia coli) is a bacterium that has some pathogenic serotypes which may cause the so-called hemolytic-uremic syndrome, characterized by severe symptoms such as bloody diarrhea and renal failure. In the beginning of the study we had participants read an informational article about E. coli including both, facts about the disease and statements which indicate that in the United States it was very unlikely that an epidemic would occour. Then participants were instructed to apply the strategy of mental contrasting of a negative future, or one of the three other modes of self-regulatory thought specified in Fantasy Realization Theory. Subsequently, we assessed self-reported state anxiety. We hypothesized participants in the mental contrasting condition to show less state anxiety than in the three control conditions. The study was designed as an online study, using a one-factorial (self-regulatory strategy: mental contrasting vs. negative future only vs. positive reality only vs. reverse contrasting) design.

Method

Participants. We recruited participants ($N = 214$) via Amazon Mechanical Turk (www.mturk.com). Fifteen participants were exluded from data analyses because they did not mentally elaborate and write down their free thoughts and images during the induction of the self-regulatory strategy. The remaining participants ($N = 199$) were included in the data analyses. All participants were living in the United States of America. Forty-nine percent ($n = 97$) were female, their age ranged from 18 to 73 years ($M = 36.21$, $SD = 12.61$).

Procedure and materials. Participants submitted to the study via MTurk and were directed to the online survey which was programmed with EFS Survey. Participants were informed about the procedure of the study and signed the consent form. After finishing the whole survey which took about 20 minutes they were fully debriefed and received 1 US Dollar credit for their participation.

E. coli. To inform participants about E. coli, we asked them to read a bogus newspaper article. Importantly, this article included both facts about the E. coli bacterial disease (e.g., that humans might get infected via animal-based food) and statements from fictitious health experts that spoke for the notion that an E. coli epidemic in the United States was unlikely (e.g., that the hygiene provisions in the United States meet the highest standards which reduces the risks of an infection dramatically). Thus, we made sure that participants understood that the likelihood of getting infected would be very low.

Manipulation of the self-regulatory strategy. Participants were randomly assigned to one of four experimental conditions: in (1) the mental contrasting condition, participants were instructed to vividly imagine both the negative future of an E. coli epidemic in the U.S. and the positive reality that was standing against their feared future coming true. Participants should begin with naming the most important aspect of the negative future ("What is the worst thing that you associate with E. coli coming to the United States? Identify the worst thing and write it down."). Then participants were instructed to mentally elaborate on this aspect thoroughly. Participants read:

> Now really think about this worst thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts.

After elaborating on the aspect of the negative future, participants should name the most important aspect of the present reality that was standing against the spreading of E. coli to the United States:

> Sometimes things do not happen although we are afraid they could. What is the most important aspect of the present reality that is standing against the spreading of E.coli to the United States? What should hinder the spreading of E. coli? Identify the most important thing that should hinder the spreading of E. coli to the United States and write it down.

Again, they were asked to elaborate on this aspect. In (2) the negative future only condition, participants were only instructed to think about the negative future of a spreading of E. coli. Respectively, they were asked to name and elaborate on the worst and the second worst thing they associated with a spreading of E. coli. In (3) the positive reality only condition, participants should think about the positive reality only. They were asked to name and elaborate on the most important and the second most important aspects that were standing against a spreading of E. coli to the U.S. In (4) the reverse contrasting condition, participants were asked to think about both the negative future and the positive reality; however, unlike in the mental contrasting, participants in the reverse contrasting condition should begin with the reality aspect and only thereafter they were instructed to think about the negative future.

State anxiety. After the manipulation we assessed our dependent variable, state anxiety. Specifically, we asked participants: "When you think about E. coli: how do you feel now?" We used the state anxiety subtest of the State-Trait-Anxiety Inventory (STAI-S; Spielberger et al., 1970). As outlined above, the STAI-S consists of 20 items (e.g., "I am worried") using a 4-point response scale from 1 (*not at all*) to 4 (*very much so*).

Control variables. To be able to control for participants' general tendency to react with fearful thoughts and feelings, we assessed trait anxiety in the beginning of the study,

using the trait anxiety subtest of the State-Trait-Anxiety Inventory (STAI-T). It consists of 20 items (e.g., "I feel nervous and restless") using a 4-point Likert response scale from 1 (*not at all*) to 7 (*very much so*). In addition, right after presenting the newspaper article, we assessed a short baseline measure of participants' state anxiety. Therefore we used three single items of the STAI-S (e.g., "I feel nervous"), providing high internal consistency (Cronbach's $\alpha = .83$). Then we assessed participants' expectations and their incentive value to overcome their fear; specifically, we adapted the instructions of prior research on mental contrasting (e.g., Oettingen, Pak, & Schnetter, 2001) and asked participants: "How likely do you think it is that you will be able to overcome your fear?" and "How important is it to you to overcome your fear?", both items using a 7-point scale from 1 (*not at all*) to 7 (*very much so*). Finally, we assessed demographic data from our participants like gender, age, profession and place of residence.

Results

Descriptive data. We calculated sum scores of trait anxiety (with a maximum possible score of 80) and baseline state anxiety (with a maximum possible score of 12). Participants had a moderate extent of trait anxiety ($M = 37.63$, $SD = 11.50$) and a moderate extent of baseline state anxiety ($M = 5.40$, $SD = 2.22$). Expectations and incentive value to overcome the fear were above the midpoint of the 7-point scale (expectations: $M = 5.86$, $SD = 1.48$; incentive value: $M = 4.98$, $SD = 1.75$). Thus, participants had relatively high expectations to overcome their fear. Correlations between the key variables are given in Table 1.

Table 1

Correlations Between Key Variables (Study 1).

	1.	2.	3.	4.	5.
1. trait anxiety	-				
2. expectations	-.10	-			
3. incentive	-.24**	.29**	-		
4. baseline state anxiety	.21**	-.31**	.13	-	
5. state anxiety	.36**	-.20**	.03	.58**	-

Note. **$p < .01$

State anxiety. We calculated a sum score of state anxiety for each participant. To analyze whether particpants who mentally contrasted had lower state anxiety than participants who applied one of the other self-regulatory strategies, we computed a General Linear Model (GLM) with state anxiety as the dependent variable and condition as a fixed between-subjects factor; we included trait anxiety, baseline state anxiety, expectations and incentive as continuous covariates. We found significant effects for the covariates trait anxiety, $F(1, 191) = 23.27$, $p < .001$, and baseline state anxiety, $F(1, 191) = 67.34$, $p < .001$. More importantly, we also found the expected main effect for condition, $F(3, 191) = 6.92$, $p < .001$, see Table 2. Pairwise comparisons reveal (1) significantly less state anxiety in the mental contrasting condition, $M = 37.20$, than in the negative future only condition, $M = 42.54$, $t(191) = 2.88$, $p = .03$, and (2) significantly less state anxiety in the mental contrasting condition than in the reverse contrasting condition, $M = 43.45$, $t(191) = 3.39$, $p = .01$. Interestingly, the pattern of results in the positive reality only condition was similar to that in the mental contrasting condition. We found no differences between the mental contrasting condition and the positive reality only condition, $t(191) = 0.17$, $p = .86$. In fact, the positive reality only condtion showed significantly lower anxiety scores than the negative

future only condition, $t(191) = 3.02$, $p = .02$, and the reverse contrasting condition, $t(191) = 3.53$, $p = .003$.

To test whether there were any interaction effects between condition and one of the covariates, we ran four additional GLMs and included the interactions between condition and one of the covariates in each of the analyses. There were no significant interaction effects between condition and any of the covariates, all ps > .05.

Table 2

Mean Differences Between Conditions in the Dependent Variable State Anxiety (Study 1).

	Mental contrasting	Negative future only	Positive reality only	Reverse contrasting	*F*
State anxiety	37.20[a]	42.54[b]	36.90[a]	43.45[b]	6.92***
n	58	42	56	43	

Note. Means with different subscripts differ significantly, $p < .05$, df = 191.
*** $p < .001$.

Discussion

Participants who mentally contrasted the negative future of a bacterial epidemic with a positive reality standing against that future showed less state anxiety than participants who either imagined the negative future only, or reverse contrasted. The findings show that the self-regulatory strategy of mental contrasting of a negative future with a positive reality can be used to regulate negative emotions in response to a feared future. More specifically, when people contrast their negative future with positive aspects of the present reality, they can down-regulate their state of anxiety. By contrary, when thinking about the negative future only, participants reported significantly higher state anxiety than participants who mentally contrasted. They were only reflecting on thoughts about their feared future and did not use the positive reality to contrast that future. In other words, they were envisioning their fear

without thinking about what was standing against their fear coming true. Like previous research has shown, the order in which people think about the future and the reality is essential for the effects of mental contrasting to occur (Kappes & Oettingen, 2014; Oettingen, 2012). Our results confirm these findings, since participants who started with elaborating on the present reality and only after that elaborated on the negative future (i.e., who reverse contrasted) showed significantly higher state anxiety than participants who mentally contrasted. In other words, only in mental contrasting the future serves as an anchor for the reality. Future and reality get linked to each other, and the reality is perceived as standing in the way of the future (Kappes & Oettingen, 2014). Consequently, people may realize their anxiety to be unreasonable in relation to actual threat which in turn leads to a decrease in state anxiety.

Unexpectedly, we found a similiar effect for the positive reality only condition as for the mental contrasting condition. On the one hand, this raises the question if thinking about the positive reality only might be sufficient to down-regulate state anxiety. On the other hand, the reason for this effect might be found in our introductory information about E. coli: we had participants first read a section about the risks of E. coli, and subsequently imagine factors for a relatively low chance of an epidemic in the U.S. One may argue, that this procedure corresponds to what participants do when they mentally contrast: contrasting a negative future (i.e., the risks of E. coli) with a positive present reality (i.e., a low chance of an epidemic). However, state anxiety in participants in the negative future only condition and in the reverse contrasting condition were significantly higher, although they obviously read the same introductory information. Thus, one may conclude that when reading aspects of the negative future and the positive reality during the introductory procedure (i.e. the information about E. coli) and subsequently mentally elaborating on the negative future only or reverse contrasting, the latter procedure might deminish any benefit from the introductory

information. Obviously, the procedure in these two conditions (i.e., the negative future only and the reverse contrasting condition) overlap with a potential effect of the introductory information. To point out, it becomes clear that mental contrasting is a much more comprehensive procedure than merely reading about future and reality; it includes a thorough mental elaboration of these aspects in a distinct order. In Study 2, we sought to address this methodological issue in order to not vividly present the negative future and aspects of the present reality to all participants. Therefore, we implemented a different introductory procedure regarding participants' fears.

To sum up, in Study 1 we found anxiety-regulatory effects of mental contrasting of a negative future in the context of a bacterial epidemic. In Study 2 we wanted to extend these findings on the broader context of fears in people's individual everyday lives. Thus, we sought to investigate the effects of mental contrasting on idiosyncratic fears.

Study 2: Regulation of Idiosyncratic Fears

As shown in Study 1, mental contrasting of a negative future leads to a reduction of state anxiety. In Study 2, we wanted to extend these findings by (1) transferring the anxiety regulatory function of mental contrasting into the broader context of an idiosyncratic fear and (2) investigating further emotional effects of mental contrasting by adding a dependent variable and measuring how calm participants were regarding their feared future. Like Study 1, Study 2 was designed as an online study. We used a one-factorial (self-regulatory strategy: mental contrasting vs. negative future only vs. positive reality only vs. reverse contrasting) design. Participants should apply the strategy of mental contrasting of a negative future, or one of the control strategies to an idiosyncratic fear regarding the next three weeks of their lives. We hypothesized participants in the mental contrasting condition to (1) show less state anxiety and (2) be calmer regarding their fear evoking event compared to the three control conditions.

Method

Participants. We recruited participants (N = 218) via Amazon Mechanical Turk. We excluded participants (n = 12) who did not mentally elaborate and write down their free thoughts and images during the self-regulatory procedure. The remaining participants (N = 206) were included in the data analyses. All participants were living in the United States, 59% (n = 122) were female. Their age ranged from 18 to 81 years (M = 36.96, SD = 12.99).

Procedure and materials. After submitting to the study, participants were directed to the online survey, were informed about the procedure, and signed the consent form. The study was said to take about 20 minutes. After complete participation, participants were fully debriefed and received 1 US Dollar credit.

Idiosyncratic fear. We wanted participants to apply the self-regulatory strategy to an idiosyncratic fear. Therefore, we first asked participants to name a fear evoking event that they were facing within the next three weeks. Importantly, we were interested in unfounded fears to guarantee that participants did not reduce reasonable anxiety evoked by a truly threatening situation. Specifically, participants read:

> Sometimes we are afraid of a negative future although we know our fears are unreasonable or unfounded. For example, there may be a specific future event or scenario that provokes fearful thoughts in you although you know it is very unlikely that your fears will bear out. Now, thinking about the next three weeks, please name an event or scenario that you will face that evokes such unfounded or unreasonable fears in you. Name an event or scenario, where you have such fears although you feel that they are unfounded or unreasonable.

Then participants were instructed to briefly name their fear they associated with that event.

Manipulation of the self-regulatory strategy. Participants were randomly assigned to one of four experimental conditions. The manipulation was in line with Study 1: in (1) the mental contrasting condition, participants were asked to name the most important aspect of the negative future ("What is the worst thing that you associate with your feared future coming true? Identify the worst thing and write it down."). Subsequently, they received instructions to mentally elaborate on this aspect of the negative future. Specifically, participants read:

> Now really think about this worst thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images.

Afterwards we asked participants to name the most important aspect of the present reality that was standing against their fear coming true:

> Sometimes things do not happen although we are afraid they could. What is the most important aspect of the present reality that is standing against your feared future coming true? What should prevent your feared future from coming true? Identify the most important thing that should prevent that your feared future will actually happen and write it down.

Again, they mentally elaborated on this aspect of the present reality. In sum, participants in the mental contrasting condition contrasted the negative future of their fear coming true with the present reality that was standing against their fear coming true. In (2) the negative future only condition participants were only asked to name and elaborate on the most important and the second most important aspects of the negative future of their fear coming true. In (3) the positive reality only condition participants were only instructed to name and elaborate on the two most important aspects of the present reality that were standing against their fear coming

true. In (4) the reverse contrasting condition participants should think about both the negative future and the positive reality. However, unlike in the mental contrasting condition participants in the reverse contrasting condition started with the positive reality and only then elaborate on the negative future.

State anxiety. Right after the manipulation of the self-regulatory strategy we assessed state anxiety as our primary dependent variable. We used the state subtest of the STAI like in Study 1.

Calmness. To assess how participants rated their own state of calmness in relation to their upcoming event, we created eight items (e.g., "Regarding the future event I named before, I will take things as they come"), using a 7-point response scale from 1 *(not at all)* to 7 *(very)*. Unlike the state anxiety questionnaire, these items were directly linked to the feared future event.

Control variables. Like in Study 1, we controlled for participants' individual trait anxiety using the STAI-T. To control for a baseline measure of state anxiety we used the same three items of the STAI-S like in the previous study. Furthermore, we assessed participants' expectations to overcome their fear by asking "How likely do you think it is that you will be able to overcome your fear?", and their incentive value to overcome their fear by asking "How important is it to you to overcome your fear?", both items using a 7-point scale from 1 (*not at all*) to 7 (*very much so*). Finally, we assessed participants' demographic data like gender, age and profession.

Results

Descriptive data. Like in Study 1, we calcluated sum scores of trait anxiety (with a maximum possible score of 80) and baseline state anxiety (with a maximum possible score of 12). Participants had a moderate extent of trait anxiety ($M = 38.56$, $SD = 12.06$) and a slightly high extent of baseline state anxiety ($M = 8.32$, $SD = 2.45$). Expectations and incentive value

to overcome the fear were also above the midpoint of the 7-point scale (expectations: $M = 4.59$, $SD = 1.78$; incentive value: $M = 5.83$, $SD = 1.37$). Thus, participants had high expectations to overcome their fear. Correlations between the key variables are given in Table 3.

Table 3

Correlations Between Key Variables (Study 2).

	1.	2.	3.	4.	5.	6.
1. trait anxiety	-					
2. expectations	-.29**	-				
3. incentive	-.17**	.36**	-			
4. baseline state anxiety	.34**	-.40**	.09	-		
5. state anxiety	.36**	-.35**	.06	.58**	-	
6. calmness	.41**	.42**	.05	-.43**	-.55**	-

Note. **$p < .01$

State anxiety. We computed a GLM with state anxiety as the dependent variable and condition as a fixed between-subjects factor. We included the continuous measures of trait anxiety, baseline state anxiety, expectations and incentive value as covariates. Trait anxiety, $F(1, 198) = 10.01$, $p = .002$, baseline state anxiety, $F(1, 198) = 47.90$, $p < .001$, and expectations, $F(1, 198) = 4.82$, $p = .03$, were all significant covariates. More importantly, we found the hypothesized main effect for condition to be significant, $F(3, 198) = 10.77$, $p < .001$. Thus, depending on which self-regulatory strategy participants applied, they had a different extent of state anxiety (see Table 4). Participants who mentally contrasted the negative future with the present reality had the lowest state anxiety score ($M = 48.04$, $SD = 1.48$), whereas participants who only reflected on the negative future had the highest

state anxiety score (M = 57.84, SD = 1.46). Pairwise comparisons reveal significant differences between the mental contrasting condition and the negative future only condition, $t(198) = 7.72$, $p < .001$, and between the mental contrasting condition and the reverse contrasting condition, $t(198) = 5.11$, $p = .003$, both comparisons being Bonferroni adjusted. The pattern of results in the positive reality condition was similar to that in the mental contrasting condition. We found no differences between the mental contrasting condition and the positive reality only condition, $t(198) = –1.79$, $p > .05$. In fact, the positive reality only condtion showed significantly lower anxiety scores than the negative future only condition, $t(198) = 7.22$, $p < .001$, and the reverse contrasting condition, $t(198) = 4.60$, $p = .05$.

We found no interaction effects between condition and any of the covariates, $Fs(3, 198) = 0.40 – 1.77$, all ps > .05.

Table 4

Mean Differences Between Conditions in the Dependent Variable State Anxiety (Study 2).

	Mental contrasting	Negative future only	Positive reality only	Reverse contrasting	*F*
State anxiety	48.04[a]	57.84[b]	48.45[a]	55.20[b]	10.77***
n	52	53	43	58	

Note. Means with different subscripts differ significantly, $p < .05$, df = 198.
*** $p < .001$.

Calmness. We combined the eight items to a sum score of calmness as internal consistency was high (Cronbach's $\alpha = .85$). We computed a GLM with calmness as the dependent variable and condition as a fixed between-subjects factor. We included trait anxiety, baseline state anxiety, expectations and incentive value as covariates. Trait anxiety, $F(1, 198) = 17.91$, $p < .001$, baseline state anxiety, $F(1, 198) = 7.73$, $p = .01$, and

expectations, $F(1, 198) = 16.23$, $p < .001$, were significant. More importantly, we found a significant main effect for condition, $F(1, 198) = 3.26$, $p = .02$. This main effect was qualified by a significant interaction between condition and expectations, $F(1, 198) = 2.80$, $p = .04$: as depicted in Figure 2, the link between expectations and calmness was stronger in the mental contrasting condition than in any of other three conditions. However, the slope ($b = 3.36$) was only significantly different to the slope in the reverse contrasting condition, ($b = 0.40$, $t(195) = 2.82$, $p = .01$). More specifically, when expectations were low, particpants in the mental contrasting condition had the lowest score of calmness ($M = 21.56$), although it did not differ significantly from the reverse contrasting condition, $t(195) = 2.08$, $p = .83$, *n.s*. But when expectations were high, participants in the mental contrasting condition were significantly calmer ($M = 41.71$) than participants in the reverse contrasting condition, ($M = 29.56$), $t(195) = 8.44$, $p = .001$.

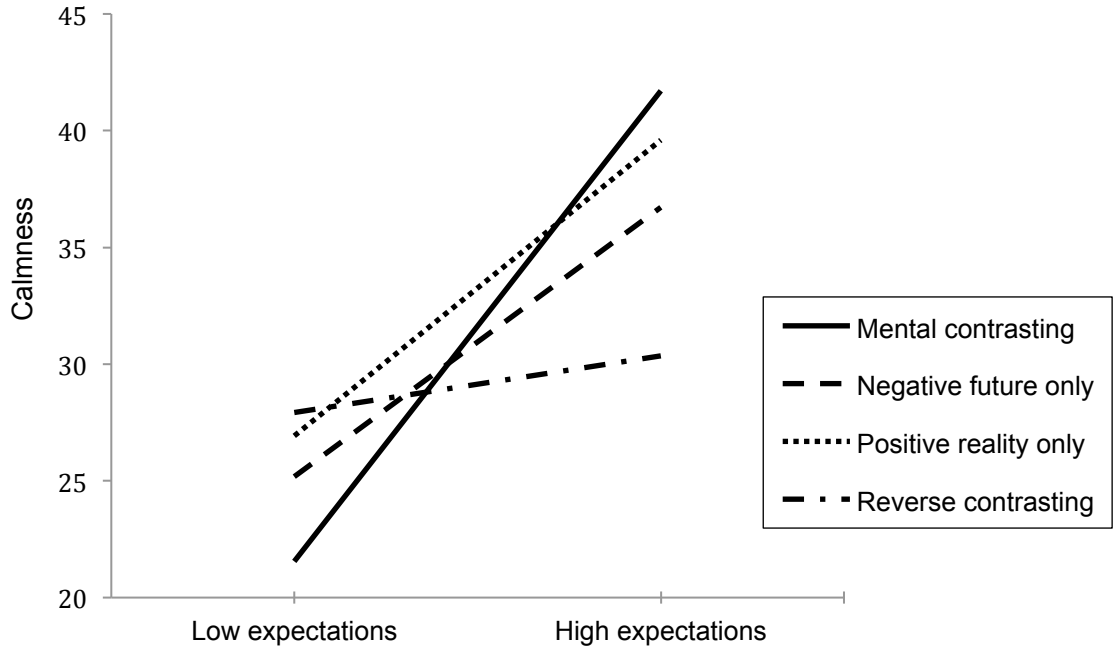

Figure 2. Interaction effect between condition and expectations on calmness. The slopes of the regression lines represent the link between expectations and calmness. The link is stronger in the mental contrasting condition than in the reverse contrasting condition.

Discussion

In Study 2, participants who mentally contrasted a negative future with the positive present reality exhibited lower state anxiety than participants who either reflected on the negative future only or reverse contrasted. In this regard, we replicated the anxiety regulatory effect of mental contrasting that we found in Study 1. Beyond that, we varied the context in which people applied the self-regulatory strategy: whereas in Study 1, we had participants think about a specific topic which we had presented to them (i.e., a potential epidemic of E. coli), in Study 2, participants themselves chose an idiosyncratic fear in their everyday lives. These findings extend the results of Study 1 and underline the wide range of application in which people may benefit from mentally contrasting a negative future. In addition to the anxiety-regulatory effect of mental contrasting, our data also indicate an impact on calmness regarding the feared future event: only in the mental contrasting condition we found a strong link between expectations of success and calmness. To point out, paired with high expectations of success, mental contrasting led to more calmness which in turn may help people approach their feared future event more constructively.

Interestingly, like in Study 1, we found a similiar anxiety-regulatory effect for the positive reality only condition as for the mental contrasting condition. Although we varied the methodological procedure to rule out the possibility that all participants passed a shortened kind of mental contrasting in the introductory section, participants who reflected on the positive reality only also showed less state anxiety than participants in the two other control conditions (i.e., the negative future only and the reverse contrasting condition). In contrast to these results, Oettingen et al. (2005) did not find an effect on tolerance for the positive reality only condition. Thus, again one might wonder if, in the context of anxiety, the mental elaboration on the positive reality only is sufficient to reduce anxiety. However, it would be premature to conlcude that from our findings, since there was a crucial difference in

the experimental manipulation of the positive reality only condition in Oettingen et al. (2005): whereas Oettingen et al. (2005) actively guided participants' attention away from the negative future (by linking their thoughts tightly to the positive reality), our manipulation was in line with the classic instructions in the research on mental contrasting (i.e., in the positive reality only condition, we had particpants name and elaborate on the most important and the second most important aspect of the present reality). More specifically, we did not have participants actively diminish the meaning of the future. Therefore, we assume that participants in the positive reality condition yet performed a kind of mental contrasting routine: by instructing them to think about their most important fear in the beginning of the study and subsequently having them mentally elaborate on the positive reality, the procedure was very similar to the procedure in the mental contrasting condition. In other words, the positive reality appeared in the context of the future. Although we paid attention to have people only name their fear in the beginning (i.e., without profound elaboration), we assume that participants yet started to imagine their feared future in more detail: their feared future event might have evoked such vivid images and fearful thoughts that it might have been in line with the first step of the mental contrasting manipulation (i.e., thinking about the worst thing participants associated with the feared future coming true). One may even argue that it is impossible to induce a positive reality only condition experimentally properly in the context of fears without actively guiding participants' thoughts away from their fear and undermining the meaning of the future (i.e., like in Oettingen et al., 2005). In contrast to a desired future, the mere mentioning of a fear may automatically activate vivid images of the corresponding future. From a functional perspective, fear and anxiety play a key role in the organism's defense system, and an effective defense must be quickly activated (Öhman, 2008). Consequently, "anxiety and worry are associated with an automatic processing bias" (Mathews, 1990, p. 462), oriented to threat. Thus, when participants are instructed to name an

idiosyncratic fear, images and thoughts of the feared future may immediately pop out. By thinking about a positive reality afterwards, participants inevitably pass a mental contrasting procedure. However, a vital advantage of mental contrasting over a positive reality only condition is that in mental contrasting people are guided systematically through each stage of the contrasting procedure. This includes an explicit instruction to elaborate on both the negative future and the positive reality. In other words, mental contrasting is well structured and predetermined and thus leads to predictable outcomes. In the positive reality only condition, by contrary, there is no clear instruction to elaborate on the negative future. Thus, one can only speculate about what exactly happened during the introductory section (i.e., when naming a feared future event). Much more research on the mechanisms is necessary before one may conclude under which circumstances the effects occur.

To summarize, in Study 2 we demonstrated the anxiety-regulatory effect of mental contrasting of a negative future with the positive reality in the context of idiosyncratic fears. We further found an expectancy-dependent effect of mental contrasting on calmness: paired with high expectations participants who mentally contrasted were calmer regarding their feared future event. In the next study we sought to find out if mental contrasting of a negative future also helps people in a current anxiety evoking situation. We used a mood manipulation paradigm to induce state anxiety and investigated the effects of mental contrasting.

Pilot Study for Study 3: Mood Manipulation Procedure

In Study 3 we sought to find out if mental contrasting of a negative future may help people reduce anxiety in a specific harmful situation. We focused on test anxiety and designed a test situation in the lab which participants were directly confronted with. Before launching the study we conducted a pilot study to investigate whether the test situation we created in the lab effectively evoked anxiety. We compared the progress of state anxiety in two experimental groups that both had to fulfill a mental task; importantly, we varied the

framework of this task between the groups. Participants in the test situation condition were expected to show a greater increase in state anxiety than participants in the control condition.

Method

Participants. We recruited participants (N = 24) from a large university in Germany. They had a mean age of 24 years (SD = 5.38), 79% (n = 19) were female.

Procedure and materials. Participants were run individually in the lab. After participants had signed the consent form we assessed state anxiety as a baseline measure, using the STAI-S with all twenty items. Participants were then randomly assigned to one of two conditions. In the test situation condition participants were faced with a mood manipulation procedure adapted from Keogh and French (1999) as well as from Kirschbaum, Pirke, and Hellhammer (1993). We announced a bogus novel intelligence test that we called *Speed Accuracy Intelligence Test (SAIT)*. The SAIT was said to measure hard-wired intelligence in a short, but valid way. To increase plausibility, we mentioned a ficitious author and date of publication and also listed some bogus empirical evidence for the test (e.g., that test scores correlated with measures of the working memory). Participants then read the instructions of their upcoming task. Specifically, they were instructed to count backwards out loud in steps of 17 from 2043 for two minutes. Additionally, we informed participants that they would be videotaped in order to evaluate their performance precisely. To summarize, we used several principles to raise state anxiety: (1) The announcement of a cognitive task, (2) a diagnostic value of the task which allows an interpersonal evaluation of the performance, and (3) a video recording which increases self-awareness (Duval & Wicklund, 1972).

Participants in the control condition also received a cognitive task. However, we described it neither as a task nor as an intelligence measure. Instead, it was introduced as a concentration game that students had recenty developed. Additionally, to avoid pressure that

simply arises from a difficult cognitive task, the mathematical operation was designed much easier; specifically, participants were assigned to only count forward in steps of 5 from zero. To avoid time pressure, we told participants that they should count as fast or as slowly as they like. There was no video camera installed in the control condition.

After this mood manipulation procedure, but before running the task, we assessed state anxiety as the dependent variable. We used the full 20-item subtest of the STAI. Subsequently, participants should actually perform the task. After assessing demographic data like gender and age, participants were fully debriefed. Due to the mood manipulation procedure the debriefing was notably extensive.

Results and Discussion

We computed a repeated measures analysis of variance (ANOVA) with state anxiety as the dependent variable, time of measurement as the within-subjects factor and condition as a fixed between-subjects factor. We found a significant main effect for time of measurement, $F(1,22) = 8.88$, $p < .01$. Importantly, this main effect was qualified by a significant interaction effect between condition and time of measurement, $F(1,22) = 5.42$, $p = .03$. As shown in Figure 3, participants in the experimental condition had a much stronger increase in state anxiety than participants in the control condition. Thus, the test situation in the lab worked successfully as a mood manipulation paradigm to induce anxiety. Based on this finding, in Study 3 we did not only seek to enhance anxiety by using this paradigm, but also and more importantly, to investigate if mental contrasting of a negative future may be used to down-regulate the resulting state anxiety.

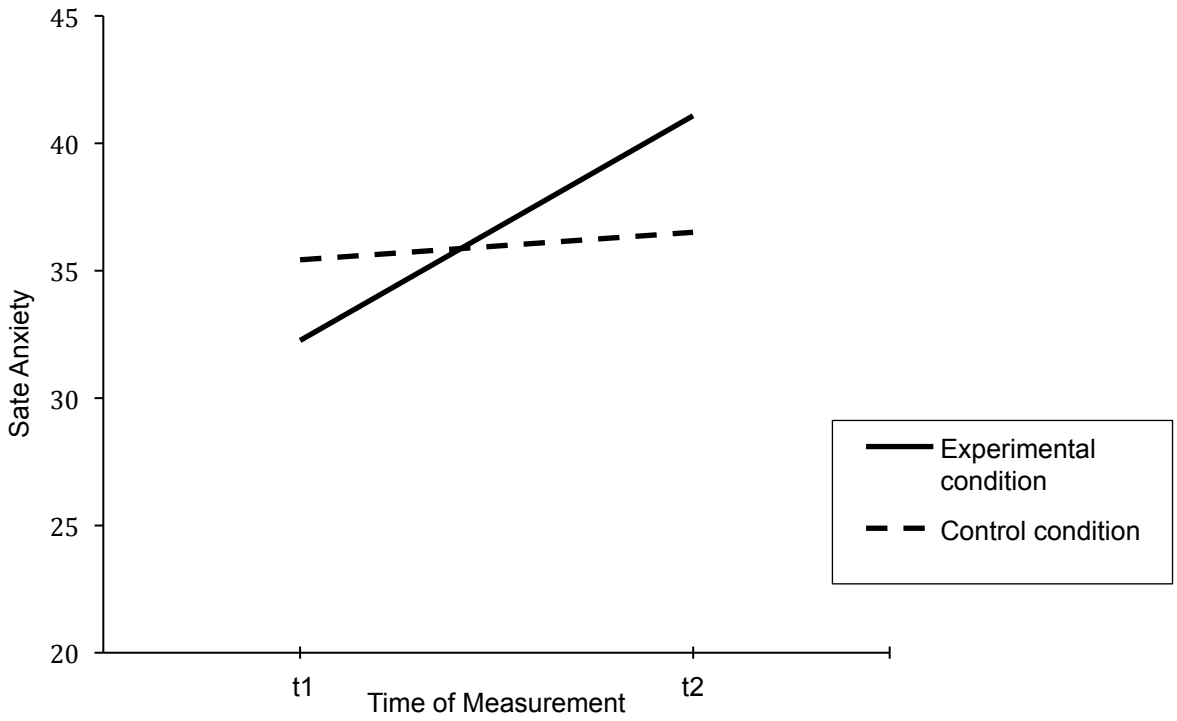

Figure 3. Interaction effect in the repeated-measures ANOVA between condition and time of measurement.

Study 3: Regulation of Test Anxiety

In this study we sought to investigate the effects of mental contrasting of a negative future on state anxiety and calmness in a test situation. Tests and examinations are a crucial part of our education system and in professional life. Since they have a "major impact on many aspects of adult life" (Keogh & French, 2001, p. 123) the pressure to do well is often extremely high. An individual's consistent and cross-situational reaction with anxiety related to test taking and examinations is called test anxiety (Pekrun, 1992; Sarason, 1984). Test anxiety plays in increasingly important role in education: according to Huberty (2010), up to thirty percent of students experience severe test anxiety. In this study we created a test situation in the lab to induce anxiety. Therefor we used the mood manipulation paradigm that was proved to increase state anxiety in the pilot study. We used a one-factorial experimental design: participants should either apply the strategy of mental contrasting of a negative

future, reflect on the negative future only, or simply describe an image which was used as a no treatment condition. We expected participants in the mental contrasting condition (1) to have less state anxiety and (2) to be calmer than participants in the two other conditions.

Method

Participants. We recruited participants (N = 110) from a large German university. Ten participants were excluded from data analyses bescause they did not mentally elaborate and write down their thoughts and images during the self-regulatory strategy. Of the remaining 100 participants 84 were female. The mean age was 25 years (SD = 6.04).

Procedure and materials. Participants were run in the lab individually. The study was said to be designed to evaluate a novel test and would take about 30 minutes. Participants were told that their participation was voluntary and that they could stop the experiment whenever they wanted. They signed the consent form and were handed out the questionnaires. At the end of the study participants were extensively debriefed and received credit for their participation which was course credit or 4.25 € by choice.

Mood manipulation. To create a test situation and increase participants' extent of anxiety we used the mood manipulation procedure of the pilot study. To summarize, participants were told that we would like to validate a novel method to measure intelligence. Therefor participants would have to perform a mental task, meaning that they should count backwards out loud in steps of 17 from 2043 for two minutes. This procedure was said to have a high diagnostic value. We videotaped participants during the task.

Manipulation of the self-regulatory strategy. Participants should apply the self-regulatory strategy in a state of fear. As Keogh and French (1999) pointed out, it is the announcement of a threatening situation that is sufficient to evoke fear. Hence, we instructed participants to use the self-regulatory mode of thought after the description of their task, but before performing the task. First, we asked participants to name their most important fear

regarding the upcoming task. Again we focused on unfounded fears so we instructed participants to write down a fear that was important to them, but that they felt was unfounded. Then, participants were randomly assigned to one of three conditions. (1) In the mental contrasting condition participants were instructed to think about both the negative future of their fear coming true and the positive reality that was standing against their fear coming true. Specifically, participants should begin with writing down the most important aspect of the negative future ("Think about the task. Imagine that your fear would come true. How would you feel? What would be the worst thing?"). Then we instructed participants to elaborate on this negative future ("Now really think about this worst thing. Take as much time as you need and let your thoughts and images free rein. Write down everything that comes to your mind."). Subsequently, we asked them to write down the most important aspect of the present reality that was standing against their fear coming true ("Sometimes things do not happen although we are afraid they could. What is standing in the way of your fear coming true? Name the most important aspect."). Again, they were instructed to elaborate on this most important aspect. (2) In the negative future only condition we had participants only reflect on the negative future of their fear coming true. The first two instructions were the same as in the mental contrasting condition. However, instead of the aspect of the present reality, we asked participants to think about the second worst thing they associated with their fear coming true. (3) In the no treatment control condition participants should apply no self-regulatory strategy. Instead, they were asked to describe an image of toy blocks in detail. This image was adapted from the International Affective Picture System (IAPS, Lang, Bradley, & Cuthbert, 1997) and was previously rated as emotionally neutral.

State anxiety. We assessed state anxiety at two times of measurement: (1) as a baseline measure after the mood manipulation procedure and (2) as our dependent variable after the manipulation of the self-regulatory strategy. We used the German version of the

STAI-S (Laux, Glanzmann, Schaffner, & Spielberger, 1981). Like the English version it consists of 20 items (e.g., "I am nervous"). However, due to the two times of measurement within a short period of time, we used a visual analogue scale instead of the original 4-point scale to minimize consistency biases in participants' responses. The scale had a length of 4 cm with the labels *not at all* at 0 cm and *very much so* at 4 cm.

Calmness. We also measured how calm participants were regarding the upcoming task. We used four self-created items that were directly linked to the cognitive task (e.g., "Regarding the task, I will take things as they come") on a 7-point resonse scale from 1 *(not at all)* to 7 *(very)*.

Performance in the cognitive task. Based on research demonstrating that anxiety impairs cognitive performance (see Eysenck, 1992, for an overwiew), we assume that if mental contrasting affected state anxiety and calmness, it might also have an influence on participants' actual performance in the cognitive task. Thus, we assessed performance as our third dependent variable by (1) counting how many steps of calculation participants accomplished within the two minutes, and (2) counting the number of mistakes participants made.

Control variables. We assessed several variables to control for their effect on the dependent variables.

Trait test anxiety. Prior to the mood manipulation procedure we assessed trait anxiety to be able to control for participants' stable tendencies to react anxiously in test situations. We used the German Test Anxiety Inventory (Prüfungsangstfragebogen, PAF; Hodapp, Rohrmann, & Ringeisen, 2011). The PAF is based on Spielberger's State-Trait-Anxiety Inventory (see above), but specifically refers to test situations. It consists of 20 items (e.g., "I worry about my performance"), using a 4-point response scale from 1 (*almost never*) to 4 (*almost always*).

Negative mood regulation expectancies. We also measured participants' expectations. Specifically, since we actively induced a negative emotional state we were interested in participants' general expectations to be able to regulate negative moods. Thus, we used the German short version of the Negative Mood Regulation Scale (Catanzaro & Mearns, 1990). This scale consists of 15 items (e.g. "When I am upset I believe I can usually find some way to help myself feel better ", reversely coded) on a 5-point response scale from 1 (*strongly disagree*) to 5 (*strongly agree*). It was designed to assess the "generalized expectancy for alleviating negative moods" (Catanzaro & Mearns, 1990, p. 547 f.). The scale has a high internal consistency (Cronbach's α = .78, Catanzaro & Mearns, 1990) and a high retest reliability (r_{tt} = .86 after six weeks, Mearns, 1991).

State anxiety baseline. As mentioned above we assessed a baseline measure of state anxiety using the full 20-item STAI-S. Thus, we could both control for the baseline measure of state anxiety and also analyze the progress of state anxiety within the two times of measurements.

Incentive value. We assessed participants' incentive value by asking them "How important is to you that your fear will not come true?" using a 7-point scale from 1 (*not at all important*) to 7 (*very important*).

Demographics. Finally, we assessed participants' demographics like age, gender, and cultural background.

Results

Descriptive data. We calculated sum scores of trait anxiety (with a possible score of 80) state anxiety (with a possible score of 100) and negative mood regulation expectancies (with a maximum possible score of 75). Participants had a slightly high extent of trait anxiety (M = 44.00, SD = 9.34) and a moderate extent of baseline state anxiety (M = 47.30, SD = 15.08). Participants had generally high negative mood regulation expectancies

(M = 52.89, SD = 9.29). Incentive value was above the midpoint of the 7-point scale (M = 4.61, SD = 1.54). Correlations between the key variables are given in Table 5.

Table 5

Correlations Between Key Variables (Study 3).

	1.	2.	3.	4.	5.	6.
1. trait anxiety	-					
2. expectations	-.36**	-				
3. incentive	.50**	-.33**	-			
4. baseline state anxiety	.52**	-.44**	.47**	-		
5. state anxiety	.48**	-.44**	.45**	.76**	-	
6. calmness	-.48**	.32**	-.40**	-.59**	-.76**	-

Note. **$p < .01$

State anxiety. To analyze whether participants who mentally contrasted had less state anxiety than participants in the two other conditions, we computed a GLM with state anxiety as the dependent variable, condition as a fixed between-subjects factor, and the continuous measures of trait anxiety, state anxiety baseline, negative mood regulation expectancies and incentive value as covariates. We only found a significant effect for the covariate state anxiety baseline, $F(1, 93) = 53.10$, $p < .001$, but neither did we find the expected main effect for condition nor a remarkable interaction, ps > .05, *n.s.* To get a better insight into the progress of state anxiety we also computed a repeated measures ANOVA with state anxiety as the dependent variable, time of measurement as a within-subjects factor, and condition as a fixed between-subjects factor. Overall, state anxiety slightly decreased (M_{t1}: 47.30, M_{t2}: 45.16); however, the main effect for the within-subjects factor time of measurement is only marginal significant, $F(1, 97) = 3.87$, $p = .05$. More importantly, we did not find the expected

interaction effect condition by time of measurement, $F(2, 97) < 1$, *n.s*. However, as depicted in Figure 4, the decrease of state anxiety in both the mental contrasting and the no treatment condition is more distinct than in the negative future only condition.

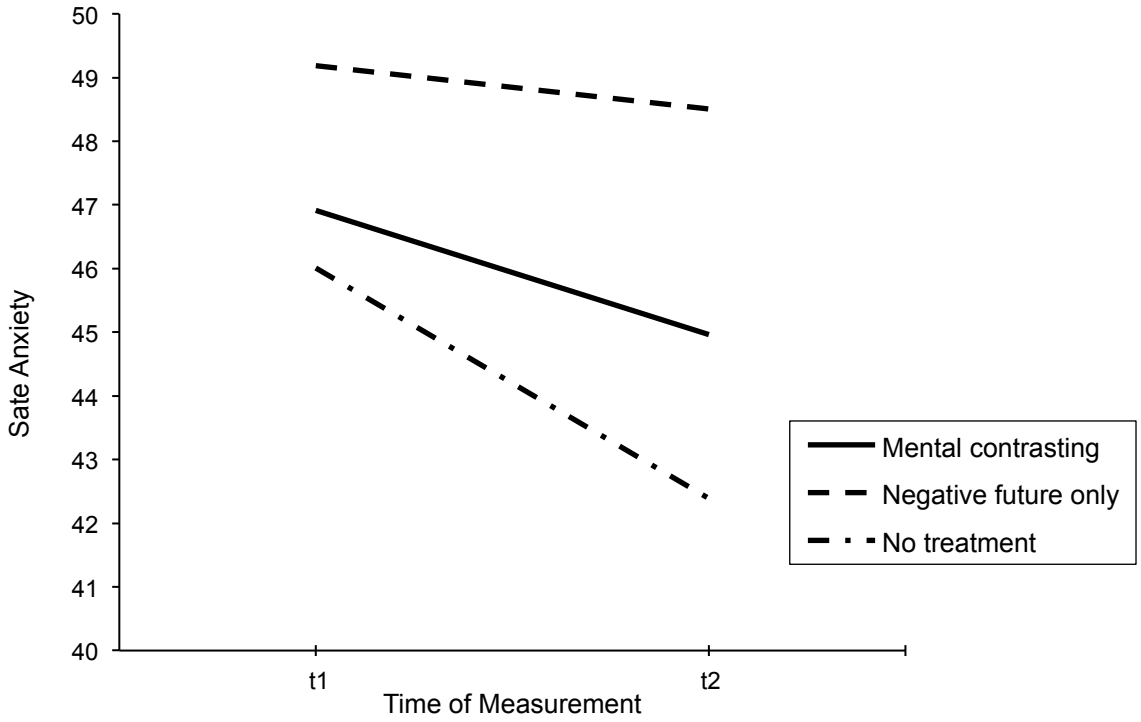

Figure 4. Results from the repeated-measures ANOVA: state anxiety descreased in the mental contrasting and in the no treatment condition more distinctly than in the negative future only condition. However, we did neither find a significant main effect nor the expected interaction condition by time of measurement.

Calmness. We combined the four items to a sum score of calmness (Cronbach's $\alpha = .71$). We computed a GLM with calmness as the dependent variable and condition as a fixed between-subjects factor. We included the continuous measures of trait anxiety, NMR expectancies, baseline state anxiety, and incentive value as covariates. We found significant effects for the covariates trait anxiety, $F(1, 93) = 4.88$, $p = .03$, and baseline state anxiety,

$F(1, 93) = 15.86$, $p < .001$. We did not find the expected main effect for condition, $F(2, 93) < 1$, *n.s.*

To test if there were interactions between condition and any of the four covariates, we ran four more GLMs. We found significant interaction effects for condition by NMR expectancies, $F(2, 91) = 44.78$, $p = .01$, condition by trait anxiety, $F(2, 92) = 6.46$, $p = .002$, and condition by baseline state anxiety, $F(2, 91) = 5.15$, $p = .01$.

Interaction between condition and NMR expectancies. The link between NMR expectancies (i.e., the expectations to be able to downregulate negative affects) and calmness was signficantly stronger in the mental contrasting condition than in the negative future only condition, $t(91) = -3.08$, $p = .003$. Bonferroni adjusted pairwise comparisons revealed that when NMR expectancies were low, participants in the mental contrasting condition were less calm than in the negative future only condition, $t(91) = 2.88$, $p = .02$; but when NMR expectancies were high, participants in the mental contrasting condition were calmer than participants in the negative future only condition, $t(91) = 3.00$, $p = .01$. Thus, mental contrasting led to expectancy-dependent calmness. This interaction effect is depicted in Figure 5.

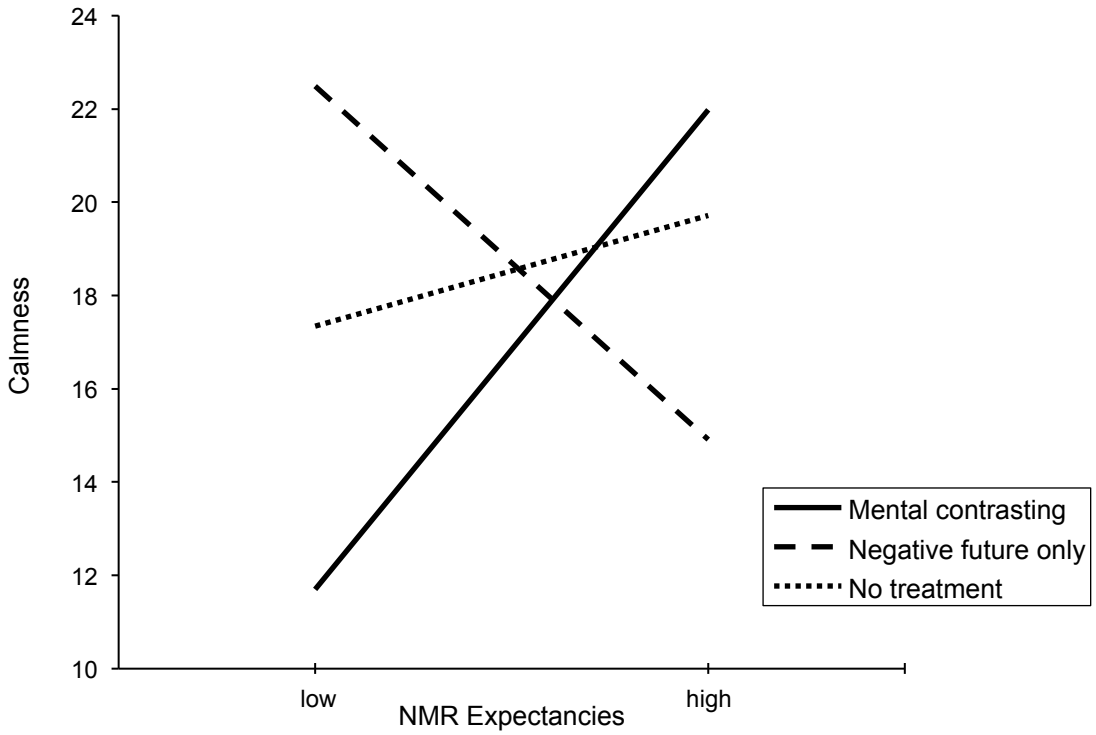

Figure 5. Interaction effect between condition and Negative Mood Regulation Expectancies (NMR Expectancies) on the dependent variable calmness. Participants who mentally contrasted showed a greater expectancy-dependent calmness than participants in the two other conditions.

Interaction between condition and trait test anxiety. The link between trait test anxiety and calmness was significantly stronger in the mental contrasting condition than in the negative future only condition, $t(91) = 2.89$, $p = .01$, and the no treatment condition, $t(91) = 3.36$, $p = .001$. Interestingly, Bonferroni adjusted pairwise comparisons revealed that when trait test anxiety was low, participants in the mental contrasting condition were calmer than participants in both the negative future only condition, $t(91) = 2.84$, $p = .02$, and the no treatment condition, $t(91) = 2.79$, $p = .02$; however, when trait test anxiety was high, participants in the mental contrasting condition were less calm than participants in the

negative future only condition, $t(91) = 2.73$, $p = .02$, and the no treatment condition, $t(91) = 3.48$, $p = .002$. This interaction is shown in Figure 6 left.

Interaction between condition and baseline state anxiety. The link between baseline state anxiety and calmness was significantly stronger in the mental contrasting condition than in the negative future only condition, $t(91) = 3.09$, $p = .003$. Bonferroni adjusted pairwise comparisons revealed that when baseline state anxiety was low, participants in the mental contrasting condition were calmer than participants in the negative future only condition, $t(91) = 3.06$, $p = .01$; when baseline state anxiety was high, participants in the mental contrasting condition were less calm than participants in the negative future only condition, $t(91) = 2.62$, $p = .03$. This interaction is shown in Figure 6 right.

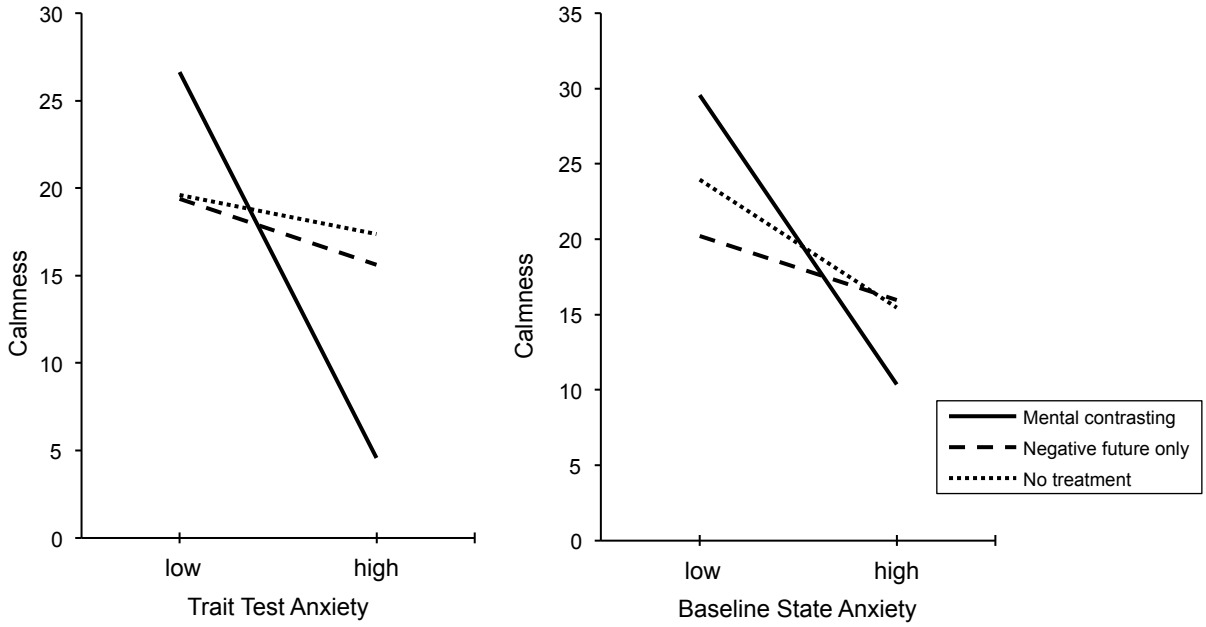

Figure 6. Left: Interaction effect between condition and trait test anxiety on calmness. Right: Interaction effect between condition and baseline state anxiety on calmness.

Performance in the cognitive task. To test whether mental contrasting affects participants' performance in the cognitive task, we computed two GLMs, (1) with number of calculation steps as the dependent variable, and (2) with number of mistakes as the dependent variable. Condition was a fixed between-subjects factor, and the measures of trait test anxiety, NMR expectancies, baseline state anxiety, and incentive value were included as covariates. We did not find any main effects or interaction effects, all *p*s > .08, *n.s.*

Discussion

In this study we investigated the effects of mental contrasting of a negative future on anxiety and calmness in a test situation. We found that mental contrasting led to expectancy-dependent calmness regarding the upcoming task. More specifically, participants who mentally contrasted and who had high NMR expectancies (i.e., high expectations to successfully regulate negative moods) were calmer than particpants who either reflected on the negative future only or who did not apply any self-regulatory strategy. But when participants had low NMR expectancies (i.e., low expectations to successfully regulate negative moods) mental contrasting led to less calmness regarding the upcoming task compared to the negative future only condition. Thus, with regard to calmness we found that general expectations to regulate negative moods play an important role: if expectations are high, people may benefit from mental contrasting in terms of increasing calmness. If expectations are low, people who mentally contrast may realize that chances of down-regulating their negative moods are low; as a consequence, it is reasonable to turn away from the cognitive task and to react less calm. In other words, mental contrasting may help people clarify their emotion-regulatory capacities.

Interestingly, we did not find a significant difference between the mental contrasting condition and the no treatment condition. One may argue, that the procedure in the no treatment condition might also have an emotion-regulatory effect: by concentrating on the

neutral image participants' thoughts were potentially distracted from the test situation and thus, particpants were less focused on their worries and fears. Therefore, it seems not surprising that we did not find significant differences between the mental contrasting condition and the no treatment condition. However, there were no differences between the no treatment condition and the negative future only condition either so that mental contrasting proved to be the most effective strategy. Furthermore, as outlined above, the regulatory effect of distraction is only impersistent and more likely to turn out rather ineffective in the long-term (e.g., Gross & Thompson, 2007; Hayes, Strosahl, & Wilson, 1999; Wenzlaff & Wegner, 2000).

We also found interaction effects on calmness between the self-regulatory strategy and trait test anxiety on the one hand, and between the self-regulatory strategy and baseline state anxiety on the other hand. To point out, only when participants had low anxiety (whether trait anxiety or baseline state anxiety) mental contrasting seemed to be an effective strategy to calm down even more. In contrast, when participants had high anxiety scores, mental contrasting led to less calmness regarding the upcoming task. There are several possible explanations for this effect: The first one is limited cognitive capacity due to high anxiety. Mental contrasting is a cognitively based strategy (e.g., Oettingen & Gollwitzer, 2001; Oettingen, 2012) and thus, one might argue, it may require at least some cognitive capacity. Anxiety, though, demands attention and thereby dampens cognitive efficiency (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & Van, 2007; Eysenck, Derakshan, Santos, & Calvo, 2007). As a result, people high in anxiety might not be able to down-regulate their anxiety by mental contrasting due to temporary cognitive restrictions. However, there is no empirical evidence that mental contrasting indeed requires much cognitive capacity. In fact, research demonstrating that mental contrasting is effectively applied by second graders (e.g.,

A. Gollwitzer, Kirby, Duckworth, & Mayer, 2011) underlines the assumption that mental contrasting is easy to learn and not likely to demand a vast amount of cognitive prerequisites.

A more plausible reason for the interaction effect between condition and anxiety might be found in our mood manipulation procedure: potentially, the cognitive task was too tough. People high in anxiety might have felt overstrained and thus were unable to find a positive aspect of the present reality standing in the way of their feared future. Although participants did mention distinctly positive reality aspects (e.g., "I know that I am good in arithmetic", "I have high self-esteem"), it does not rule out the possibility that participants might have been overstrained when actually starting the task. They might have felt unable to successfully cope with the challenge of the task and were therefore feeling less calm. In this regard, mental contrasting again helped participants clarify their chances to increase calmness: if they were too anxious from the outset and did not find a positive aspect of the present reality standing in the way of their feared future, it is reasonable to turn away and be less calm.

Unexpectedly, we could not replicate the effect of mental contrasting on state anxiety that we found in Study 1 and Study 2. If the cognitive task was too tough and participants were unable to put a reliable positive reality aspect against their feared future, it seems not surprising that anxiety scores did not decrease significantly. Furthermore, the STAI-S consists of relatively general items that are not related to a specific event (e.g., "I feel nervous"); mental contrasting, though, was specifically related to the task. Therefore, a small effect of mental contrasting might not have been apparent in the STAI-S. Since the items to assess calmness were more directly related to the task, this measure seemed to be more appropriate.

The relatively small and specific effect of mental contrasting might also be responsible for not finding an effect on the dependent measure of performance. Performance

per se is influenced by a variety of factors, and the relationship between anxiety and performance "has proved elusive" (Jones & Hardy, 1990, p. 8). Thus, there had to be a large effect of mental contrasting to affect actual performance in the task as well.

A methodological limitation of the study refers to the assessment of state anxiety at only two times of measurement: we had participants fill out the STAI-S (1) right after the mood manipulation procedure, and (2) again after applying the self-regulatory strategy. Since we did not measure state anxiety right before the mood manipulation, we were not able to check if our anxiety induction was successful. However, we relinquished this assessment deliberately because participants had already filled out the STAI-S two times within a short period of time. We sought to avoid consistency biases in participants' responses that would have been fostered by a third time of measurement. Therefore we conducted the pilot study and proved the mood manipulation procedure to successfully increase anxiety. Thus, one may assume the mood manipulation working in Study 3 in the same way as it did in the pilot study. Comparable anxiety scores in the two studies after the manipulation support this assumption.

To sum up, we found that mental contrasting of a negative future led to expectancy-dependent calmness in an anxiety evoking test situation. Thus, when general expectations to be able to regulate negative moods are high, mental contrasting may help people calm down and approach a challenging task.

General Discussion

Mental contrasting of a desired future has proven to be an effective strategy in a huge variety of domains with different populations and in different settings. However, until today there is little research on mental contrasting of a negative future. Oettingen et al. (2005) used this variant of the strategy and found it to be effectively increasing adolescents' tolerance towards immigrants. Yet, the research literature lacks further empirical evidence so that one

may only speculate about its functionality in different domains. In the present research we pursued this auspicious track and investigated the effects of mental contrasting of a negative future in the context of anxiety regulation. In three studies, we found a beneficial effect of mental contrasting of an unfoundedly feared future on anxiety in everyday life situations. In Study 1, participants who mentally contrasted a negative future of a potential bacterial epidemic with the positive reality standing against that feared future coming true, exhibited less state anxiety than participants who either reflected on the negative future only, or who reverse contrasted. In Study 2, we found that mental contrasting of a negative future also led to less state anxiety regarding an unfounded idiosyncratic fear in everyday life. Furthermore, we found that mental contrasting, paired with high expectations to successfully overcome the fear, led to increased calmness. In Study 3, we replicated the expectancy-dependent effect of mental contrasting on calmness with regard to an anxiety evoking test situation. In summary, our data suggest that mental contrasting of a negative future is an effective strategy to cope with a variety of fears.

Limitations and Future Research

The present research is only the beginning of investigating effects of mental contrasting of a negative future on anxiety. Thus, besides our findings of effectively reducing state anxiety, there are pending questions and methodological issues to be considered for future research.

Experimental manipulation of a positive reality only condition. In our first two studies we found a similar effect for the positive reality only condition as for the mental contrasting condition. In other words, participants who were instructed to reflect on the positive reality only also exhibited less state anxiety than those in the negative future only condition and the reverse contrasting condition. Is it therefore sufficient to think about positive reality only to regulate anxiety? From our point of view, one cannot conclude that from our findings: by thinking about their fear and subsequently elaborating on the positive

reality, participants in the positive reality only condition passed a comparable procedure as participants in the mental contrasting condition. Even more, it raises the question if one cannot induce a true positive reality only condition as far as participants should name their fear in the beginning of the study, because participants may automatically start to vividly imagine their feared future. As illustrated above, fear and anxiety are part of the organism's defense system and may therefore activate automatic processes like threat-related thoughts and images. Thus, more research is required to reveal what exactly happens in the positive reality only condition. So far, we assume mental contrasting of a negative future to provide a crucial advantage over a positive reality only condition, as it guides people systematically through the single stages of the contrasting procedure.

Mediating processes. Additional research is needed to investigate potential mediating processes. Does mental contrasting directly lead to less state anxiety, or does it initiate further regulatory mechanisms within the individual? Research on mental contrasting of a desired future has already demonstrated the mediating role of different cognitive and motivational processes (Kappes & Oettingen, 2014; Kappes, Singmann, & Oettingen, 2012; Kappes, Wendt, Reinelt, & Oettingen, 2013; Oettingen et al., 2009). One might assume that these underlying mechanisms may be present also in mental contrasting of a negative future. However, further research may unveil other potential mediating processes.

Mulitdimensional measures of anxiety. In our research we assessed participants' anxiety by self-report. Since anxiety is a multidimensional concept (see above), further measures that are not based on self-report would be a valuable complement. For instance, physiological measures like blood pressure or skin conductance would extend our findings. Certainly, these techniques only refer to somatic anxiety, disregarding the cognitive component. Hence, as mental contrasting is a cognitively based strategy, we would suggest not to pass up the cognitive anxiety dimension of anxiety.

Effects on behavior. We explicitly focused on state anxiety and calmness. Thus, we investigated the effects of mental contrasting from an emotion-regulatory perspective. However, a behavioral measure would provide additional important insights into the effectiveness of mental contrasting of a negative future. Does mental contrasting not only lead to less anxiety, but also foster action to constructively deal with a feared future event? The early study by Oettingen et al. (2005) indicates just that. However, the authors only measured participants' plans and did not explicitly focus on anxiety neither. The assessment of a behavioral measure subsequent to the mental contrasting procedure would contribute to a comprehensive understanding of mental contrasting of a negative future. For example, one might assess avoidance and approach behavior immediately prior to the occurance of a feared future event.

Long-term effects. An important question is whether mental contrasting of a negative future affects anxiety in the long term. In our research we focused on participants' state anxiety as our primary dependent variable. Thus, we investigated the effects of mental contrasting on emotion regulation in the short term. In other words, we demonstrated that people may use mental contrasting to immediately reduce anxiety in a given situation. But does mental contrasting also reduce trait anxiety and therefore influence people's stable tendencies to react anxiously across a variety of situations? We assume that people who regularly apply mental contrasting with regard to state anxiety will consequently (1) exhibit less state anxiety across different situations and (2) experience high regulatory competence frequently. As a result, we would expect trait anxiety to decrease. However, longitudinal studies are needed to provide insight into the effects of mental contrasting on trait anxiety.

Implications and Future Directions

The present research builds on initial findings that mental contrasting can also be applied in the context of a negative future (Oettingen et al., 2005). By finding that people

who mentally contrasted a negative future exhibited lower state anxiety and expectancy-dependent calmness than various control conditions, we made a first step towards applying mental contrasting as a strategy to regulate emotions. Specifically, we have shown that mental contrasting may be used to deal with fears in different everyday life situations. However, to establish mental contrasting of a negative future as an anxiety intervention some practical issues need to be considered and more research is needed.

Clinical anxiety. In the present research we focused on subclinical anxiety. We sought to investigate whether people may benefit from mental contrasting of a negative future in everyday life situations. However, our findings suggest that it might be worthwhile to investigate effects of mental contrasting in populations with clinical anxiety disorders. Anxiety disorders are characterized by an unfavorable and exaggerated extent of anxiety. Therefore, patients might benefit from any strategy that helps them down-regulate their anxiety. The implementation of mental contrasting – whether of a positive or negative future – is content-free as well as time- and cost-effective. People can easily learn the strategy and adapt it to any individual wish or fear, respectively. Hence, in a clinical context, it could be a beneficial supplement to conventional psychotherapy approaches. Mental contrasting is often taught as a metacognitive strategy, demonstrating long-term effects on behavior change (e.g., Johannessen, Oettingen, & Mayer, 2012; Oettingen, Mayer, & Brinkmann, 2010). Thereby, people first apply mental contrasting to an individual concern within the next twenty-four hours. Thereafter, they repeat the procedure with regard to an individual concern within a longer period of time (e.g., the next two weeks). The aim of this procedure is that people learn that they can apply mental contrasting to any concern they would like to. Thus, being taught as a metacognitive strategy, mental contrasting of a negative future could be a helpful tool that patients with severe anxiety disorders might benefit from.

Facilitative effects of anxiety. As long as anxiety is perceived as unreasonable and debilitative people will seek to reduce its extent. However, with regard to performance, there is research indicating that anxiety may also have facilitative effects so that a reduction of anxiety is not always beneficial. For example, initial research by Yerkes and Dodson (1908) suggest a negative quadratic relationship between arousal and performance. In other words, a moderate extent of arousal will be more likely to increase performance, whereas low and high arousal will be more likely to undermine performance. However, Yerkes and Dodson rather refer to physiological arousal than to anxiety. As a consequence, their findings might not be adequately applied to the relationship between anxiety and performance. Generally, one has to consider carefully, how researchers define the construct of anxiety. As Humara (1999) puts it, "[the] main problem that research on the relationship between anxiety and performance has encountered is that researchers have not adequately operationally defined the construct of anxiety. Instead, terms such as stress, anxiety, arousal and activation have been used interchangeably." (p. 1). More recently, Jones (1995) postulated that the effects of anxiety on performance depend on the individual's interpretation: whereas one individual may perceive a high extent of anxiety as facilitative, another one may perceive it as debilitative. Importantly, most research on the model of facilitative and debilitative anxiety is limited to sports performance. With regard to cognitive performance, though, evidence is more consistent, indicating that anxiety impairs performance especially when the task is complex and attentionally demanding (Derakshan & Eysenck, 2009; Eysenck, 1992). To point out, using mental contrasting of a negative future as an interventional tool to regulate anxiety requires a careful consideration of individual differences in the interpretation of anxiety and the specific area of application.

Dealing with reasonable fears. In our research we wanted participants to use mental contrasting of a negative future to down-regulate anxiety. This implies that an approach of

the feared future is effective for people's well-being. We therefore instructed participants to name a fear they felt being unfounded. However, although anxiety in many everyday life situations is not reasonable in relation to actual threat (Rapee, 1991), there are situations in which it is. For example, it would obviously not be adequate to reduce a child's fear of a busy road. As mentioned above, fear and anxiety have an important function in the organism's defense system (Öhman, 2008). To point out, one may not always seek to approach a negative future, but to avoid it. If a negative future should be used to create avoidance goals one may also use the strategy of mental contrasting. As outlined above, in a research by Oettingen et al. (2010) participants successfully set avoidance goals using mental contrasting of the negative future of continued cigarette consumption. Importantly, the experimental manipulation of mental contrasting regarding avoidance goals differs from the manipulation of mental contrasting regarding approach goals (see above). To sum up, one has to consider, if the reduction of anxiety is sensible and useful to constructively cope with an unfoundedly feared future, or if one has to deal with actual threat which should better be avoided.

Conclusion

The present research indicates that mental contrasting of a negative future with a positive reality is an effective strategy to deal with fears. In three studies, we found that mental contrasting led to less self-reported state anxiety and to an expectancy-dependent calmness regarding a feared future event. We have illustrated that people often feel afraid and yet simultaneously feel that their fear is unfounded. Whenever people find themeselves in these kinds of situations in which an unfounded fear restrains them from actively dealing with a future event (e.g., when facing a flight over the Atlantic, an exam, or an important job interview), they may benefit from mental contrasting of a negative future. Since it is a content-free, time- and cost-effective strategy, mental contrasting could be easily taught as a metacognitive strategy and thus may help people across various situtations in their everyday

lives. There is still little research on mental contrasting of a negative future, and we are only at the very beginning of examining it in the context of anxiety regulation. Thus, further research is needed to provide a more comprehensive insight into the mechanisms and the effectiveness in more domains.

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Appendix

Appendix 1: Questionnaire Study 1 (Online) 72

Appendix 2: Questionnaire Study 2 (Online) 87

Appendix 3: Questionnaire Pilot Study for Study 3 (Paper and Pencil) 102

Appendix 4: Questionnaire Study 3 (Paper and Pencil) 114

Appendix 1: Questionnaire Study 1 (Online)

CONSENT

We are interested in learning more about people's thoughts and feelings about what is happening on other continents.

PROCEDURES

If you decide to take part in the study, you will be asked several questions on the following pages. Taking part in the study will involve approximately 30 minutes. Please complete this study in one sitting - in a place that is quiet or where you will not be disturbed.

RISKS

There are no known risks to taking part in this study beyond those of everyday life.

BENEFITS

This research may help the investigator better understand how people think and feel about what is happening on other continents.

COMPENSATION & COSTS

Your participation in this study is voluntary. Participants who complete this survey will receive $1 for completing it. To verify completion, you must enter your worker ID at the end of the survey and you must paste the code you will find on the last page of the survey into MTurk. If you do not get to the last page of the survey where you receive this code you will not receive payment for your participation. There is no cost to participate.

CONFIDENTIALITY

The information from your participation in this study will be kept strictly confidential. The researcher will not ask you for any information that identifies you individually, and data will be stored on a protected computer in a locked office. The data will only be seen by the investigator and their co-investigators, and only aggregate data will be reported in any presentation or publication. Your IP address may be captured to check for participation in previous studies, but will not be used for any other purpose.

CONTACT INFORMATION

If you have any questions or concerns, please contact the investigator of this study:

gunnar.brodersen@uni-hamburg.de

I have read and understand the information above.

- ☐ Yes
- ☐ No

I want to participate in this research and continue with the survey.

- ☐ Yes
- ☐ No

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

	not at all	somewhat	moderately so	very much so
1. I feel pleasant	1	2	3	4
2. I feel nervous and restless	1	2	3	4
3. I feel satisfied with myself	1	2	3	4
4. I wish I could be as happy as others seem to be	1	2	3	4
5. I feel like a failure	1	2	3	4
6. I feel rested	1	2	3	4
7. I am "calm, cool, and collected"	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
9. I worry too much over something that really doesn't matter	1	2	3	4
10. I am happy	1	2	3	4
11. I have disturbing thoughts	1	2	3	4
12. I lack self-confidence	1	2	3	4
13. I feel secure	1	2	3	4
14. I make decisions easily	1	2	3	4
15. I feel inadequate	1	2	3	4
16. I am content	1	2	3	4
17. Some unimportant thought runs through my mind and bothers me	1	2	3	4
18. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
19. I am a steady person	1	2	3	4
20. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

In this study we want to investigate how people think about what is happening on other continents. Often, we do not really know much about actual political or health problems on other continents. For example, did you know how the severe disease caused by the E.coli bacterium has entailed a serious epidemic in Western Europe in 2011?
Below, you find an article of the New York Times Magazine which describes E.coli. Please read the article carefully because subsequently you will be asked questions referring to the article.

An unexpected threat: E.coli causes a new epidemic in Europe
04/05/2014

It is as obscure as its name insinuates: Enterohemorrhagic Escherichia coli, betterly known as E.coli or EHEC, kept Western Europe in a state of shock. After outbreaks in the early 2000s people thought they had defeated the terrible bacterium. But in 2011, E.coli made a comeback: Beginning in Germany and spreading over Western Europe. More than 3,000 cases of infection were counted. The threatening distinction from earlier cases lied in the source of infection; whereas the causative agent of E.coli usually infected humans via animal-based food products, like meat or milk, now vegetables like gherkins and tomatoes were the new carriers of E.coli bacteria. The so-called hemolytic-uremic syndrome which includes symptoms like bloody diarrhea and even renal failure, requires urgent treatment. During the fatal epidemic in 2011, 50 people died, demonstrating the grave danger of E.coli. However, experts consider the risks of E.coli spreading of E.coli to the United States very unlikely. Specifically, they clarify:

- Research on E.coli has made substantial progress, and thus scientists know all possible variations of the bacterium.
- Based on acquired knowledge and past experiences, health organizations are well-prepared: A first case of infection would be identified and treated quickly, so an outbreak can be prevented.
- The best prevention of E.coli is hygiene, and hygiene provisions in the United States comply with the highest standards.

Please indicate your fear that E.coli might spread to the United States.

1	2	3	4	5	6	7
no fear at all						very much fear

How likely do you think it is that you will overcome this fear?

1	2	3	4	5	6	7
not at all likely						very likely

How important is it to you that you will overcome this fear?

1	2	3	4	5	6	7
not at all important						very important

How likely do you think it is that E.coli will spread to the United States?

1	2	3	4	5	6	7
not at all likely						very likely

How important is it to you that E.coli will <u>not</u> spread to the United States?

1	2	3	4	5	6	7
not at all important						very important

When you think about E.coli: How do you feel right now?

	not at all	somewhat	moderately so	very much so
1. I feel calm	1	2	3	4
2. I am worried	1	2	3	4
3. I feel nervous	1	2	3	4

[Mental Contrasting]
Now imagine E.coli would spread to the United States. For example, it might come to the continent via infected animals or vegetables. Or tourists might be infected and would bring the disease to America.
What is the worst thing that you associate with E.coli coming to the United States? Identify the worst thing and write it down:

_____ (3-6 words)

Now really think about this worst thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

Sometimes things do not happen although we are afraid they could. What is the most important aspect of the present reality that is standing against the spreading of E.coli to the United States? What should hinder the spreading of E.coli? Identify the most important thing that should hinder the spreading of E.coli to the United States and write it down:

_____ (3-6 words)

Now really think about this most important thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

[Negative Future Only]
Now imagine E.coli would spread to the United States. For example, it might come to the continent via infected animals or vegetables. Or tourists might be infected and would bring the disease to America. What is the worst thing that you associate with E.coli coming to the United States? Identify the worst thing and write it down:

_____ (3-6 words)

Now really think about this worst thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

Again, imagine E.coli would spread to the United States. What is the second worst thing that you associate with E.coli coming to the United States? Identify the second worst thing and write it down:

_____ (3-6 words)

Now really think about this second worst thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

[Positive Reality Only]
Sometimes things do not happen although we are afraid they could. What is the most important aspect of the present reality that is standing against the spreading of E.coli to the United States? What should hinder the spreading of E.coli? Identify the most important thing that should hinder the spreading of E.coli to the United States and write it down:

_____ (3-6 words)

Now really think about this most important thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

What is the second most important aspect of the present reality that is standing against the spreading of E.coli to the United States? What should hinder the spreading of E.coli? Identify the second most important thing that should hinder the spreading of E.coli to the United States and write it down:

_____ (3-6 words)

Now really think about this second most important thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

[Reverse Contrasting]
Sometimes things do not happen although we are afraid they could. What is the most important aspect of the present reality that is standing against the spreading of E.coli to the United States? What should hinder the spreading of E.coli? Identify the most important thing that should hinder the spreading of E.coli to the United States and write it down:

_____ (3-6 words)

Now really think about this most important thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

Now imagine E.coli would spread to the United States. For example, it might come to the continent via infected animals or vegetables. Or tourists might be infected and would bring the disease to America.
What is the worst thing that you associate with E.coli coming to the United States? Identify the worst thing and write it down:

_____ (3-6 words)

Now really think about this worst thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

When you think about E.coli: How do you feel right now?

	not at all	somewhat	moderately so	very much so
1. I feel calm	1	2	3	4
2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I feel strained	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes	1	2	3	4
8. I feel satisfied	1	2	3	4
9. I feel frightened	1	2	3	4
10. I feel comfortable	1	2	3	4
11. I feel self-confident	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel indecisive	1	2	3	4
15. I am relaxed	1	2	3	4
16. I feel content	1	2	3	4
17. I am worried	1	2	3	4
18. I feel confused	1	2	3	4
19. I feel steady	1	2	3	4
20. I feel pleasant	1	2	3	4

At last, olease answer some demographic questions.

Gender

- ☐ female
- ☐ male

How old are you?

_____ years

In which country do you live?

- ☐ USA
- ☐ Mexico
- ☐ China
- ☐ India
- ☐ Other: _____

In which city do you live?

City: _____ State: _____

In which country were you born?

- ☐ USA
- ☐ Mexico
- ☐ China
- ☐ India
- ☐ Other: _____

Please specify your ethnicity:

- ☐ White
- ☐ Hispanic or Latino
- ☐ Black or African American
- ☐ Native American or American Indian
- ☐ Asia / Pacific Islander
- ☐ Other: _____

What is your highest graduation?

- ☐ None
- ☐ Middle School
- ☐ High School
- ☐ College
- ☐ Other: _____

Please specify your current employment status:

- ☐ Employed
- ☐ Self-Employed
- ☐ Unemployed and looking for work
- ☐ Unemployed and currently not looking for work
- ☐ A homemaker
- ☐ A student
- ☐ Military
- ☐ Retired
- ☐ Unable to work

Thank you very much for your participation!
On the next page you will find your confirmation code for amazon MTurk. Enter the code on the study's site on MTurk. After sending the code on MTurk, the investigator of this study will check the completeness of the data and will pay you off.

Debriefing of the study:
In this study we would like to investigate the effectiveness of a self-regulation strategy in the context of affect regulation. Therefore you were assigned randomly to one of four experimental conditions (different self-regulatory strategies). We analyse if participants in the four conditions differ in relation to their stated thougths and feelings regarding the fear of E.coli. The article you read was fictitious and has never published in the New York Times Magazine nor elsewhere. Its purpose was to give you some information about E.coli. Parts of the information was right, but other parts were fictisious. Also the funds at the end of the study were fictitious. We want to measure if people who use different self-regulatory strategies would also differ in the amount of donation to the fund which is said to protect the U.S. against E.coli.
This reasearch is based on Fantasy Realization Theory (see Oettingen, 2012) which demonstrates the effectiveness of a self-regulatory strategy called mental contrasting. Mental contrasting is characterized by contrasting a future fantasy (positive or negative) with aspects of present realtiy standing in the way of the future coming true (negative or positive, respectively). For a review, see:

Oettingen, G. (2012). Future thought and behavior change. *European Review of Social Psychology, 23*, 1-63.

Oettingen, G., Mayer, D., Thorpe, J.S., Janetzke, H., & Lorenz, S. (2005). Turning fantasies about positive and negative futures into self-improvement goals. *Motivation and Emotion, 29*, 237-267.

If you have any questions or concerns, please feel free to contact the investigator of the study via e-mail: gunnar.brodersen@uni-hamburg.de

☐ I have read and understand the information above and confirm my debriefing.

1. In order to confirm that you finished this task and to receive the payment of 1 US Dollar: 1. Please enter the following code in the text box below AND on MTurk (you may write it down or copy and paste it).
   Code here: _____

2. Please enter your MTurk Worker ID below:
   (Please make sure you enter your ID correctly. We will need this information in order to pay you on MTurk).

   _____

Appendix 2: Questionnaire Study 2 (Online)

CONSENT

We are interested in learning more about people's thoughts and feelings about what is happening on other continents.

PROCEDURES

If you decide to take part in the study, you will be asked several questions on the following pages. Taking part in the study will involve approximately 30 minutes. Please complete this study in one sitting - in a place that is quiet or where you will not be disturbed.

RISKS

There are no known risks to taking part in this study beyond those of everyday life.

BENEFITS

This research may help the investigator better understand how people think and feel about what is happening on other continents.

COMPENSATION & COSTS

Your participation in this study is voluntary. Participants who complete this survey will receive $1 for completing it. To verify completion, you must enter your worker ID at the end of the survey and you must paste the code you will find on the last page of the survey into MTurk. If you do not get to the last page of the survey where you receive this code you will not receive payment for your participation. There is no cost to participate.

CONFIDENTIALITY

The information from your participation in this study will be kept strictly confidential. The researcher will not ask you for any information that identifies you individually, and data will be stored on a protected computer in a locked office. The data will only be seen by the investigator and their co-investigators, and only aggregate data will be reported in any presentation or publication. Your IP address may be captured to check for participation in previous studies, but will not be used for any other purpose.

CONTACT INFORMATION

If you have any questions or concerns, please contact the investigator of this study:
gunnar.brodersen@uni-hamburg.de

I have read and understand the information above.

- ☐ Yes
- ☐ No

I want to participate in this research and continue with the survey.

- ☐ Yes
- ☐ No

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

	not at all	somewhat	moderately so	very much so
1. I feel pleasant	1	2	3	4
2. I feel nervous and restless	1	2	3	4
3. I feel satisfied with myself	1	2	3	4
4. I wish I could be as happy as others seem to be	1	2	3	4
5. I feel like a failure	1	2	3	4
6. I feel rested	1	2	3	4
7. I am "calm, cool, and collected"	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
9. I worry too much over something that really doesn't matter	1	2	3	4
10. I am happy	1	2	3	4
11. I have disturbing thoughts	1	2	3	4
12. I lack self-confidence	1	2	3	4
13. I feel secure	1	2	3	4
14. I make decisions easily	1	2	3	4
15. I feel inadequate	1	2	3	4
16. I am content	1	2	3	4
17. Some unimportant thought runs through my mind and bothers me	1	2	3	4
18. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
19. I am a steady person	1	2	3	4
20. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

Sometimes we are afraid of a negative future although we know our fears are unreasonable or unfounded. For example, there may be a specific future event or scenario that provokes fearful thoughts in you although you know it is very unlikely that your fears will bear out.

Now, thinking about the next three weeks, please name an event or scenario that you will face that evokes such unfounded or unreasonable fears in you. Name an event or scenario, where you have such fears although you feel that they are unfounded or unreasonable.

Event or scenario:

_____

Think about this event or scenario: What are you afraid of? What is your feared future? Write it down.

My feared future:

_____

How likely do you think it is that your feared future will come true?

1	2	3	4	5	6	7
not at all likely						very likely

How important is it to you that your feared future will <u>not</u> come true?

1	2	3	4	5	6	7
not at all important						very important

How likely do you think it is that you will overcome your fear?

1	2	3	4	5	6	7
not at all likely						very likely

How important is it to you that you will overcome your fear?

1	2	3	4	5	6	7
not at all important						very important

When you think about your feared future: How do you feel now?

	not at all	somewhat	moderately so	very much so
1. I feel calm	1	2	3	4
2. I am worried	1	2	3	4
3. I feel nervous	1	2	3	4

[Mental Contrasting]
What is the worst thing that you associate with your feared future coming true? Identify the worst thing and write it down:

_____ (3-6 words)

Now really think about this worst thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

Sometimes things do not happen although we are afraid they could. What is the most important aspect of the present reality that is standing against your feared future coming true? What should prevent your feared future from coming true? Identify the most important thing that should prevent that your feared future will actually happen and write it down:

_____ (3-6 words)

Now really think about this most important thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

[Negative Future Only]
What is the worst thing that you associate with your feared future coming true? Identify the worst thing and write it down:

_____ (3-6 words)

Now really think about this worst thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

What is the second worst thing that you associate with your feared future coming true? Identify the second worst thing and write it down:

_____ (3-6 words)

Now really think about this second worst thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

[Positive Reality Only]
Sometimes things do not happen although we are afraid they could. What is the most important aspect of the present reality that is standing against your feared future coming true? What should prevent your feared future from coming true? Identify the most important thing that should prevent that your feared future will actually happen and write it down:

_____ (3-6 words)

Now really think about this most important thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

What is the second most important aspect of the present reality that is standing against your feared future coming true? What should prevent your feared future from coming true? Identify the second most important thing that should prevent that your feared future will actually happen and write it down:

_____ (3-6 words)

Now really think about this second most important thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

[Reverse Contrasting]
Sometimes things do not happen although we are afraid they could. What is the most important aspect of the present reality that is standing against your feared future coming true? What should prevent your feared future from coming true? Identify the most important thing that should prevent that your feared future will actually happen and write it down:

_____ (3-6 words)

Now really think about this most important thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

What is the worst thing that you associate with your feared future coming true? Identify the worst thing and write it down:

_____ (3-6 words)

Now really think about this worst thing. Imagine the relevant events and scenarios as vividly as possible. Let your mind go! Do not hesitate to give your thoughts and images free rein. Take as much time and space as you need to write down your thoughts and images:

When you think about your feared future: How do you feel now?

	not at all	somewhat	moderately so	very much so
1. I feel calm	1	2	3	4
2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I feel strained	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes	1	2	3	4
8. I feel satisfied	1	2	3	4
9. I feel frightened	1	2	3	4
10. I feel comfortable	1	2	3	4
11. I feel self-confident	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel indecisive	1	2	3	4
15. I am relaxed	1	2	3	4
16. I feel content	1	2	3	4
17. I am worried	1	2	3	4
18. I feel confused	1	2	3	4
19. I feel steady	1	2	3	4
20. I feel pleasant	1	2	3	4

Now think about your future event or scenario and indicate for each of the following statements to what extent you agree with it.

Regarding the future event I named before ...

... I feel my fears have subsided.

1	2	3	4	5	6	7
not at all						very

... I feel let the event come.

1	2	3	4	5	6	7
not at all						very

... I will take things as they come.

1	2	3	4	5	6	7
not at all						very

... I feel like avoiding it.

1	2	3	4	5	6	7
not at all						very

... I feel like running away from it.

1	2	3	4	5	6	7
not at all						very

... I feel like actively dealing with it.

1	2	3	4	5	6	7
not at all						very

... I feel like taking it right on.

1	2	3	4	5	6	7
not at all						very

... I feel like preparing for it.

1	2	3	4	5	6	7
not at all						very

At last, please answer some demographic questions.

Gender

- ☐ female
- ☐ male

How old are you?

_____ years

In which country do you live?

- ☐ USA
- ☐ Mexico
- ☐ China
- ☐ India
- ☐ Other: _____

In which city do you live?

City: _____ State: _____

In which country were you born?

- ☐ USA
- ☐ Mexico
- ☐ China
- ☐ India
- ☐ Other: _____

Please specify your ethnicity:

- ☐ White
- ☐ Hispanic or Latino
- ☐ Black or African American
- ☐ Native American or American Indian
- ☐ Asia / Pacific Islander
- ☐ Other: _____

Which language do you speak (at home)?

- ☐ English
- ☐ Spanish
- ☐ Chines
- ☐ Other: _____

What is your highest graduation?

- ☐ None
- ☐ Middle School
- ☐ High School
- ☐ College
- ☐ Other: _____

Please specify your current employment status:

- ☐ Employed
- ☐ Self-Employed
- ☐ Unemployed and looking for work
- ☐ Unemployed and currently not looking for work
- ☐ A homemaker
- ☐ A student
- ☐ Military
- ☐ Retired
- ☐ Unable to work

Thank you very much for your participation!
On the next page you will find your confirmation code for amazon MTurk. Enter the code on the study's site on MTurk. After sending the code on MTurk, the investigator of this study will check the completeness of the data and will pay you off.

Debriefing of the study:
In this study we would like to investigate the effectiveness of a self-regulation strategy in the context of affect regulation. Therefore you were assigned randomly to one of four experimental conditions (different self-regulatory strategies). We analyse if participants in the four conditions differ in relation to their stated thougths and feelings regarding an unfounded fear.
This reasearch is based on Fantasy Realization Theory (see Oettingen, 2012) which demonstrates the effectiveness of a self-regulatory strategy called mental contrasting. Mental contrasting is characterized by contrasting a future fantasy (positive or negative) with aspects of present realtiy standing in the way of the future coming true (negative or positive, respectively). For a review, see:

Oettingen, G. (2012). Future thought and behavior change. *European Review of Social Psychology, 23*, 1-63.

Oettingen, G., Mayer, D., Thorpe, J.S., Janetzke, H., & Lorenz, S. (2005). Turning fantasies about positive and negative futures into self-improvement goals. *Motivation and Emotion, 29*, 237-267.

If you have any questions or concerns, please feel free to contact the investigator of the study via e-mail: gunnar.brodersen@uni-hamburg.de

☐ I have read and understand the information above and confirm my debriefing.

3. In order to confirm that you finished this task and to receive the payment of 1 US Dollar: 1. Please enter the following code in the text box below AND on MTurk (you may write it down or copy and paste it).
   Code here: _____
4. Please enter your MTurk Worker ID below:
   (Please make sure you enter your ID correctly. We will need this information in order to pay you on MTurk).

   _____

Appendix 3: Questionnaire Pilot Study for Study 3 (Paper and Pencil)

Informationen/Informierte Einwilligungserklärung zur Studie „Cognition“

Ihre Teilnahme an der Studie ist freiwillig. Sie können Ihre Teilnahme jederzeit ohne jegliche Konsequenzen beenden oder abbrechen.

Der Ablauf der Studie ist in zwei Abschnitte geteilt, in denen Sie jeweils einen Fragebogen ausfüllen sollen. Insgesamt wird die Untersuchung ca. 45 Minuten dauern.

Es sind keine Nebenwirkungen oder potentielle Risiken bekannt, die durch die Teilnahme auftreten können.

Die Erhebung und die Auswertung Ihrer Daten erfolgen vertraulich und anonym.

Bei Fragen bezüglich der Studie wenden Sie sich bitte an:
Gunnar Brodersen: gunnar.brodersen@uni-hamburg.de

Ich habe die oben stehende Information zur Kenntnis genommen und nehme aus freien Stücken an dieser Studie teil.

Name (Vor- und Nachname) :_____

Unterschrift:_____

Datum : _____

Herzlich Willkommen!

Der Ablauf der Studie ist in zwei Abschnitte unterteilt, in denen Sie jeweils einen Fragebogen ausfüllen sollen. Bitte füllen Sie zunächst den Fragebogen auf der folgenden Seite vollständig aus und geben anschließend dem Versuchsleiter Bescheid. Dieser wird Ihnen dann das weitere Material aushändigen.

Bitte wenden

Im Folgenden finden Sie eine Reihe von Feststellungen, mit denen man sich selbst beschreiben kann. Bitte lesen Sie jede Feststellung durch und geben Sie an, wie Sie sich **jetzt**, d.h. **in diesem Moment fühlen**. Setzen Sie dafür bitte bei jeder Feststellung einen kurzen, senkrechten Strich an genau die Stelle der Linie, die angibt, wie sie sich gerade fühlen.

Es gibt keine richtigen und falschen Antworten. Überlegen Sie bitte nicht lange und denken Sie daran, diejenige Stelle mit einem Strich zu markieren, die Ihren **augenblicklichen** Gefühlszustand am besten beschreibt.

	überhaupt nicht	ein wenig	ziemlich	sehr
1. Ich bin ruhig	1	2	3	4
2. Ich fühle mich geborgen	1	2	3	4
3. Ich fühle mich angespannt	1	2	3	4
4. Ich bin bekümmert	1	2	3	4
5. Ich bin gelöst	1	2	3	4
6. Ich bin aufgeregt	1	2	3	4
7. Ich bin besorgt, dass etwas schiefgehen könnte	1	2	3	4
8. Ich fühle mich ausgeruht	1	2	3	4
9. Ich bin beunruhigt	1	2	3	4
10. Ich fühle mich wohl	1	2	3	4
11. Ich fühle mich selbstsicher	1	2	3	4
12. Ich bin nervös	1	2	3	4
13. Ich bin zappelig	1	2	3	4
14. Ich bin verkrampft	1	2	3	4
15. Ich bin entspannt	1	2	3	4

16. Ich bin zufrieden	1	2	3	4
17. Ich bin besorgt	1	2	3	4
18. Ich bin überreizt	1	2	3	4
19. Ich bin froh	1	2	3	4
20. Ich bin vergnügt	1	2	3	4

[Mood Manipulation Condition)

Zweiter Abschnitt

In diesem zweiten Teil der Studie wird ein neuartiges von Marshall (2011) entwickeltes Verfahren zur effizienten Messung von Intelligenz angewendet: Der *Speed-Accuracy-Intelligence Test (SAIT)*. Bei diesem Verfahren handelt es sich um eine sogenannte *Speed-Accuracy Task*, d.h. eine Aufgabe, die Sie möglichst schnell und mit möglichst wenig Fehlern lösen müssen. Im Vergleich zu anderen Intelligenzmessverfahren bietet Marshall's Test drei entscheidende Vorteile:

- Der Test ist sehr zeitökonomisch, so dass schnell ein Ergebnis vorliegt.
- Er misst grundlegende kognitive Funktionen („hard-wired intelligence") und ist deshalb kulturübergreifend verwendbar.
- Neurophysiologische Studien mit bildgebenden Verfahren (z.B. fMRI, PET) konnten zeigen, dass mittels dieses Intelligenztests zudem die saltatorische Erregungsgeschwindigkeit im Bereich des Arbeitsgedächtnisses als zusätzliches Maß erfasst werden kann. Diese lässt eine direkte Aussage über die Effizienz des Arbeitsgedächtnisses zu (Clark & Marshall, 2012).

Sie werden gleich die Aufgabe des SAIT erhalten. Wie gut Ihre kognitiven Funktionen ausgeprägt sind, erfahren Sie direkt im Anschluss an die Aufgabe in Form eines kurzen Leistungsfeedbacks. Das lässt sich anhand der Schnelligkeit und der Anzahl der Fehler beurteilen, mit der Sie die Aufgabe bewältigen: Je besser und stärker Ihre kognitiven Fähigkeiten ausgeprägt sind, desto schneller werden Sie die Aufgabe lösen können und desto weniger Fehler werden Sie machen.

Um zu bewerten, wie gut Sie abschneiden, wird eine Videokamera laufen und Sie beim Lösen der Aufgabe filmen.

Bitte wenden

Ihre Aufgabe lautet folgendermaßen:

Zählen Sie von der Zahl 2043 in 17er Schritten rückwärts.

Sprechen Sie jedes Zwischenergebnis laut und deutlich aus, damit es von der Kamera aufgezeichnet werden kann. Der Versuchsleiter wird Ihnen das Startsignal geben. Ab diesem Zeitpunkt haben Sie zwei Minuten Zeit, um so weit wie möglich herunter zu zählen. Zählen Sie so schnell wie möglich und machen Sie so wenig Fehler wie möglich.

Bevor es losgeht, beantworten Sie bitte zunächst die Fragen auf den folgenden Seiten. Anschließend geben Sie dem Versuchsleiter Bescheid.

Bitte wenden

[Control Condition]

Zweiter Abschnitt

In diesem zweiten Teil der Studie soll nun der Nutzen eines Konzentrationsspiels getestet werden: Studenten haben dieses Spiel im Rahmen ihrer Masterarbeit entwickelt. Es stellt die Kurzform des v.a. in den USA beliebten und bereits etablierten Konzentrationsspiels „Count for your mind“ (Spinx Spieleverlag) dar. Wir möchten nun in Erfahrung bringen, ob diese Kurzform mit der Langform vergleichbar ist: Da in der Kurzform Elemente der längeren Originalversion entfernt wurden, ist das Spiel deutlich schneller und einfacher durchzuführen. Ob der Spaßfaktor und der Nutzen aber noch derselbe ist, möchten wir mit dieser Studie untersuchen.

Sie werden gleich die Kurzform des Spiels erhalten. Wie es funktioniert, wird auf der nächsten Seite erklärt. Wie beliebt das Spiel bei anderen Personen ist, erfahren Sie im Anschluss.

Es ist in dieser Studie lediglich von Interesse, wie Ihnen das Spiel gefällt und ob Sie sich vorstellen könnten, es auch in Zukunft einmal anzuwenden.

Bitte wenden

Das Spiel funktioniert folgendermaßen:

Zählen Sie von der Zahl 0 in 5er Schritten aufwärts.
Lassen Sie sich dabei ruhig Zeit und zählen Sie so schnell oder langsam, wie Sie möchten. Sie müssen die Zwischenergebnisse nicht laut aussprechen, sondern können auf die Art und Weise zählen, wie es für Sie angenehm ist.
Der Versuchsleiter wird Ihnen das Startsignal geben und dann den Raum verlassen, damit Sie in Ruhe zählen können. Nach zwei Minuten ist das Spiel beendet; der Versuchsleiter wird Ihnen dann wieder Bescheid geben.

Bevor es losgeht, füllen Sie bitte jetzt den Fragebogen auf der folgenden Seite aus. Anschließend geben Sie dem Versuchsleiter Bescheid.

Bitte wenden

Im Folgenden finden Sie eine Reihe von Feststellungen, mit denen man sich selbst beschreiben kann. Bitte lesen Sie jede Feststellung durch und geben Sie an, wie Sie sich **jetzt**, d.h. **in diesem Moment fühlen**. Setzen Sie dafür bitte bei jeder Feststellung einen kurzen, senkrechten Strich an genau die Stelle der Linie, die angibt, wie sie sich gerade fühlen.

Es gibt keine richtigen und falschen Antworten. Überlegen Sie bitte nicht lange und denken Sie daran, diejenige Stelle mit einem Strich zu markieren, die Ihren **augenblicklichen** Gefühlszustand am besten beschreibt.

	überhaupt nicht	ein wenig	ziemlich	sehr
1. Ich bin ruhig	1	2	3	4
2. Ich fühle mich geborgen	1	2	3	4
3. Ich fühle mich angespannt	1	2	3	4
4. Ich bin bekümmert	1	2	3	4
5. Ich bin gelöst	1	2	3	4
6. Ich bin aufgeregt	1	2	3	4
7. Ich bin besorgt, dass etwas schiefgehen könnte	1	2	3	4
8. Ich fühle mich ausgeruht	1	2	3	4
9. Ich bin beunruhigt	1	2	3	4
10. Ich fühle mich wohl	1	2	3	4
11. Ich fühle mich selbstsicher	1	2	3	4
12. Ich bin nervös	1	2	3	4
13. Ich bin zappelig	1	2	3	4
14. Ich bin verkrampft	1	2	3	4
15. Ich bin entspannt	1	2	3	4

16. Ich bin zufrieden	1	2	3	4
17. Ich bin besorgt	1	2	3	4
18. Ich bin überreizt	1	2	3	4
19. Ich bin froh	1	2	3	4
20. Ich bin vergnügt	1	2	3	4

Demografie-Fragebogen

Bitte beantworten Sie nun noch die abschließenden Fragen:

Geschlecht:
- ☐ weiblich
- ☐ männlich

Was ist Ihre Muttersprache?
- ☐ Deutsch
- ☐ Englisch
- ☐ Russisch
- ☐ Türkisch
- ☐ Sonstige: _____

Wie alt sind Sie? _____

Welchen Beruf üben Sie aus? _____

Falls Sie studieren: Welches Fach studieren Sie? _____

Welches ist Ihr höchster akademischer Abschluss?
- ☐ Hochschulabschluss
- ☐ Abitur
- ☐ Fachhochschulreife
- ☐ Realschulabschluss
- ☐ Hauptschulabschluss
- ☐ Kein Schulabschluss

Vielen Dank für die Teilnahme!

Debriefing

In dieser Studie möchten wir untersuchen, ob die Ankündigung einer kognitiven Aufgabe im Laborsetting angstinduzierend wirkt. Dafür haben Sie eine Aufgabe (Experimentalbedingung) oder ein Spiel (Kontrollbedingung) erhalten. Die Aufgabe ist entgegen der vorherigen Beschreibung nicht relevant für Ihre kognitive Leistungsfähigkeit, sondern ist frei erfunden. Das Spiel ist ebenfalls fiktiv und spielt keine praktische Rolle. Um die empfundene Angst messen und eine Veränderung der Angstwerte feststellen zu können und somit die Aussagekraft der Studie zu gewährleisten, war es notwendig, Sie als VersuchsteilnehmerIn erst jetzt darüber aufzuklären.

Falls Sie Fragen zu der Studie haben, wenden Sie sich bitte an Gunnar Brodersen: gunnar.brodersen@uni-hamburg.de.

☐ Ich wurde ausreichend über den Sinn der Studie informiert. Die Forscherin/der Forscher hat das Ziel der Studie erklärt. Fragen meinerseits wurden zufriedenstellend beantwortet.

☐ Ich werde zum Wohle der Forschung nicht mit Anderen über Sinn und Zweck dieser Studie reden, bis die Datenerhebung abgeschlossen ist.

Name (Vor- und Nachname) :_____

Unterschrift:_____

Datum : _____

Appendix 4: Questionnaire Study 3 (Paper and Pencil)

Informationen/Informierte Einwilligungserklärung zur Studie „Take it easy"

Herzlich Willkommen zu dieser Studie!
In dieser Studie möchten wir ein neuartiges Testverfahren evaluieren, zu dem Sie im Laufe der Studie noch weitere Informationen erhalten. Die Studie dauert ungefähr 30 Minuten. Sie werden während der Studie verschiedene Fragebögen erhalten.
Die Erhebung und Auswertung der Daten erfolgt anonym. Eine Zuordnung Ihrer Daten zu Ihrer Person ist nicht möglich. Alle Daten werden in einem verschlossenen Raum der Universität Hamburg verwahrt und sind nur den Mitarbeitern des Arbeitsbereichs zugänglich.
Es sind keine Nebenwirkungen oder potentielle Risiken bekannt, die durch die Teilnahme auftreten können.
Ihre Teilnahme an der Studie ist freiwillig. Sie können Ihre Teilnahme jederzeit ohne jegliche Konsequenzen beenden oder abbrechen.
Für die Teilnahme erhalten Sie wahlweise 0,5 Versuchspersonenstunden oder 4,25 Euro.
Bei Fragen bezüglich der Studie wenden Sie sich bitte an Gunnar Brodersen:
gunnar.brodersen@uni-hamburg.de

Ich habe die oben stehende Information zur Kenntnis genommen und nehme aus freien Stücken an dieser Studie teil.

Name (Vor- und Nachname) :_____

Unterschrift:_____

Datum : _____

Herzlich Willkommen!

Im Folgenden finden Sie eine Reihe von Feststellungen, mit denen man sich selbst beschreiben kann. Bei diesen Feststellungen soll es um Ihre **Gefühle und Gedanken in Prüfungssituationen** gehen.

Bitte lesen Sie jede Feststellung durch und wählen Sie aus den vier Antworten diejenige aus, die angibt, wie Sie sich im Allgemeinen bei Tests, Klausuren bzw. Klassenarbeiten oder mündlichen Prüfungen fühlen, und was Sie in solchen Situationen denken. Kreuzen Sie bitte bei jeder Feststellung die Zahl unter der von Ihnen gewählten Antwort an.

Es gibt keine richtigen oder falschen Antworten. Überlegen Sie bitte nicht lange und denken Sie daran, diejenige Antwort auszuwählen, die am besten beschreibt, wie Sie sich **im Allgemeinen in Prüfungssituationen** (Tests, Klausuren bzw. Klassenarbeiten, mündlichen Prüfungen) fühlen, und was Sie dabei denken.

Bitte wenden

	fast nie	manchmal	oft	fast immer
1. Ich vertraue auf meine Leistung	1	2	3	4
2. Ich denke darüber nach, wie wichtig mir die Klausur Klassenarbeit oder Prüfung ist	1	2	3	4
3. Mir schießen plötzlich Gedanken durch den Kopf, die mich blockieren	1	2	3	4
4. Ich bin zuversichtlich, was meine Leistung betrifft	1	2	3	4
5. Ich denke an andere Dinge und werde dadurch abgelenkt	1	2	3	4
6. Ich denke daran, wie wichtig mir ein gutes Ergebnis ist	1	2	3	4
7. Mich überkommt ein ungutes Gefühl, und schon verliere ich den Faden	1	2	3	4
8. Das Herz schlägt mir bis zum Hals	1	2	3	4
9. Ich mache mir Gedanken über mein Abschneiden	1	2	3	4
10. Ich fühle mich ängstlich	1	2	3	4
11. Ich vergesse Dinge, weil ich einfach zu sehr mit mir selbst beschäftigt bin	1	2	3	4
12. Ich bin mit mir zufrieden	1	2	3	4
13. Ich mache mir Gedanken, wie mein Notenschnitt aussehen wird	1	2	3	4
14. Ich zittere vor Aufregung	1	2	3	4
15. Ich werde in meinem Gedankengang unterbrochen, weil mir etwas Nebensächliches einfällt	1	2	3	4
16. Ich habe ein beklemmendes Gefühl	1	2	3	4
17. Ich denke, dass ich alles schaffen werde	1	2	3	4
18. Ich denke daran, was passiert, wenn ich schlecht abschneide	1	2	3	4
19. Ich bin aufgeregt	1	2	3	4
20. Ich bin überzeugt, dass ich gut abschneiden werde	1	2	3	4

In den folgenden Fragen geht es darum, wie Sie Ihre Möglichkeiten einschätzen, mit unangenehmen Gefühlen umzugehen.

Es gibt dabei keine „richtigen“ oder „falschen“ Antworten. Bitte versuchen Sie, möglichst nah an Ihrem Empfinden zu antworten. Lesen Sie die Aussagen auf dem Fragebogen sorgfältig durch, bevor Sie sich für eine Antwortmöglichkeit entscheiden. Ihre Antworten auf die Fragen geben Sie an, indem Sie von den Kästchen mit den Zahlen dasjenige durchstreichen, das Ihrer Einschätzung am ehesten entspricht. Vergewissern Sie sich bitte, dass Sie bei jeder Aussage nur eine Antwort angeben.

Sie haben dabei fünf Antwortmöglichkeiten:

Die Aussage trifft für Sie überhaupt nicht zu:	"1" bzw. starke Ablehnung
Die Aussage trifft für Sie eher nicht zu:	"2" bzw. leichte Ablehnung
Die Aussage trifft für Sie genauso sehr zu wie sie nicht zutrifft:	"3" bzw. unentschieden
Die Aussage trifft für Sie eher zu:	"4" bzw. leichte Zustimmung
Die Aussage trifft für Sie ganz uneingeschränkt zu:	"5" bzw. starke Zustimmung

Wenn ich mich traurig und niedergeschlagen fühle...	Starke Ablehnung	Leichte Ablehnung	Unentschieden	Leichte Zustimmung	Starke Zustimmung
1. ... finde ich normalerweise einen Weg, um mich aufzuheitern.	1	2	3	4	5
2. ... kann ich etwas dafür tun, damit meine Stimmung besser wird.	1	2	3	4	5
3. ... wird es schwer sein, jemanden zu finden, der mich wirklich verstehen kann.	1	2	3	4	5
4. ... werde ich mich besser fühlen, wenn ich verstehe, warum es mir schlecht geht.	1	2	3	4	5
5. ... wird es mich aufheitern, wenn ich etwas Nettes für jemand anderen tue.	1	2	3	4	5
6. ... werde ich mich letztendlich richtig niedergeschlagen fühlen.	1	2	3	4	5

7. ... wird mir das nicht mehr aus dem Kopf gehen.	1	2	3	4	5
8. ... wird es mir helfen, wenn ich plane, wie ich mit meinen Angelegenheiten umgehe.	1	2	3	4	5
9. ... erscheint mir alles nur noch viel schlimmer, wenn ich versuche, das Problem in meinem Kopf klar zu kriegen.	1	2	3	4	5
10. ... werde ich eine Möglichkeit finden, mich zu entspannen.	1	2	3	4	5
11. ... wird es mir helfen, mit Freunden zum Essen auszugehen.	1	2	3	4	5
12. ... werde ich mich für eine lange Zeit nicht beruhigen können.	1	2	3	4	5
13. ... kann ich mich dadurch besser fühlen, dass ich etwas Kreatives tue.	1	2	3	4	5
14. ... werde ich mich "allein unter anderen" fühlen, wenn ich in einer Gruppe von Menschen bin.	1	2	3	4	5
15. ... kann ich die Situation mit Humor betraten und fühle mich dann besser.	1	2	3	4	5

Speed-Accuracy-Task

In diesem Teil der Studie wird ein neuartiges von Marshall (2011) entwickeltes Verfahren zur effizienten Messung von Intelligenz angewendet: Der *Speed-Accuracy-Intelligence Test (SAIT)*. Bei diesem Verfahren handelt es sich um eine sogenannte *Speed-Accuracy Task*, d.h. eine Aufgabe, die Sie möglichst schnell und mit möglichst wenig Fehlern lösen müssen. Im Vergleich zu anderen Intelligenzmessverfahren bietet Marshall's Test drei entscheidende Vorteile:

- Der Test ist sehr zeitökonomisch, so dass schnell ein Ergebnis vorliegt.
- Er misst grundlegende kognitive Funktionen („hard-wired intelligence") und ist deshalb kulturübergreifend verwendbar.
- Neurophysiologische Studien mit bildgebenden Verfahren (z.B. fMRI, PET) konnten zeigen, dass mittels dieses Intelligenztests zudem die saltatorische Erregungsgeschwindigkeit im Bereich des Arbeitsgedächtnisses als zusätzliches Maß erfasst werden kann. Diese lässt eine direkte Aussage über die Effizienz des Arbeitsgedächtnisses zu (Clark & Marshall, 2012).

Sie werden gleich die Aufgabe des SAIT erhalten. Wie gut Ihre kognitiven Funktionen ausgeprägt sind, erfahren Sie direkt im Anschluss an die Aufgabe in Form eines kurzen Leistungsfeedbacks. Das lässt sich anhand der Schnelligkeit und der Anzahl der Fehler beurteilen, mit der Sie die Aufgabe bewältigen: Je besser und stärker Ihre kognitiven Fähigkeiten ausgeprägt sind, desto schneller werden Sie die Aufgabe lösen können und desto weniger Fehler werden Sie machen.

Um zu bewerten, wie gut Sie abschneiden, wird eine Videokamera laufen und Sie beim Lösen der Aufgabe filmen.

Ihre Aufgabe lautet folgendermaßen:

Zählen Sie von der Zahl 2043 in 17er Schritten rückwärts.

Sprechen Sie jedes Zwischenergebnis laut und deutlich aus, damit es von der Kamera aufgezeichnet werden kann. Der Versuchsleiter wird Ihnen das Startsignal geben. Ab diesem Zeitpunkt haben Sie zwei Minuten Zeit, um so weit wie möglich herunter zu zählen. Zählen Sie so schnell wie möglich und machen Sie so wenig Fehler wie möglich.

Bevor es losgeht, beantworten Sie bitte zunächst die Fragen auf den folgenden Seiten. Anschließend geben Sie dem Versuchsleiter Bescheid.

Im Folgenden finden Sie eine Reihe von Feststellungen, mit denen man sich selbst beschreiben kann. Bitte lesen Sie jede Feststellung durch und geben Sie an, wie Sie sich **jetzt**, d.h. **in diesem Moment fühlen**. Setzen Sie dafür bitte bei jeder Feststellung einen kurzen, senkrechten Strich an genau die Stelle der Linie, die angibt, wie sie sich gerade fühlen.

Es gibt keine richtigen und falschen Antworten. Überlegen Sie bitte nicht lange und denken Sie daran, diejenige Stelle mit einem Strich zu markieren, die Ihren **augenblicklichen** Gefühlszustand am besten beschreibt.

	überhaupt nicht — sehr
1. Ich bin ruhig	_____
2. Ich fühle mich geborgen	_____
3. Ich fühle mich angespannt	_____
4. Ich bin bekümmert	_____
5. Ich bin gelöst	_____
6. Ich bin aufgeregt	_____
7. Ich bin besorgt, dass etwas schiefgehen könnte	_____
8. Ich fühle mich ausgeruht	_____
9. Ich bin beunruhigt	_____
10. Ich fühle mich wohl	_____
11. Ich fühle mich selbstsicher	_____
12. Ich bin nervös	_____

13. Ich bin zappelig	_____
14. Ich bin verkrampft	_____
21. Ich bin entspannt	_____
22. Ich bin zufrieden	_____
23. Ich bin besorgt	_____
24. Ich bin überreizt	_____
25. Ich bin froh	_____
26. Ich bin vergnügt	_____

Wir alle haben manchmal Ängste und Befürchtungen. Von einigen wissen wir, dass sie begründet sind (z.B. in tatsächlich gefährlichen Situationen); von anderen wissen wir, dass sie unbegründet sind (z.B. in tatsächlich ungefährlichen Situationen).
Denken Sie an die bevorstehende Aufgabe. Was ist Ihre größte Befürchtung in Bezug auf Ihr Abschneiden, von der Sie wissen, dass sie unbegründet ist?

Meine größte unbegründete Befürchtung:

_____

Für wie wahrscheinlich halten Sie es, dass Ihre Befürchtung eintritt?

1	2	3	4	5	6	7
gar nicht wahrscheinlich						sehr wahrscheinlich

Für wie schwierig halten Sie die Aufgabe?

1	2	3	4	5	6	7
gar nicht schwierig						sehr schwierig

Wie wichtig ist es Ihnen, dass Ihre Befürchtung nicht eintritt?

1	2	3	4	5	6	7
gar nicht wichtig						sehr wichtig

Wie enttäuscht wären Sie, wenn Ihre Befürchtung eintreten würde?

1	2	3	4	5	6	7
gar nicht enttäuscht						sehr enttäuscht

[Mental Contrasting]

Denken Sie an die Aufgabe. Stellen Sie sich vor, Ihre größte Befürchtung würde eintreten. Was wäre das Schlimmste daran?

Nennen Sie den wichtigsten Aspekt:

_____ (ca. 1 – 3 Wörter)

Stellen Sie sich diesen wichtigsten Aspekt nun in Gedanken vor. Nehmen Sie sich soviel Zeit, wie Sie benötigen und lassen Sie Ihren Gedanken und Vorstellungen freien Lauf. Schreiben Sie diese auf (sollte der Platz nicht ausreichen, schreiben Sie auf der Rückseite weiter):

Manchmal treten Dinge nicht ein, obwohl wir sie befürchten.
Was spricht dagegen, dass Ihre Befürchtung eintritt?

Nennen Sie den wichtigsten Aspekt:

_____ (ca. 1 – 3 Wörter)

Stellen Sie sich diesen wichtigsten Aspekt nun in Gedanken vor. Nehmen Sie sich soviel Zeit, wie Sie benötigen und lassen Sie Ihren Gedanken und Vorstellungen freien Lauf. Schreiben Sie diese auf (sollte der Platz nicht ausreichen, schreiben Sie auf der Rückseite weiter):

[Negative Future Only]

Denken Sie an die Aufgabe. Stellen Sie sich vor, Ihre größte Befürchtung würde eintreten. Was wäre das Schlimmste daran?

Nennen Sie den wichtigsten Aspekt:

_____ (ca. 1 – 3 Wörter)

Stellen Sie sich diesen wichtigsten Aspekt nun in Gedanken vor. Nehmen Sie sich soviel Zeit, wie Sie benötigen und lassen Sie Ihren Gedanken und Vorstellungen freien Lauf. Schreiben Sie diese auf (sollte der Platz nicht ausreichen, schreiben Sie auf der Rückseite weiter):

Denken Sie an die Aufgabe. Stellen Sie sich noch einmal vor, Ihre größte Befürchtung würde eintreten. Was wäre das Zweitschlimmste daran?

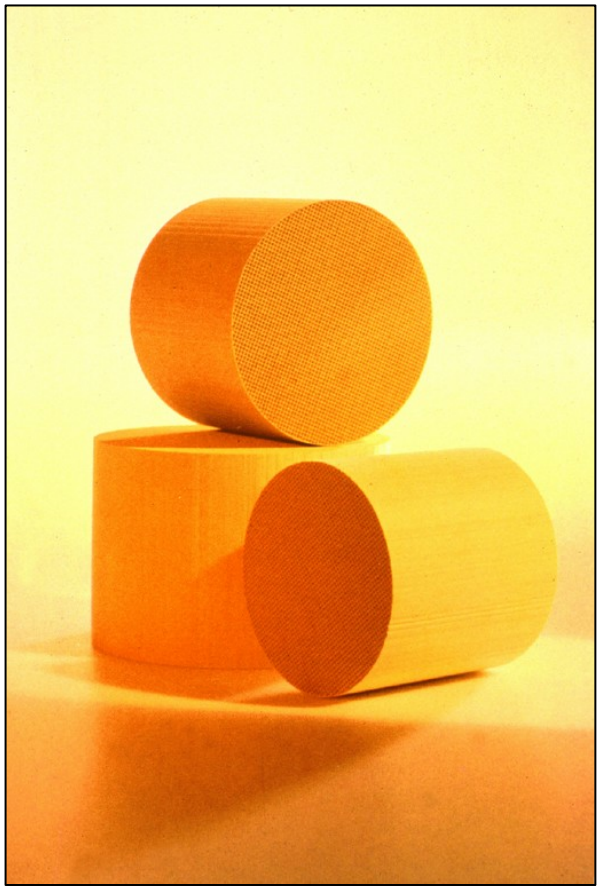
Nennen Sie den zweitwichtigsten Aspekt:

_____ (ca. 1 – 3 Wörter)

Stellen Sie sich diesen zweitwichtigsten Aspekt nun in Gedanken vor. Nehmen Sie sich soviel Zeit, wie Sie benötigen und lassen Sie Ihren Gedanken und Vorstellungen freien Lauf. Schreiben Sie diese auf (sollte der Platz nicht ausreichen, schreiben Sie auf der Rückseite weiter):

[No Treatment]

Betrachten Sie nun das folgende Bild:



Beschreiben Sie das Bild möglichst genau. Schreiben Sie alles auf, was Sie auf dem Bild sehen.

Im Folgenden finden Sie wieder eine Reihe von Feststellungen, mit denen man sich selbst beschreiben kann. Bitte lesen Sie jede Feststellung durch und geben Sie an, wie Sie sich **jetzt**, d.h. **in diesem Moment fühlen**. Setzen Sie dafür bitte bei jeder Feststellung einen kurzen, senkrechten Strich an genau die Stelle der Linie, die angibt, wie sie sich gerade fühlen.

Es gibt keine richtigen und falschen Antworten. Überlegen Sie bitte nicht lange und denken Sie daran, diejenige Stelle mit einem Strich zu markieren, die Ihren **augenblicklichen** Gefühlszustand am besten beschreibt.

	überhaupt nicht — sehr
1. Ich bin ruhig	_____
2. Ich fühle mich geborgen	_____
3. Ich fühle mich angespannt	_____
4. Ich bin bekümmert	_____
5. Ich bin gelöst	_____
6. Ich bin aufgeregt	_____
7. Ich bin besorgt, dass etwas schiefgehen könnte	_____
8. Ich fühle mich ausgeruht	_____
9. Ich bin beunruhigt	_____
10. Ich fühle mich wohl	_____
11. Ich fühle mich selbstsicher	_____
12. Ich bin nervös	_____

13. Ich bin zappelig	_____
14. Ich bin verkrampft	_____
15. Ich bin entspannt	_____
16. Ich bin zufrieden	_____
17. Ich bin besorgt	_____
18. Ich bin überreizt	_____
19. Ich bin froh	_____
20. Ich bin vergnügt	_____

In Bezug auf die gleich folgende Aufgabe ...

... habe ich das Gefühl, dass sich meine Befürchtungen reduziert haben.

1	2	3	4	5	6	7
gar nicht						sehr

... lasse ich die Dinge einfach auf mich zukommen.

1	2	3	4	5	6	7
gar nicht						sehr

... werde ich die Dinge nehmen, wie sie kommen.

1	2	3	4	5	6	7
gar nicht						sehr

... würde ich die Situation am liebsten vermeiden.

1	2	3	4	5	6	7
gar nicht						sehr

Wie sehr würden Sie sich ärgern, wenn Ihre Befürchtung eintreten würde?

1	2	3	4	5	6	7
gar nicht						sehr

Wie enttäuscht wären Sie, wenn Ihre Befürchtung eintreten würde?

1	2	3	4	5	6	7
gar nicht enttäuscht						sehr enttäuscht

Wie schlimm wäre es für Sie, wenn Ihre Befürchtung eintreten würde?

1	2	3	4	5	6	7
gar nicht schlimm						sehr schlimm

Wie sehr werden Sie sich bemühen, dass Ihre Befürchtung nicht eintritt?

1	2	3	4	5	6	7
gar nicht						sehr

Wie fühlen Sie sich gerade?

… voller Energie

1	2	3	4	5	6	7
gar nicht						sehr

… stark

1	2	3	4	5	6	7
gar nicht						sehr

…begeistert

1	2	3	4	5	6	7
gar nicht						sehr

Demografie-Fragebogen

Bitte beantworten Sie nun noch die abschließenden Fragen:

Geschlecht:

- ☐ weiblich
- ☐ männlich

Was ist Ihre Muttersprache?

- ☐ Deutsch
- ☐ Englisch
- ☐ Russisch
- ☐ Türkisch
- ☐ Sonstige: _____

Wie alt sind Sie? _____

Welchen Beruf üben Sie aus? _____

Falls Sie studieren: Welches Fach studieren Sie? _____

Welches ist Ihr höchster akademischer Abschluss?

- ☐ Hochschulabschluss
- ☐ Abitur
- ☐ Fachhochschulreife
- ☐ Realschulabschluss
- ☐ Hauptschulabschluss
- ☐ Kein Schulabschluss

Vielen Dank für die Teilnahme!

Debriefing Studie „Take it easy“

In dieser Studie möchten wir untersuchen, ob die Anwendung der Selbstregulationsstrategie der mentalen Kontrastierung (vgl. Oettingen, 2012) dabei helfen kann, Nervosität und Angst in einer Testsituation zu reduzieren. Diese Strategie hat sich in anderen Bereichen als effektiv erwiesen, wenn es darum geht, ein Ziel zu erreichen. Dafür sollten Sie sich je nach Versuchsbedingung auf bestimmte Art und Weise mental mit einer kognitiven Aufgabe beschäftigen. Der Intelligenztest (SAIT) mit der kognitiven Aufgabe ist frei erfunden und lässt demzufolge keine Schlüsse auf Ihre kognitive Leistungsfähigkeit zu. Um eine Testsituation zu simulieren, war es notwendig, Sie als VersuchsteilnehmerIn erst jetzt darüber aufzuklären. Die Videoaufnahmen sind ausschließlich den Versuchsleitern und Mitarbeitern zugänglich und werden nach der Datenauswertung gelöscht. Sollten Sie einer Analyse der Videoaufnahme nicht zustimmen, wenden Sie sich bitte jetzt an die Versuchsleiterin/den Versuchsleiter. Die Aufnahme wird in diesem Fall ungesehen gelöscht.
Für weitere Informationen siehe:

- Oettingen, G. (2012). Future thought and behavior change. *European Review of Social Psychology, 23*, 1-63.
- Oettingen, G., Mayer, D., Thorpe, J.S., Janetzke, H., & Lorenz, S. (2005). Turning fantasies about positive and negative futures into self-improvement goals. *Motivation and Emotion, 29*, 237-267.

Bei weiteren Fragen wenden Sie sich bitte an Gunnar Brodersen: gunnar.brodersen@uni-hamburg.de.

☐ Ich wurde ausreichend über den Sinn der Studie informiert. Die Forscherin/der Forscher hat das Ziel der Studie erklärt. Fragen meinerseits wurden zufriedenstellend beantwortet.

☐ Ich werde zum Wohle der Forschung nicht mit anderen über Sinn und Zweck dieser Studie reden, bis die Datenerhebung abgeschlossen ist.

Name (Vor- und Nachname) :_____

_____ _____

Unterschrift Datum

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Bewegungswissenschaft

Institut für Bewegungswissenschaft
Institut für Psychologie

Erklärung gemäß *(bitte Zutreffendes ankreuzen)*

☐ **§ 4 (1c) der Promotionsordnung**

des Instituts für Bewegungswissenschaft der Universität Hamburg vom 18.08.2010

☐ **§ 5 (4d) der Promotionsordnung**

des Instituts für Psychologie der Universität Hamburg vom 20.08.2003

Hiermit erkläre ich,

_____ (Vorname, Nachname),

dass ich mich an einer anderen Universität oder Fakultät noch keiner Doktorprüfung unterzogen oder mich um Zulassung zu einer Doktorprüfung bemüht habe.

_____ _____

Ort, Datum Unterschrift

Universität Hamburg
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Fakultät für
Psychologie und
Bewegungswissenschaft

Institut für Bewegungswissenschaft
Institut für Psychologie

Eidesstattliche Erklärung nach *(bitte Zutreffendes ankreuzen)*

☐ **§ 7 (4) der Promotionsordnung des Instituts für Bewegungswissenschaft der Universität Hamburg vom 18.08.2010**

☐ **§ 9 (1c und 1d) der Promotionsordnung des Instituts für Psychologie der Universität Hamburg vom 20.08.2003**

Hiermit erkläre ich an Eides statt,

1. dass die von mir vorgelegte Dissertation nicht Gegenstand eines anderen Prüfungsverfahrens gewesen oder in einem solchen Verfahren als ungenügend beurteilt worden ist.
2. dass ich die von mir vorgelegte Dissertation selbst verfasst, keine anderen als die angegebenen Quellen und Hilfsmittel benutzt und keine kommerzielle Promotionsberatung in Anspruch genommen habe. Die wörtlich oder inhaltlich übernommenen Stellen habe ich als solche kenntlich gemacht.

_____ _____

Ort, Datum Unterschrift