



## Mental contrasting turns positive feedback on creative potential into successful performance

Gabriele Oettingen<sup>a,b,\*</sup>, Michael K. Marquardt<sup>c</sup>, Peter M. Gollwitzer<sup>a,c</sup>

<sup>a</sup> Psychology Department, New York University, USA

<sup>b</sup> Department of Psychology, University of Hamburg, Germany

<sup>c</sup> Department of Psychology, University of Konstanz, Germany

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### ABSTRACT

In two studies employing a creativity test (i.e., solving insight problems), we hypothesized and observed that mental contrasting of a desired future with present reality (Oettingen, Pak, & Schnetter, 2001) transforms positive feedback into strong performance. Participants received positive or moderate bogus feedback on their creative potential and then engaged either in mental contrasting, indulging in the desired future, dwelling on present reality, or irrelevant contrasting with respect to taking a creativity test. Mental contrasting participants who received positive feedback performed better than those who received moderate feedback. They also performed better than indulging, dwelling, and irrelevant contrasting participants, regardless of the feedback received. By manipulating expectations of success through bogus feedback, the present research adjusts for confounding variables and validates previous findings showing that mental contrasting produces expectancy-dependent goal commitments and performance. Implications for designing interventions to enhance people's creativity are discussed.

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### Introduction

Consider a situation in which a person is praised as having creative potential because she painted a unique picture, solved a tricky puzzle, or prepared a sophisticated dinner. Such positive feedback makes her expect to succeed on further tasks that demand creativity. She wanted to engage and succeed in similar tasks, but she never did. What went wrong? The present research explores whether people can use self-regulation strategies to translate positive feedback on creative potential into strong creative performances.

We will use an insight task paradigm (Dow & Mayer, 2004) to test whether mental contrasting, a self-regulation strategy fostering goal commitment and performance, helps people capitalize on positive feedback. We base our hypotheses on the dual pathway to creativity model (DPCM; De Dreu, Baas, & Nijstad, 2008). The DPCM postulates that creative performance depends on flexible processing of information and cognitive perseverance. As mental contrasting fosters both flexible processing of information and cognitive persistence (review by Oettingen, 2012), we reasoned that it should enhance creative performance. Specifically, because mental contrasting unfolds its effects

on flexibility and persistence based on a person's high expectations of success, and positive performance feedback fosters high expectations of success, mental contrasting should translate positive feedback about people's creative potential into creative performance.

The present research adds to the literature on mental contrasting as in previous studies preexisting expectations of success were measured, but not manipulated. We manipulate expectations of success by giving *ad hoc* positive feedback on people's creative potential, testing whether mental contrasting in combination with high expectations not only predicts but actually heightens creative performance.

#### *The self-regulation strategy of mental contrasting*

Mental contrasting starts with identifying an important desired future (fulfilling a wish or solving a concern) in a specific area (e.g., to improve my math grade); then people imagine having attained the future (e.g., feeling pride) and reflect on obstacles of present reality that stand in the way of realizing this future (e.g., getting distracted). In doing so, expectations of successfully reaching the desired future become activated: when they are high, mental contrasting leads to strong goal commitment and performance; when they are moderate, no heightened commitment and performance is observed. One-sided mental elaborations of the future (i.e., indulging) and of reality (i.e., dwelling) lead to unchanged goal commitment and performance independent of expectations of success (Oettingen, 2000; Oettingen, Pak, & Schnetter, 2001).

\* Corresponding author at: New York University, Department of Psychology, 6 Washington Place, 7th Floor, NY 10003, USA.

E-mail addresses: [gabriele.oettingen@nyu.edu](mailto:gabriele.oettingen@nyu.edu) (G. Oettingen), [michael.marquardt@uni-konstanz.de](mailto:michael.marquardt@uni-konstanz.de) (M.K. Marquardt), [peter.gollwitzer@nyu.edu](mailto:peter.gollwitzer@nyu.edu) (P.M. Gollwitzer).

A multitude of studies supports the effects of mental contrasting on commitment and performance (review by Oettingen, 2012). These studies measured cognitive (e.g., making plans), affective (e.g., feelings of anticipated disappointment in case of failure), motivational (interest, readiness to invest) and behavioral indicators (e.g., exerted effort and actual performance), measured via self-report or observations, directly after the experiment or weeks later. Given high expectations of success, people in the mental-contrasting condition showed stronger commitments than in the indulging and dwelling conditions (Oettingen, 2000; Oettingen, Mayer, & Thorpe, 2010; Oettingen, Mayer, Thorpe, Janetzke, & Lorenz, 2005; Oettingen, Stephens, Mayer, & Brinkmann, 2010; Oettingen et al., 2001).

Motivational and cognitive processes that mediate mental contrasting effects on goal commitment and performance are energization (measured implicitly via systolic blood pressure and explicitly via self-reported feelings; Oettingen et al., 2009) and planning (Oettingen et al., 2001, 2005). In addition, mental contrasting influences goal commitment and performance by modulating implicit cognition. When expectations are high, it strengthens the associations between the desired future and the reality, as well as between the reality and goal-directed means; these changes in implicit cognition in turn predict commitment and performance (A. Kappes & Oettingen, under revision; A. Kappes, Singmann, & Oettingen, in press).

In sum, mental contrasting rather than indulging and dwelling raises goal commitment and performance when expectations of success are high. Thus high expectations of success (e.g., Ajzen, 1991; Bandura, 1997; Locke & Latham, 2002) are just a prerequisite for successful goal pursuit. It is mental contrasting that facilitates the translation of expectations into performance.

#### *Mental contrasting and creative performance*

The dual pathway to creativity model (DPCM; De Dreu et al., 2008) operationalizes creativity as good performance in tasks that assess one or more of the following aspects of creativity: fluency (the number of non-redundant ideas, insights, problem solutions, or products), originality (the uncommonness of ideas, insights, problem solutions, or products), and flexibility (using different cognitive categories and perspectives, and broad and inclusive categories). DPCM emphasizes that the cognitive and motivational orientations with which people work on the creativity tasks affect performance. Regarding the cognitive orientation, people benefit from flexible thinking, breaking sets, and operating on the basis of uncommon associations. Regarding the motivational orientation, people benefit from hard work and perseverance leading to the generation and combination of many ideas. The DPCM model is in line with earlier work by Friedman and Förster (2001) showing that motivational orientations (here promotion vs. prevention orientation) by affecting cognitive procedures influence performance on creativity tasks, no matter whether these tasks required solving insight problems or generating uncommon ideas.

Regarding cognitive flexibility, mental contrasting under high expectations fosters goal-directed reinterpretation of the environment (e.g., A. Kappes, Wendt, Reinelt, & Oettingen, 2012; Oettingen et al., 2001, Study 1), goal-directed planning (e.g., Oettingen et al., 2001, Study 1; Oettingen et al., 2005; Study 2), using uncommon means (e.g., help seeking and help giving; Oettingen, Stephens, Mayer, & Brinkmann, 2010), insights with respect to critical opportunities to act (e.g., Adriaanse et al., 2010; Oettingen, Mayer, & Brinkmann, 2010) as well as finding integrative solutions in negotiations (e.g., Kirk, Oettingen, & Gollwitzer, 2011, in press). Regarding perseverance, as pointed out above, mental contrasting under high expectations increases energization, but it also, improves rote learning (A. Gollwitzer, Oettingen, Kirby, Duckworth, & Mayer, 2011), heightens math and language grades (Oettingen, Hönig, & Gollwitzer, 2000, Study 1; Oettingen et al., 2001; Study 4), and fosters activities to reduce cigarette consumption (Oettingen, Mayer, & Thorpe, 2010).

Based on these findings we reasoned that mental contrasting may help people who endorse high expectations of being creative to perform well on creativity tests—no matter whether these effects are achieved by heightened cognitive flexibility, increased perseverance, or both.

#### *Positive feedback on creative potential leads to high expectations of success*

Most people do not hold clear expectations of how creative they can be. In the present research, we manipulated expectations by providing *ad hoc* moderate or positive performance feedback which was said to be indicative of people's creative potential. In combination with mental contrasting such positive feedback on participants' creative potential should benefit creative performance. Our manipulation is based on social cognitive learning theory which holds that performance feedback is the main source of forming expectations that one is able to execute the behavior necessary to achieve a desired outcome (self-efficacy expectations; Bandura, 1977; Mischel, 1973; Olson, Roesse, & Zanna, 1996). Verbal persuasion by respected others (e.g., positive feedback by an experimenter) also enhances a person's expectations of success. For instance, positive feedback instigates expectations for continued success (Feather, 1966, 1968), increases self-efficacy expectations (Bandura, 1977), and self-attributions of high ability (Weiner, Heckhausen, & Meyer, 1972).

#### *The present research*

At the outset of the two experiments, we asked participants to complete the Creative Personality Scale (Gough, 1979) and then provided either moderate or positive bogus feedback on their scores. In Experiment 1, we then induced mental contrasting, indulging, or dwelling; in Experiment 2, we added another control condition mimicking the procedure of mental contrasting but containing irrelevant content. The dependent variable was creative performance in terms of three sets of insight problems (Dow & Mayer, 2004). Even though the predictions of fantasy realization theory pertain to all aspects of goal commitment, cognitive, affective, motivational, and behavioral, we decided to focus on the behavioral aspects. Behavioral aspects such as performance on tests are considered the most valid measure of goal commitment (Locke, Latham, & Erez, 1988). Of the many creativity tests available (e.g., Baas, De Dreu, & Nijstad, 2008), we picked solving non-routine insight problems (i.e., newly structured problems), so that participants would have little prior experience with similar problems (Mayer, 1995, 1999). Moreover, solving such problems is facilitated by both flexibility and perseverance (De Dreu et al., 2008; Friedman & Förster, 2001).

### **Study 1**

#### *Method*

##### *Participants and design*

A total of 158 (130 female; one student did not indicate gender) undergraduate students from New York University with a mean age of 19.34 years ( $SD = 1.74$ ) participated in return for course credit. Study 1 followed a 2 between (Feedback: positive vs. moderate)  $\times$  3 between (Self-Regulatory Thought: mental contrasting vs. indulging vs. dwelling) factorial design.

##### *Materials and procedure*

Participants signed the consent form, and in separate cubicles received instructions mostly given by a computer. Participants were told that we were investigating creativity, as it facilitates living up to the demands of our rapidly changing world (Runco, 2004).

**Expectations of success.** To provide bogus feedback, we asked participants to rate whether each of a series of adjectives described them or not. Adjectives appeared one at a time on a computer screen. They were taken from the Creative Personality Scale (CPS; Gough, 1979; e.g., inventive, insightful). Participants learned that their answers were indicative of their creative potential, which was said to be predictive for solving the forthcoming creativity tasks. The positive feedback (moderate feedback in parentheses) read as follows: “Out of a possible score of 31 points you have received 28 (15) points. You are in the 90th (60th) percentile of the population. Your creative potential is far better (a little better) than average.”

As a manipulation check we measured expectations of solving the forthcoming creativity tasks. To ensure that incentive value was unaffected by the bogus feedback, we measured incentive value of solving the tasks. Specifically, using 7-point scales ranging from 1 (*not at all*) to 7 (*very*), we asked: “How likely do you think it is that you will be successful on these creativity tasks?” and “How important is it to you that you will be successful on these creativity tasks?”

**Self-regulatory thought.** Based on Oettingen et al. (2001), we induced the three modes of self-regulatory thought (i.e., mental contrasting, indulging, dwelling). On the first page of a paper-and-pencil questionnaire containing four pages, participants had to jot down four positive aspects of successfully solving the upcoming problems (i.e., aspects of the desired future, such as being proud or having a life of ease). On the second page, participants had to name four negative aspects of the present reality standing in the way of being successful (i.e., obstacles such as being tired or inattentive). In the mental-contrasting condition, participants were then asked to copy the first of the four positive future aspects they had named related to successfully solving the upcoming problems to the top of page three; there they also found the following instructions:

Now really think about this positive aspect. Imagine the relevant events and experiences as vividly as possible! Let your mind go! Do not hesitate to give your thoughts and images free reign. Take as much time and space as you need to write down what you are thinking. If you need more space to write, please use the back of the page.

When participants had finished elaborating this positive future aspect, they were instructed to copy the first negative reality aspect they had previously named to the lower half of page three; there they found the same instructions, this time requesting to elaborate the named reality aspect. Finally, participants were asked to move on to the fourth page where they were requested to write down and elaborate the second aspect of the positive future and the second aspect of the negative reality. In the indulging condition, on pages three and four participants were asked to write down and elaborate the four positive future aspects; in the dwelling condition, only the named four negative reality aspects had to be written down and elaborated.

To test whether the three self-regulatory thought manipulations had differentially influenced expectations of success, we then measured expectations a second time. We first asked participants' standard of performance: “How successful do you want to be on the upcoming creativity tasks?” and then measure their expectations: “How likely do you think it is that you will be as successful as you indicated in the first question?” Questions were answered on 7-point scales ranging from 1 (*successful*) to 7 (*most successful*) and from 1 (*not at all*) to 7 (*very*).

**Assessing creative performance.** We applied a paper-and-pencil test consisting of three sets of insight problems. Ten minutes after working on the first set, participants were interrupted and asked to turn to the next set of problems. The three sets consisted of eight verbal problems, eight mathematical problems, and eight spatial problems

(e.g., Dow & Mayer, 2004). The test included problems such as: “Describe how to put 27 animals in 4 pens in such a way that there will be an odd number of animals in each pen.” The problems were selected based on a pre-test showing that they were of moderate difficulty and demanded a maximum of 3 min. To account for individual differences in creative potential, we had recorded participants' CPS scores at the beginning of the experiment (the CPS is a reliable and valid measure of creative potential; Domino, 1994). At the end of the experiment, we measured demographic characteristics, checked for suspicions, and thoroughly debriefed participants.

## Results

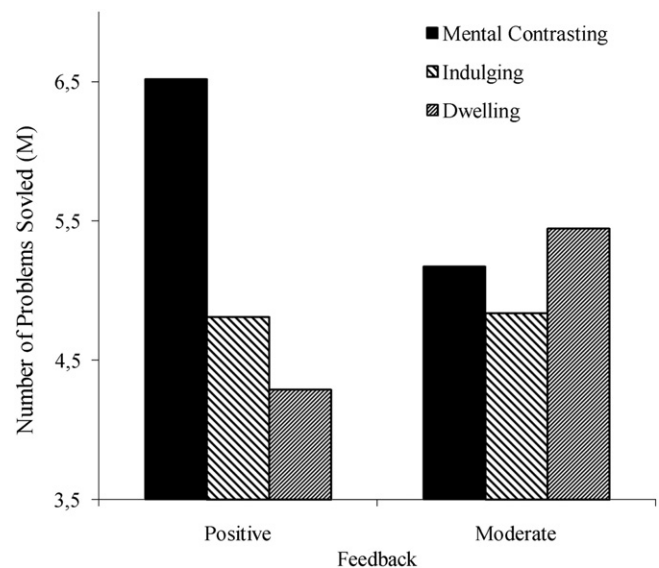
### Descriptive analyses

Participants had a CPS score of  $M = 7.64$  ( $SD = 3.55$ ) out of a possible range from  $-12$  to 28 points. They had expectations of success of  $M = 4.88$  ( $SD = 1.23$ ) before and of  $M = 4.41$  ( $SD = 1.35$ ) after the self-regulatory thought manipulation, and an incentive value of  $M = 4.20$  ( $SD = 1.62$ ). Finally, they correctly solved  $M = 5.21$  ( $SD = 2.50$ ) problems.

### Creative performance

To test for the effects of the manipulations on performance, a Feedback  $\times$  Self-Regulatory Thought ANCOVA with incentive value and the CPS score as covariates was conducted. We found no main effect of Feedback,  $F(1,149) < 1$ , *ns*, and a marginally significant main effect of Self-Regulatory Thought,  $F(2,149) = 2.84$ ,  $p = .06$ ,  $\eta_p^2 = .04$ , that was qualified by the predicted interaction effect,  $F(2,149) = 3.64$ ,  $p = .03$ ,  $\eta_p^2 = .04$  (Fig. 1).

Planned comparisons indicated that participants in the mental contrasting condition who received positive feedback solved more problems than respective participants who received moderate feedback,  $t(149) = 2.04$ ,  $p = .04$ ,  $d = .33$ . They also solved more problems than respective participants in the indulging,  $t(149) = 2.54$ ,  $p = .01$ ,  $d = .42$ , and dwelling conditions,  $t(149) = 3.35$ ,  $p = .001$ ,  $d = .55$ . Participants in the dwelling condition who received positive feedback tended to solve fewer problems than respective participants who received moderate feedback,  $t(149) = 1.80$ ,  $p = .08$ ,  $d = .29$ . No other differences were found, all  $t_s(149) < 1$ , *ns*.



**Fig. 1.** Mean number of insight problems solved as a function of creative potential feedback and self-regulatory thought (mental contrasting, indulging, and dwelling) in Study 1.



### Expectations of success

Participants who received positive feedback had marginally higher expectations of success than those who received moderate feedback ( $M = 5.04$ ,  $SD = 1.21$  vs.  $M = 4.17$ ,  $SD = 1.25$ ),  $t(155) = 1.65$ ,  $p = .10$ ,  $d = .27$ . The feedback manipulation did not affect the incentive value,  $t(155) < .1$ , *ns*. The funnel debriefing revealed that all participants believed the feedback.

We also conducted a Feedback  $\times$  Self-Regulatory Thought ANCOVA with expectations before the self-regulatory thought manipulation as a covariate and expectations after the self-regulatory thought manipulation as dependent variable. There were neither main effects, all  $F_s(1,150) < 1.94$ , *ns*, nor an interaction effect,  $F(2,150) < 1$ , *ns*, indicating that the observed results were not related to a change in expectations due to the self-regulatory thought manipulation.

### Discussion

Participants who received positive feedback regarding their creative potential and mentally contrasted thereafter solved more insight problems than mental contrasting participants who received moderate feedback; the positive feedback mental-contrasting participants also performed better than participants who indulged or dwelled, irrespective of the feedback they had received. These results indicate that mental contrasting transforms positive feedback into strong respective performance, whereas indulging and dwelling fail to do so.

Participants who received positive feedback tended to have higher expectations to perform well than those who received moderate feedback, suggesting that the feedback manipulation was effective in changing participants' expectations of success. The feedback manipulation did not affect the incentive value of performing well, indicating that the feedback manipulation was specific in that it affected expectations. This finding also rules out that the results are based on changes in the incentive value of doing well.

In sum, the findings suggest that mental contrasting transforms positive feedback into strong respective performances. However, Study 1 leaves two issues open: first, mere positive feedback could lead to strong goal commitment, without any subsequent mental contrasting needed. That is, it remains unclear whether positive feedback has an effect on performance if no self-regulatory thought is induced afterward. Second, mental contrasting may not improve performance; rather, indulging and dwelling may impede it when positive feedback is received.

Study 2 addressed these points. We added an irrelevant content control condition that allowed testing whether positive feedback by itself, without mental contrasting thereafter, heightens performance. Adding the control condition also allowed checking whether, after having received positive feedback, mental contrasting increases performance, or whether indulging and dwelling impede it. Moreover, in Study 1 the two feedback conditions only marginally differed in expectations of success. In Study 2, we therefore made the moderate feedback less positive. As in Study 1, our dependent variable was creative performance in terms of solving insight problems.

## Study 2

### Methods

#### Participants and design

A total of 147 (85 female) undergraduate students from the University of Konstanz with a mean age of 23.2 years ( $SD = 2.03$ ) participated in return for 5€ (about \$6) or course credit. Study 2 followed a 2 between (Feedback: positive vs. moderate)  $\times$  4 between (Self-Regulatory Thought: mental contrasting vs. indulging vs. dwelling vs. irrelevant content control) factorial design.

### Materials and procedure

Study 2 followed the procedure of Study 1. We changed the moderate feedback from slightly above average (Study 1, 60th percentile) to slightly below average (Study 2, 39th percentile). The positive feedback (moderate feedback in parentheses) now read: "Out of a possible score of 31 points you have received 28 (12) points. You are in the 93rd (39th) percentile of the population; 9/10 (6/10) of the population have a lower (higher) creative potential than you."

Self-regulatory thought was induced as in Study 1; in the added irrelevant content control condition the procedure mimicked mental contrasting, but participants had to focus on an irrelevant content by elaborating aspects of a picture: four positive aspects of a landscape picture (e.g., it shows beautiful detail) had to be listed, followed by four negative aspects (e.g., it is not colorful enough). Of these eight aspects, two positive and two negative aspects had to be elaborated in alternation, beginning with a positive aspect.

To measure the dependent variable, like in Study 1, we asked all participants to work on insight problems. Four tasks from each set, the verbal, mathematical, and the spatial set, were included in ascending difficulty. The problems were pre-tested with 23 (13 female) students from the University of Konstanz with a mean age of 26.3 years ( $SD = 7.65$ ).

### Results

#### Descriptive analyses

Participants had a CPS score of  $M = 5.58$  ( $SD = 3.64$ ). They had expectations of success of  $M = 4.20$  ( $SD = 1.47$ ) before and of  $M = 4.21$  ( $SD = 1.08$ ) after the self-regulatory thought manipulation, and an incentive value of  $M = 4.65$  ( $SD = 1.43$ ). Finally, participants solved  $M = 4.67$  ( $SD = 2.31$ ) problems correctly.

#### Creative performance

A Feedback  $\times$  Self-Regulatory Thought ANCOVA with incentive value and CPS scores as covariates was conducted. We found no main effect of Feedback,  $F(1,137) < 1$ , *ns*, a marginally significant main effect of Self-Regulatory Thought,  $F(3,137) = 2.17$ ,  $p = .09$ ,  $\eta_p^2 = .05$ , and the predicted interaction effect,  $F(3,137) = 2.67$ ,  $p = .05$ ,  $\eta_p^2 = .06$  (Fig. 2).

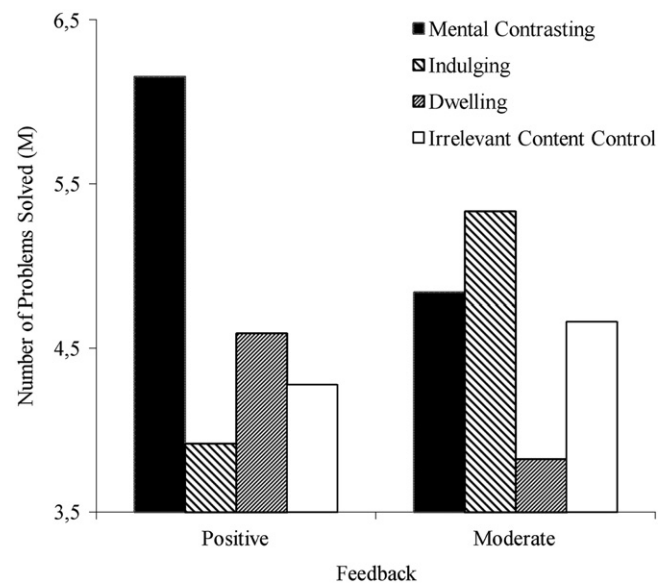


Fig. 2. Mean number of insight problems solved as a function of creative potential feedback and self-regulatory thought (mental contrasting, indulging, dwelling, and irrelevant content control) in Study 2.

Planned comparisons indicated that participants in the mental-contrasting condition who received positive feedback tended to solve more problems than respective ones who received moderate feedback,  $t(137) = 1.77, p = .08, d = .30$ . Moreover, participants in the mental-contrasting condition who received positive feedback solved more problems than respective participants in the indulging,  $t(137) = 3.00, p < .01, d = .51$ , dwelling,  $t(137) = 1.97, p = .05, d = .34$ , and control conditions,  $t(137) = 2.48, p = .01, d = .42$ . No other differences were found, all  $t(137) < 1.11, ns$ ; except that indulging participants who received positive feedback tended to solve fewer problems than indulging participants who received moderate feedback,  $t(137) = 1.91, p = .06, d = .33$ , and that indulging participants in the moderate feedback condition solved fewer problems than dwelling participants who received moderate feedback,  $t(137) = 1.99, p < .05, d = .34$ .

#### Expectations of success

Participants who received positive feedback on their creative potential indicated higher expectations of success than those who received moderate feedback. In contrast to Study 1, this difference reached significance ( $M = 3.95, SD = 1.12$  vs.  $M = 4.51, SD = 0.95$ ),  $t(145) = 3.41, p < .001, d = .56$ . Again, the feedback manipulation did not affect incentive value,  $t(145) < 1, ns$ . The funnel debriefing confirmed that all participants believed the feedback.

We also conducted a Feedback  $\times$  Self-Regulatory Thought ANCOVA with expectations before the self-regulatory thought manipulation as a covariate and expectations after the self-regulatory thought manipulation as dependent variable. Neither main effects,  $F(1,134) < 1.14, ns$ , nor an interaction effect emerged,  $F(3,134) = 1.99, ns$ , suggesting that the observed performance results cannot be explained by potential changes in expectations from before to after the self-regulatory thought manipulation.

#### Discussion

Study 2 replicated the findings of Study 1: mental contrasting participants who had received positive feedback showed better creative performance in terms of solving more insight problems than those who had received moderate feedback, and they performed better than respective indulging and dwelling participants. They also showed better creative performance than participants in the irrelevant content control group who did not have to engage in any self-regulatory thought. Interestingly, participants who received positive feedback and indulged or dwelled did not differ in their creative performance from those who did not engage in any self-regulatory thought, irrespective of the feedback received (moderate or positive). This latter finding rules out that it may not be mental contrasting that turns positive feedback into strong respective performance, but rather that other forms of self-regulatory thought (indulging or dwelling) may weaken a person's performance (Fig. 2). In sum, the results of Study 2 suggest that the self-regulatory strategy of mental contrasting facilitates the translation of positive feedback on creative potential into strong performance on creativity tests.

#### General discussion

Two studies showed that after positive feedback on creative potential mental contrasting leads to strong creative performance. Other self-regulatory thought (i.e., indulging, dwelling) as well as reflecting on irrelevant content did not translate positive feedback on creative potential into strong creative performance. The present findings have implications for self-regulation research, for research on creativity as well as for the development of behavior change interventions.

#### Implications for research on mental contrasting

Research testing the predictions of fantasy realization theory has measured rather than manipulated expectations of success (review by Oettingen, 2012). However, solely measuring a variable that is believed to predict the variation in another variable runs the risk that the predicting variable is confounded with an unnoticed third variable. To exclude a third variable explanation and to draw a conclusion about causal relations, we manipulated the predicting variables in a controlled experimental setting. We thus validated the effects of mental contrasting on expectancy-dependent commitment and performance as observed in previous studies that measured rather than manipulated expectations of success.

Expectations of success measured in previous research on mental contrasting can be assumed to reflect individuals' performance in similar situations in the past and thus their performance history. Contrary to these already existing expectations of success, situated expectations of success emerge from information obtained in a new situation (Bandura, 1977, 1997; Mischel, 1973). The positive feedback manipulations in the present experiments increased such situated expectations of success before participants engaged in mental contrasting. High situated expectations created by a single recent positive feedback experience, much like existing high expectations, provided a fruitful basis for mental contrasting to unfold its effects on performance. It is important, however, that the positive feedback is provided before individuals start to work on a given task. As research on completed and uncompleted goals has shown (e.g., Baas, De Dreu, & Nijstad, 2011; Förster, Liberman, & Higgins, 2005; Kawada, Oettingen, Gollwitzer, & Bargh, 2004; Wicklund & Gollwitzer, 1982), positive feedback that is received when individuals are already on their way to implement the goal (i.e., are engaged in goal striving) is interpreted that the goal has been attained. In this case, positive feedback should lower a person's goal striving and as a consequence task performance should diminish.

#### Implications for creativity research

There are numerous creativity trainings that succeed in heightening people's creative performance (Scott, Leritz, & Mumford, 2004). These programs teach problem solving skills that are demanded by the creativity problems that are to be solved later on. Teaching such specific problem solving skills suffers from the disadvantage that the beneficial effects are limited to the respective type of task. For example, training people in solving spatial insight problems enhances performance in solving spatial insight problems, but not in solving verbal insight problems; the reverse is true for training people in solving verbal insight problems (Dow & Mayer, 2004). Similarly, training people in creative poetry writing does not transfer to creative story writing and vice versa (Baer, 1996).

The present research suggests that creative performance can also be strengthened by a quite different technique, the self-regulatory strategy of mental contrasting. Simply fantasizing about one's creative performance and juxtaposing these fantasies with reflections on impeding reality suffices to foster creative performance, given that expectations of success are high. Importantly, *ad hoc*, one-time positive feedback can establish such positive expectations. That way, mental contrasting can unfold its beneficial effects on unveiling people's creative potential.

#### Potential process explanations

Our findings do not speak to the mediating processes of the observed mental-contrasting effects on creative performance, and whether these effects emerged because of heightened cognitive flexibility or increased perseverance (energization). Future research may tap these mediating processes by blocking cognitive flexibility and

perseverance (e.g., by rigidity training and relaxation, respectively). Else one may measure these variables (e.g., by using relevant cognitive task paradigms and by taking physiological measures, respectively) and compute mediation analyses.

May mental contrasting effects be based on cognitive dissonance processes (Cooper, 2012; Festinger, 1957)? Cognitive dissonance theory focuses on attitude change, while the model of mental contrasting focuses on commitment and performance in line with a person's expectations of success. Indeed, research neither finds changes in attitudes or incentive value as a function of mental contrasting, indulging, or dwelling, nor as a function of these self-regulation strategies interacting with expectations (Oettingen, 2012). But interaction effects of these strategies and expectations consistently emerge for goal commitment and performance. Apparently, mental contrasting does not induce people to feel that they have engaged in attitude-discrepant behavior or made a decision between equally attractive choice options—the most common elicitors of dissonance reduction. Even assuming that mental contrasting produces cognitive dissonance that is reduced by effort justification (i.e., facing obstacles is effortful and this effort needs to be justified by increasing one's commitment to realize the desired future) is not a viable option, because the literature on mental contrasting suggests otherwise: contrary to the prediction of effort justification, mental contrasting fosters commitment and performance to realize the desired future to a larger degree when minor obstacles are considered (i.e., expectations of success are high) as compared to major obstacles (i.e., when expectations of success are low).

#### Implications for behavior change interventions

Mental contrasting heightens goal commitment and performance when expectations of success are high, leads to no change when expectations are moderate, and it decreases commitment and performance when expectations are low (Oettingen, 2012). When expectations are low, disengagement not only avoids failure, but also frees resources to strive for more feasible goals. However, there are situations in which no alternatives to the unfeasible goals exist. In such situations, in which disengagement is not an option, the findings of the present research suggest a solution: by bolstering situated expectations of success—via providing a one-time positive feedback—mental contrasting guarantees strong goal commitment and subsequent strong performances.

This reasoning has implications for people who—in different life domains than creativity—have low confidence. They do not need to submit to their low confidence. Rather, providing positive feedback on their creative potential will strengthen their expectations of successful creative performance. Subsequent mental contrasting fosters exactly those cognitive (i.e., flexibility) and motivational (i.e., perseverance) orientations that are the prerequisites for creative performances (De Dreu et al., 2008). The person should now be well prepared to heighten their creativity which will in turn open up a host of opportunities and possibilities that will eventually also allow to boost their feeble confidence in other life domains.

#### Conclusion

The present research points to a technique that helps to reap the benefits of *ad hoc*, one-time positive feedback about one's creative potential. We observed that mental contrasting of future and reality—rather than indulging, dwelling, or no elaborations—turn such positive feedback into creative performance. Going back to the initial question of why people do not pursue creative performance after being praised for their creative potential, we now have an answer. Because they did not mentally contrast their future of being creative with the obstacles of reality they did not succeed in translating the positive feedback into heightened creative performance.

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