



The emergence of goal pursuit: Mental contrasting connects future and reality



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HIGHLIGHTS

- We studied how thinking about the future instigates goal pursuit
- Mental associations between future and obstacles foster goal pursuit
- Studies highlight the importance of integrating obstacles into future thinking for goal pursuit

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ABSTRACT

Mental contrasting of a desired future with the present reality strengthens the link between expectations and goal pursuit: The higher expectations of success, the more people engage in goal pursuit; the lower expectations of success, the more people let go or disengage from goal pursuit. In three studies, we tested if mental contrasting increases the link between expectations and goal pursuit by affecting the strength of mental associations between future and reality. We used lexical decision tasks to measure the strength of associations between future and reality for different domains of goal pursuit (i.e., interpersonal relations, achievement), and compared results in the mental contrasting condition to relevant control conditions (i.e., reverse contrasting and content control). In the mental contrasting condition but not in the control conditions emerged a strong link between expectations of success and the strength of associations between future and reality (Study 1, 2). The strength of associations between future and reality in turn mediated the link between expectations and self-reported as well as other-rated goal pursuit in the mental contrasting condition (Study 1, 2). Finally, the link between expectations and the strength of associations between future and reality in the mental contrasting condition vanished when the goal was attained (Study 3). Taken together, these results suggest that strength of future–reality associations are a mechanism specific to mental contrasting effects on goal pursuit.

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On self-help blogs on the internet, people often write about a period in their life, when they felt that they did not live up to their potential. Despite feeling capable of, say, being a better parent, giving a successful presentation for a job interview, or finding an idea for the book they always wanted to write, they report struggling with starting to engage in the pursuit of their wishes. When looking back, they remember oscillating between periods of fantasy, dreaming vividly about successfully attaining their wishes, and periods of frustration, mired in thoughts about the obstacles of implementing their wishes. However, neither the periods of fantasy nor the periods of frustration would help to move forward. It was not until one day, in a moment of insight, they made the connection between the desired future and the present reality

standing in the way of wish fulfillment that they saw what had to be done. They then made time to spend with their children, put in the needed effort to prepare the job presentation, or decided to take a creative writing class, and thereby realized their desired futures. Similarly, we propose that people make progress toward attainable wishes when they connect thoughts and images of fulfilling these wishes with reflections on the present reality that must be overcome.

Mentally contrasting a desired future (e.g., finishing a presentation over the weekend) with the reality standing in the way of realizing the desired future (e.g., a party on Saturday night) strengthens the link between expectations of success and goal pursuit (i.e. committing to and striving for a goal). The higher the expectations of success, the more likely people are to engage in tenacious goal pursuit. Yet, the lower the expectations of success, the more likely people are to let go or disengage from goal pursuit (Oettingen, 2012, for an overview). Yet, how does mental contrasting strengthen the link between

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expectations of success and goal pursuit? We suggest that when people engage in mental contrasting of feasible wishes (i.e., high expectations of success) they acquiesce that in order to achieve the desired future they have to put in effort to overcome the reality and thus form a strong mental association between future and reality. On the contrary, what leads people to let go or disengage from unfeasible wishes (i.e., low expectations of success) is seeing that trying to overcome the reality will most likely be in vain, thereby cutting off the relation between future and reality. Hence, mental contrasting should increase the link between expectations of success and the strength of associations between future and reality: the higher expectations of success the stronger the associations between future and reality, and the lower expectations of success the weaker associations between future and reality. To test these hypotheses, we measured the strength of associations between future and reality directly after mental contrasting (versus control conditions). We further predicted that by altering the strength of the associations between future and reality alongside expectations, mentally contrasting increases the link between expectations of success and goal pursuit. We tested these ideas in three studies.

Mental contrasting and goal pursuit

Mental contrasting is a self-regulation strategy that leads people to utilize their expectations for goal pursuit (Oettingen, 2012). When people engage in mental contrasting, they first imagine a desired future (i.e., positive images of wish fulfillment) and then elaborate the reality (i.e., potential obstacles and difficulties) that stands in the way of wish fulfillment. Thereby, the question of whether the desired future can be attained is raised (Oettingen, Pak, & Schnetter, 2001). Based largely on past performances and experiences (Bandura, 1977, 1997) – including overcoming relevant obstacles and difficulties – expectations of success provide the answer, and guide subsequent goal pursuit. The higher expectations of success are, the more people commit to and strive for attaining the desired future (i.e., pursue the goal); yet the lower expectations of success, the more people let go or disengage from goal pursuit (Oettingen, 2000, 2012; Oettingen et al., 2001).

A multitude of experimental studies showed that mental contrasting bolsters the relationship between expectations of success and goal pursuit. Using various indicators of goal pursuit such as cognitive (e.g., making plans), affective (e.g., feelings of anticipated disappointment in case of failure), motivational (e.g., feelings of energization, systolic blood pressure), and behavioral indicators (e.g., observed effort, actual achievement), these studies found the described pattern of results, no matter whether the indicators of goal pursuit were assessed via self-report or observations, or whether immediate effort or sustained effort over weeks was needed (Kappes, Oettingen, & Pak, 2012; Kappes, Singmann, & Oettingen, 2012; Oettingen, 2000; Oettingen, Mayer, Thorpe, Janetzke, & Lorenz, 2005; Oettingen et al., 2001, 2009; Oettingen, Mayer, Stephens, & Brinkmann, 2010; Oettingen, Mayer, & Thorpe, 2010; summary by Oettingen, 2012). Importantly, in these studies, mental contrasting did not change the expectations of success itself; rather it made them relevant for goal pursuit (Oettingen et al., 2001, 2005). That is, the higher expectations of success were the more participants in the mental contrasting condition showed immediate and tenacious goal pursuit. In contrast, the lower expectations of success were the more participants let go or disengaged from goal pursuit.

Strength of mental associations between future and reality

How does mental contrasting increase the link between expectations of success and goal pursuit? The model of fantasy realization (Oettingen, 2000, 2012; Oettingen et al., 2001) argues that mental contrasting of feasible wishes leads people to see the reality (e.g., a party on Saturday night) as *standing in the way* of attaining the desired future (e.g., finishing a project presentation over the weekend). In mental contrasting, participants first imagine the desired future; the future thereby

sets the context for imagining the reality. Imagining the reality right after imagining the desired future activates reality information in relation to the desired future, pointing out that the attainment of the desired future depends on overcoming the reality standing in the way. For example, a person might first imagine how happy she would feel if she could finish the project presentation over the weekend. When mentally turning to the present reality of being invited to a party on Saturday night, she may immediately think about how this party impedes the desired future of completing the assignment. By understanding the reality in the context of the future, mental contrasting raises the question: Can I overcome the reality that stands in the way of wish fulfillment? Expectations of success provide an answer to this question, become activated, and should subsequently inform how people form the mental associations between future and reality.

In particular, the higher the expectations of success, the more people should realize that they can overcome the reality. In contrast, the lower expectations of success, the more people should realize that trying to overcome the reality will most likely be in vain. Thereby mental contrasting establishes a meaningful relation between future and reality in line with expectations of success. Specifically, if expectations of success are high, mental contrasting should change the meaning of reality so that participants see the reality as an obstacle towards goal pursuit such as the party in the example above is standing in the way of reaching the desired future. In contrast, participants with low expectations, as it is in vain to attain the desired future, should not see the reality as an obstacle, in the example above, the party is now a fun event, not connected to finishing the project presentation. Consistently, in a series of studies, we found a strong link between expectations of success and seeing the reality as an obstacle towards reaching the desired future. The higher the expectations of success, the more people perceived the reality as an obstacle, yet the lower expectations of success, the less they perceived the reality as an obstacle (Kappes, Wendt, Reinelt, & Oettingen, 2013).

Importantly, we predicted that constructing a relationship between future and reality will affect the strength of associations between future and reality. Theories on how relational information is stored in memory (De Houwer, 2009; Dickinson, 2009; Mitchell, De Houwer, & Lovibond, 2009) show that the strength of associations between two events expresses relational information about how the events relate to each other. If one event, for instance, is believed to be strongly related to the other, then strong associations are formed between them. However, if one event is believed to be unrelated to another event, the strength of associations between them is weakened. In line with these ideas, we hypothesized that the higher the expectations of success, the stronger the mental association between future and reality, indicating the strengthened relationship between future and reality. In contrast, we predicted that the lower the expectations of success the weaker the mental association between future and reality; expressing the weakened relationship between future and reality.

Finally, we propose that the strength of the associations between future and reality mediate the link between expectations and goal pursuit in the mental contrasting condition. Strong associations imply that the desired future cannot be thought of anymore without the reality; hence the reality should act as a reminder that action is needed to attain the desired future. Consequently, when the desired future is brought to mind, the subsequent activation of present reality will ensure that effort is invested in goal pursuit. On the contrary, weak future–reality associations imply that even when explicitly thinking about the desired future, the respective reality will not become activated; hence no reality urges people to act on their desired future. Thereby, when the desired future is brought to mind, the reality will fail to evoke effort allocation for goal pursuit.

Indulging, dwelling, and reverse contrasting

People engage not only in mental contrasting, but predominantly in other forms of thinking about the future (i.e., indulging, dwelling, and

reverse contrasting; Sevincer & Oettingen, 2013). Imagining only the desired future (i.e., indulging) or only the present reality (i.e., dwelling) does not highlight that the reality stands in the way of the desired future, and expectations do not become activated. Furthermore, reversing the order of imagining (i.e., reverse contrasting) does not lead to the activation of expectations either (Kappes, Oettingen et al., 2012; Kappes, Singmann, et al., 2012; Kappes et al., 2013; Oettingen et al., 2001). In reverse contrasting, people imagine the reality before they turn to the future. Imagining the reality without the context of the desired future activates information about the reality that may have nothing to do with the desired future. In the example above, a person might think about what to bring to the party on Saturday night, or what to wear. The reality is not perceived in the context of the desired future; hence, expectations of successfully realizing the future should not become activated.

To summarize, other ways of thinking about the future than mental contrasting fail to activate expectations of success, and thereby, we predicted, will neither strengthen nor weaken the association between future and reality in line with expectations of success. However, participants in the control conditions, nevertheless, might have preexisting strong associations between future and reality. Yet, we predicted that these strong associations between future and reality are different from the ones established by mental contrasting: they do not signal that the reality stands in the way of the future and they are not informed by high expectations of success. In other words, since we assumed that strong associations in the control conditions do not carry relational information in the sense that the obstacles stand in the way of reaching the desired future, we predicted that in these conditions, the strength of future–reality associations does not correlate with goal pursuit.

The present research

We conducted three studies to test the idea that the strong link between expectations of success and goal pursuit established by mental contrasting is mediated by the strength of the association of future and reality. In all studies, we first measured the expectations of successfully reaching the desired future, then assigned participants either to a mental contrasting, or various control conditions, and afterwards measured participants' strength of future–reality associations via a lexical decision task with sequential priming (from now on we will refer to this task as lexical decision task). In Studies 1 and 2 we assessed various indicators of goal pursuit.

We included several other measures in the lexical decision task to exclude alternative explanations for the observed effects. In addition to measuring the strength of associations between future and reality, we also measured indicators of the mere accessibility of future and reality. The accessibility of goal-related constructs plays a key role in the activation of goal-relevant action. Goal-related constructs become more accessible when people commit to goals (Dijksterhuis & Aarts, 2010; Förster, Liberman, & Higgins, 2005; Goschke & Kuhl, 1993; Zeigarnik, 1927). Measuring the accessibility of future and reality enabled us to test accessibility effects as alternative explanations.

Furthermore, the activation of future–reality associations might be sensitive to order. Previous research found that associations are sensitive to order of presentation of the primes (Kressel & Uleman, 2010; Webb & Sheeran, 2007). Therefore, we also primed participants first with the reality, and then presented the future, measuring associations between reality and future. Hence, we tested if mental contrasting is specific in affecting the strength of associations in the order of elaboration (i.e., first future, then reality), or also affects the strength of associations in the reverse order (i.e., first reality, then future).

Finally, we tested if the link between expectations and goal pursuit in the mental contrasting condition is mediated by the associations between future and reality. Our prediction that the link between future–reality associations and goal pursuit is different between the mental contrasting condition (link between associations and goal pursuit) and

the control conditions (no link between associations and goal pursuit) has important implications for this mediational analysis. Specifically, one approach would be to test this notion via moderated mediation, which would test if the differences between conditions in the relation between expectations (moderator) and goal pursuit are mediated by the strength of association between future and reality (Muller, Judd, & Yzerbyt, 2005). However, if we do not find correlations between the strength of association (mediator) and the goal pursuit indicators (dependent variable) across conditions, as predicted, moderated mediation is not permitted, since such correlations are the necessary condition for using moderated mediation (Muller et al., 2005). Therefore, we used mediation analysis (Oettingen et al., 2009) that focused on the mental contrasting condition because in the mental contrasting condition the strength of future–reality associations should correlate with goal pursuit.

Study 1: Strength of future–reality associations and the pursuit of life goals

To test our hypotheses, we first measured expectations of success, induced a mental contrasting condition versus relevant control conditions, and then as dependent variable measured the strength of future–reality associations, of reality–future associations, and the mere accessibility of future and reality. We used a standard procedure to measure strength of associations, a lexical decision task (Neely, 1977). Finally, we assessed goal pursuit via three indicators tapping into motivational (i.e., feelings of energization), emotional (i.e., feelings of responsibility), and cognitive components (i.e., perceived clarity on how to reach the desired future) used in previous research on mental contrasting. Energization (Oettingen et al., 2009), feelings of responsibility (Cantor, Norem, Niedenthal, Langston, & Brower, 1987), and perceived clarity (Adriaanse et al., 2010) have all been shown to further goal pursuit.

We included two control conditions: a reverse contrasting and an irrelevant content condition. In the reverse contrasting condition, participants first imagined the reality, then the desired future. Hence, reverse contrasting participants elaborated the same content as mental contrasting participants but in reverse order. This condition tested our prediction that imagining the reality before the future does not connect future and reality. In the irrelevant content condition, participants first elaborated a positive experience, then a negative experience. This condition excluded the alternative explanation that it is only the order of thinking about something positive (such as the desired future), then about something negative (such as the reality) that is responsible for mental contrasting effects on the strength of future–reality associations and subsequent goal pursuit.

Method

Participants

One hundred and thirty-four students of a large American university (age $M = 19.67$, $SD = 1.01$, female = 91) participated in return for partial course credit. Participants were randomly assigned either to a mental contrasting condition ($n = 41$), a reverse contrasting condition ($n = 47$), or an irrelevant content condition ($n = 46$).

Procedure and materials

Participants were told that the study dealt with important life tasks and how verbal skills relate to success at these life tasks. Following Cantor and colleagues (Cantor et al., 1987; Zirkel & Cantor, 1990), we used a procedure to ensure that participants named life tasks of similar complexity, difficulty, and importance. Specifically, they read three examples of current life tasks sufficing these criteria. Only then they were allowed to identify their own most important life task in the social domain. Participants named “finding a girlfriend,” “becoming more independent from my parents,” or “making close friendships with other

students". To measure expectations of success, students responded to the question "How likely do you think it is that you will succeed in solving the life task named above" on a scale ranging from 1 (*not at all likely*) to 7 (*extremely likely*).

Next, participants listed one aspect of the future that they associated with the best possible outcome of solving their life task (i.e., future aspect; participants named e.g., "happiness and joy," "more respect," or "trusting relationships") and one aspect of the reality that stands in the way of being successful in solving their life task (i.e., reality aspect; participants named e.g., "being shy," "depending on my parents' financial support," or "having little time"). In order to obtain words for use in the lexical decision task, participants had then to summarize the named future and reality aspect with one word each (i.e., the future word and the reality word) that best represented the respective aspect. Participants summarized the future aspect with words such as "happiness," "respect," or "trust" and the reality aspect with words such as "shyness," "dependence," or "time."

It is important to note that previous research showed that just listing future and reality aspects or summarizing these aspects does not instigate mental contrasting-like effects on goal pursuit (Kappes et al., 2013; Oettingen et al., 2001). Even though on the surface, listing future and reality aspects has some resemblance to the mental contrasting procedure (see below), the crucial difference lies in the fact that only during mental contrasting participants vividly imagine and elaborate the aspect. And previous research showed that mental and written elaborations are needed to change the meaning of events by organizing and structuring them (e.g., Pennebaker & Beall, 1986; Pennebaker, Mayne, & Francis, 1997; Taylor, Pham, Rivkin, & Armor, 1998).

Thereafter, we established three experimental conditions: a mental contrasting condition, a reverse contrasting condition, and an irrelevant content condition. In the mental contrasting condition, participants imagined and wrote about their future aspect and their reality aspect, beginning with the future aspect. To elicit the intended thoughts and images, participants read the following instructions for both future and reality:

Think about this aspect in vivid detail and write about all the thoughts and images that come to your mind. Let your mind wander and allow these events and experiences to play out. Don't hesitate to give your thoughts and images free rein. Take as much time as you need.

In the reverse contrasting condition, participants received exactly the same instructions but started with imagining the reality. In the irrelevant content condition, participants first imagined a positive experience with one of their teachers at school and second, a recent, negative experience with one of their teachers.

Dependent variables: strength of associations

A sequential priming paradigm was used to measure the strength of the associations between future and reality (i.e., future–reality associations), of the associations between reality and future (i.e., reality–future associations), and the accessibility of future (i.e., reaction times on future-only trials) and reality (i.e., reaction times on reality-only trials). Participants read that the next task would measure the speed with which they recognized personally important and unimportant words and that this was an indicator of verbal skills which might influence success in the social domain. Students learned that we would use the words they previously entered (i.e., the future word and the reality word), among others. Finally, participants had to indicate as quickly as possible whether each item presented on the screen was a word or a non-word by pressing one of two labeled keys.

Each experimental trial started with the presentation of a white fixation cross on a black screen for 500 ms followed by the presentation of a gray prime word for 50 ms which was backward masked by a random letter string (e.g., HKELKQPWRSD) for 100 ms to prevent participants

from consciously seeing the primes. The mask was replaced by the presentation of a black screen which varied randomly from 100 ms to 300 ms to prevent participants from anticipating the presentation of the target. Finally, the target word appeared in red on the screen. All the stimuli appeared at the same location on the screen. To assure that participants did not perceive the prime consciously, participants reported during a funneled debriefing whether they saw one of the primes presented before the target word appeared. Six participants reported at the end of the study having seen some words, but could not identify what words they saw. Removing these participants from the sample did not change the present results.¹

The strength of the associations between *future* and *reality* was determined by participants' mean reaction times on two trials comprising the future word as prime and the reality word as target (see Table 1). In contrast, the strength of the associations between *reality* and *future* was indexed by participants' mean reaction times on two trials comprising the reality word as prime and the future word as target. Finally, indicators of the accessibility of the future and reality were measured by participants' mean reaction times on two trials comprising unrelated negative words (e.g., "radiation," "corruption," Bargh, Chaiken, Govender, & Pratto, 1992) as the prime and the future word as the target (future-only trials), and two trials comprising unrelated positive words as the prime (e.g., "nice," "friendly," Bargh et al., 1992) and the reality word as the target (reality-only trials). We chose unrelated positive and negative words as primes to control for the influence of the prime valence on the subsequent processing of the target (Bargh, Chaiken, Raymond, & Hymes, 1996) in comparison to future–reality trials and reality–future trials. Finally, 24 filler trials containing neutral words as primes and as targets (e.g., "umbrella," "noon") and 32 non-word trials were included. Thus, the complete lexical decision task comprised 64 trials; half were real word trials of which one-fourth were critical trials.

Since all the idiosyncratic words for the lexical decision tasks were entered before participants were randomized to the experimental conditions, systematic difference in word features (e.g., length, frequency, abstractness) between conditions can be ruled out as alternative explanations for the results presented below. However, it can still be argued that word features might explain why in the mental contrasting condition, we find a link between expectations and strength of future–reality associations rather than reality–future associations. For instance, differences in abstractness may allow for easier activation in one direction such as future to reality, but not in another direction such as from reality to future. Hence, we assessed length, frequency, and abstractness of the future and reality words. For abstractness, two independent raters (interrater for future: $r = .86$, for reality: $r = .79$) categorized each future and reality word for their level of abstractness by using the procedures from Alter and Oppenheimer (2008). Then, we tested whether there were differences on any of these three features between future and reality words. We found a difference between future and reality words in frequency, $F(1, 127) = 7.33, p = .008$, with future words being more frequent than reality words, but no difference in length, $F(1, 127) = 0.04, p = .98$, or abstractness, $F(1, 127) = 2.00, p = .17$. Hence, we redid the analysis presented below with controlling for the difference in word frequency when we examined the expectancy-dependent effects of mental contrasting on future–reality and reality–future associations, but did not observe any differences.

Dependent variables: goal pursuit

Finally, participants completed a questionnaire designed to measure their feelings of energization, feelings of responsibility, and clarity of the life task in order to assess goal pursuit indicators. For all questions, the response scale ranged from 1 (*not at all*) to 7 (*extremely*). Specifically,

¹ Our hypotheses do not require subliminal presentation of the primes. We used the described priming procedure to ensure that participants do not start thinking about how the primes might relate to the targets during the lexical decision task; something that might interfere with automatic processes (Bargh et al., 1996).

Table 1

Prime-target combinations used to measure the dependent variables in the lexical decision tasks. * Primes used in Study 2 and Study 3.

Dependent variable	Prime	Target
Accessibility	Negative word/XXXXX*	Future word
	Positive word/XXXXX*	Reality word
Future–reality associations	Future word	Reality word
Reality–future associations	Reality word	Future word

to measure energization, participants first thought about their life task and then rated to which extent they were feeling encouraged, active, and motivated. Internal consistency was high ($\alpha = .95$). Feelings of responsibility were measured in line with the life task questionnaire (Cantor et al., 1987) asking participants how much they felt in control of their most important life task. Perceived clarity was assessed with the clarity dimension of the Striving Assessment Scales (Emmons, 1986), where participants indicate how clear an idea they had of what they needed to do to be successful in their life task. Finally, we debriefed, thanked, and dismissed the participants.

Results

Data preparation

Only correct responses on the lexical decision trials were included in the analyses (error rate was 3.4%). Reaction times slower than 1500 ms or faster than 250 ms were excluded to lessen the influence of outliers (<0.4% of total trials). Gender and age had no significant main effects or interaction effects with any of the variables reported here, and thus, will not be discussed further.

Descriptive analyses

Expectations of success ranged from 2 to 7 with $M = 5.59$ ($SD = .84$). Furthermore, we found mean reaction times of 581.81 ms ($SD = 152.14$ ms) on future–reality trials, of 544.39 ms ($SD = 120.62$ ms) on reality–future trials, of 546.27 ms ($SD = 147.16$ ms) on negative word–future trials, and of 565.96 ms ($SD = 139.27$ ms) on positive word–reality trials. And we measured three different goal pursuit indicators: energization ($M = 4.69$, $SD = 1.01$), feelings of responsibility ($M = 5.04$, $SD = 1.28$), and perceived clarity ($M = 5.04$, $SD = 1.32$). Energization correlated positively with feelings of responsibility, $r = .43$, $p < .01$, and with perceived clarity, $r = .33$, $p < .01$. Feelings of responsibility and perceived clarity also correlated positively, $r = .49$, $p < .01$. Finally, reaction times on reality-only trials, an indicator of the accessibility of the reality, correlated with feelings of responsibility, $r = -.17$, $p = .04$, but not with energization or perceived clarity, $ps > .20$. Reaction times on future-only trials, an indicator of the accessibility of the future, correlated with feelings of responsibility, $r = -.20$, $p = .02$, and with clarity, $r = -.19$, $p = .03$, but not with energization, $p = .48$.

Strength of associations between future and reality

First, we tested our main prediction that in the mental contrasting condition but not in the control conditions the strength of future–reality associations should be in line with expectations of success. The strength of future–reality associations was measured by trials with the future word as prime and the reality word as target. To ensure that mental contrasting affected the strength of future–reality associations beyond mere accessibility effects, we controlled for the accessibility of the reality word. As an indicator of accessibility of the reality, we used reaction times on the reality-only trials, where an unrelated word was the prime and the reality word was the target. To allow for estimating the influence of mere accessibility of the reality word on the presented results, we report both, the results with this control variable (i.e., reaction times on reality-only trials) adjusted and the results without this control variable adjusted (in parentheses).

We followed the procedures recommended by Aiken and West (1991) and West, Aiken, Wu, and Taylor (2007; see also Kashy, Donnellan, Ackerman, & Russell, 2009) for testing the interaction effects between continuous and categorical measures. We conducted a hierarchical regression analysis predicting each dependent measure (e.g., strength of future–reality associations) from (a) two dummy-coded contrasts for the main effects of condition, (b) the centered main effects of expectations, and (c) two interaction terms between expectations and each condition contrast. Hierarchical analysis allowed us to test the significance of adding the interactions terms into the model via examining the change in R^2 . When significant, we examined the link between expectations and the dependent variable in each experimental condition. Expectations should show a link to the dependent variables only in the mental contrasting condition. Finally, we tested if the link between expectations and goal pursuit in the mental contrasting condition was stronger than the link in the control conditions.

Following these procedures, we used hierarchical regression analysis entering expectations, accessibility of the reality aspect, and two dummy codes for the three conditions in the first step, and the two interaction terms between expectations and each condition in the second step (results without adjusting for reaction times on reality-only trials in parentheses). As predicted, adding the interaction terms significantly improved the model, $R^2_{change} = 4\%$ (7.1%), $F_{change}(2,127) = 3.37$, (5.03), $p = .04$ (.008) (Fig. 1, left side). In the mental contrasting condition expectations predicted strong future–reality associations (indicated by faster reaction times), $\beta = -.36$ (–.43), $t(127) = 3.33$ (3.47), $p = .001$ (.001). Expectations did predict neither the strength of future–reality associations in the reverse contrasting condition, $\beta = .01$ (.14), $t(127) = .13$ (.40), $p = .89$ (.36), nor in the irrelevant content condition, $\beta = .03$ (.05), $t(127) = .23$ (.58), $p = .83$ (.76). The link between expectations and the strength of future–reality associations was stronger in the mental contrasting condition than in the reverse contrasting condition, $t(127) = 2.15$ (2.29), $p = .03$ (.02), and stronger than in the irrelevant content condition, $t(127) = 2.15$ (2.88), $p = .03$ (.005), whereas the link did not differ between the reverse contrasting and irrelevant content conditions, $t(127) = .08$ (.40), $p = .93$ (.69).

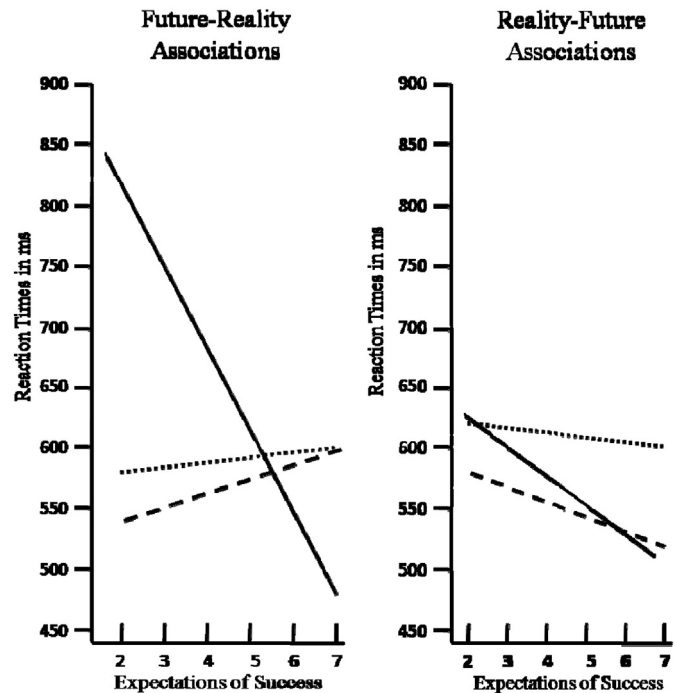


Fig. 1. Regression lines depict the link (Study 1) between expectations of success and strength of future–reality associations controlled for accessibility of the reality (left) and strength of reality–future associations controlled for accessibility of the future (right) as a function of self-regulatory thought condition.

Strength of associations between reality and future

We further tested whether mental contrasting effects on the strength of the association between future and reality are directed: that is, whether mental contrasting also affects the strength of associations between reality and future. We controlled for reaction times on future-only trials (the accessibility of the target) to exclude accessibility effects as an alternative explanation for the results. Adding the interaction terms did not improve the model, $F_{\text{change}}(2,127) = .47$ (1.35), $p = .63$ (.26) (Fig. 1, right side), and there was no main effect for expectations, $t(127) = 1.69$ (1.8), $p = .10$ (.07). Apparently, mental contrasting is specific in affecting the strength of associations in the order they were elaborated (i.e., first future, then reality), but not in the reverse order (i.e., first reality, then future).

Goal pursuit

Next, we tested whether mental contrasting produced expectancy-dependent goal pursuit, as has been shown in past research (Oettingen, 2012). For energization, adding the interaction terms significantly improved the model, $R^2_{\text{change}} = 6%$, $F_{\text{change}}(2,128) = 4.23$, $p = .02$ (Fig. 2, left side). In the mental contrasting condition expectations predicted strong energization, $\beta = .58$, $t(128) = 4.94$, $p < .001$. Expectations did affect energization neither in the reverse contrasting condition, $\beta = .10$, $t(128) = .69$, $p = .49$, nor in the irrelevant content condition, $\beta = .13$, $t(128) = .78$, $p = .43$. The link between expectations and energization was stronger in the mental contrasting condition than in the reverse contrasting condition, $t(128) = 2.28$, $p = .02$, and stronger than in the irrelevant content condition, $t(128) = 2.53$, $p = .01$, whereas the link did not differ between the reverse contrasting and irrelevant content conditions, $t(128) = .11$, $p = .91$.

For feelings of responsibility, adding the interaction terms significantly improved the model, $R^2_{\text{change}} = 8%$, $F_{\text{change}}(2,128) = 6.12$, $p = .003$ (Fig. 2, middle). In the mental contrasting condition expectations predicted strong feelings of responsibility, $\beta = .59$, $t(128) = 5.06$, $p < .001$. Expectations did affect feelings of responsibility neither in the reverse contrasting condition, $\beta = .05$, $t(128) = .35$, $p = .73$, nor in the irrelevant content condition, $\beta = .02$, $t(128) = .11$, $p = .92$. The link between expectations and feelings of responsibility was stronger in the mental contrasting condition than in the reverse contrasting condition, $t(128) = 2.91$, $p = .004$, and stronger than in the irrelevant content condition, $t(128) = 2.88$, $p = .005$, whereas the link did not differ between the reverse contrasting and irrelevant content conditions, $t(128) = .16$, $p = .88$.

Finally, for perceived clarity, adding the interaction terms significantly improved the model, $R^2_{\text{change}} = 4%$, $F_{\text{change}}(2,128) = 3.01$, $p = .05$ (Fig. 2, right side). In the mental contrasting condition expectations predicted strong perceived clarity, $\beta = .49$, $t(128) = 4.02$, $p < .001$. Expectations did affect perceived clarity neither in the reverse contrasting condition, $\beta = .04$, $t(128) = .25$, $p = .81$, nor in the irrelevant content condition, $\beta = .15$, $t(128) = .89$, $p = .37$. The link between expectations and perceived clarity tended to be stronger in the mental contrasting condition than in the reverse contrasting condition, $t(128) = 1.68$, $p = .10$, and was stronger than in the irrelevant content condition, $t(128) = 2.33$, $p = .02$, whereas the link did not differ between the reverse contrasting and irrelevant content conditions, $t(128) = .49$, $p = .62$.

Future–reality associations and goal pursuit

As predicted, we found that mental contrasting heightened the link between expectations of success and the strength of associations between future and reality as well as the link between expectations of success and goal pursuit. We further predicted that only in the mental contrasting condition, the associations between future and reality would predict goal pursuit. To test this hypothesis, we used hierarchical regression analysis to predict energization, entering strength of associations between future and reality, and two dummy codes for the three conditions in the first step, and the two interaction terms between strength of associations between future and reality and each condition in the second step. We adjusted for reaction times on reality-only trials to exclude accessibility effects as an alternative explanation for the results (results without adjusting for control variable in parentheses).

As predicted, adding the interaction terms significantly improved the model, $R^2_{\text{change}} = 11%$ (12%), $F_{\text{change}}(2,127) = 8.80$ (8.84), $p < .001$ ($<.001$). In the mental contrasting condition future–reality associations (stronger associations indicated by faster reaction times) predicted energization, $\beta = -.65$ ($-.69$), $t(127) = 4.12$ (4.53), $p < .001$ ($<.001$). Future–reality associations did predict neither energization in the reverse contrasting condition, $\beta = .15$ (.13), $t(127) = 1.13$ (.92), $p = .26$ (.36), nor in the irrelevant content condition, $\beta = .003$ ($-.03$), $t(127) = .02$ (.19), $p = .99$ (.84). Consequently, the link between the strength of future–reality associations and energization was stronger in the mental contrasting condition than in the reverse contrasting condition, $t(127) = 4.12$ (2.96), $p = .001$ (.004), and stronger than in the irrelevant content condition, $t(127) = 2.96$ (4.11), $p = .004$ ($<.001$), whereas the link did not differ between the reverse contrasting and irrelevant content conditions, $t(127) = .73$, $p = .46$.

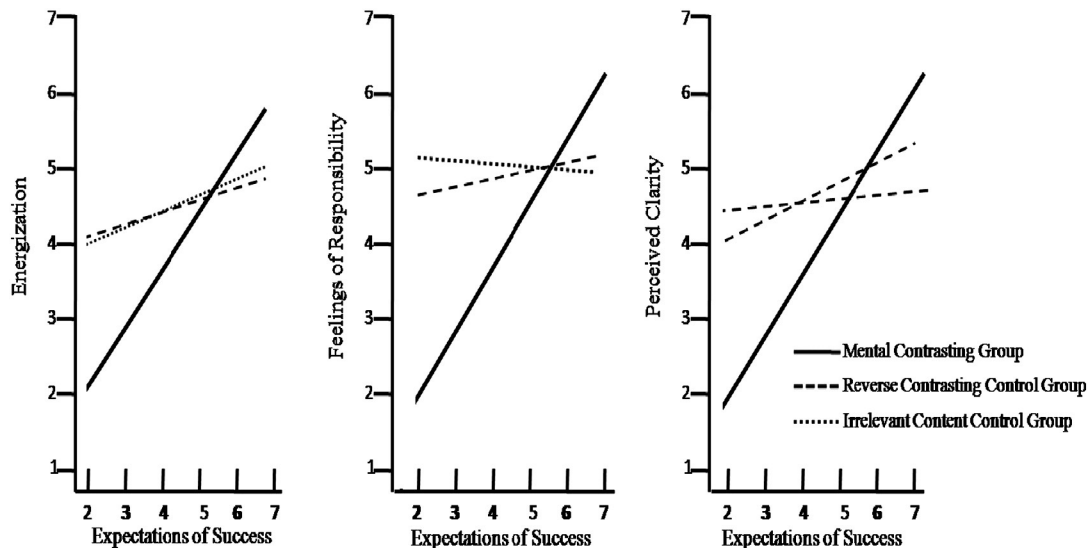


Fig. 2. Regression lines depict the relation (Study 1) between expectations of success and feelings of energization (left), feelings of responsibility (middle), and perceived clarity (right) as a function of self-regulatory thought condition.

We repeated the same set of analysis for feelings of responsibility. Adding the interaction terms significantly improved the model, $R^2_{change} = 4\%$ (4%), $F_{change}(2,127) = 3.18, p = .04$ (.04). In the mental contrasting condition future–reality associations predicted feelings of responsibility, $\beta = -.51$ (–.55), $t(127) = 3.16$ (3.60), $p = .002$ (<.001). Future–reality associations did predict neither feelings of responsibility in the reverse contrasting condition, $\beta = -.07$ (–.12), $t(127) = .43$ (.73), $p = .67$ (.56), nor in the irrelevant content condition, $\beta = -.03$ (–.09), $t(127) = .24$ (.69), $p = .81$ (.50). Consequently, the link between the strength of future–reality associations and feelings of responsibility was stronger in the mental contrasting condition than in the reverse contrasting condition, $t(127) = 2.40$ (2.40), $p = .02$ (.02), and stronger than in the irrelevant content condition, $t(127) = 1.93$ (1.93), $p = .055$ (.055), whereas the link did not differ between the reverse contrasting and irrelevant content conditions, $t(127) = .20$ (.17), $p = .85$ (.87).

However, for perceived clarity, adding the interaction terms did not improve the model, $R^2_{change} = 2\%$ (2%), $F_{change}(2,127) = 1.33$ (1.34), $p = .27$ (.26). Taken together, these results showed that future–reality associations were strongly linked to energization and feelings of responsibility in the mental contrasting condition, but not in the other conditions. Future–reality associations, however, did not show a link to perceived clarity in any of the conditions.

Mediational analysis

We tested whether the strength of associations between future and reality mediated the link between expectations of success and goal pursuit in the mental contrasting condition. Since we did not find a significant link between future–reality associations and goal pursuit in the non-mental contrasting condition, we focused on the mental contrasting condition. Furthermore, we did find a significant relationship between future–reality associations and energization as well as feelings of responsibility, but not for perceived clarity. Hence, we tested mediation only for energization and feelings of responsibility. We followed the procedures outlined by Oettingen et al. (2009) to test for mediation in the mental contrasting condition. To show mediation, the proposed mediator (i.e., the strength of future–reality associations) should significantly predict the outcome variables (feelings of energization, feelings of responsibility) while controlling for the initial variable (i.e., expectations of success). In addition, the link between expectations and the outcome variables should be attenuated after adjusting for the proposed mediator (Baron & Kenny, 1986; Preacher & Hayes, 2008).

We found that the strength of future–reality associations at least partially mediated the link between expectations and feelings of energization and between expectations and feelings of responsibility. Specifically, as shown in Fig. 3, the link between expectations of success and the goal pursuit indicators dropped below significance when the strength of future–reality associations was entered into the regression analysis. Furthermore, using bootstrap tests (Preacher & Hayes, 2008),

we observed a significant indirect effect of expectations on energization through the strength of future–reality associations, 95% confidence interval (CI) bootstrap percentile = .05, .51, and a significant indirect effect of expectations on feelings of responsibility, 95% CI bootstrap percentile = .03, .43.

Discussion

We found not only a comparatively strong link between expectations of success and goal pursuit indicators (energization, feelings of responsibility, perceived clarity) in the mental contrasting condition – replicating previous research – but also a strong link between expectations of success and the strength of future–reality associations. Furthermore, the results showed a strong link between future–reality associations and energization as well as feelings of responsibility in the mental contrasting condition, but not in the control conditions. Importantly, the strength of future–reality associations mediated the link between expectations of success and energization as well as feelings of responsibility in the mental contrasting condition. These findings support our prediction that mental contrasting increases the link between expectations of success and goal pursuit via the strength of associations between future and reality.

However, we did not find that future–reality associations mediated the link between expectations and perceived clarity in the mental contrasting condition, suggesting that another process might underlie mental contrasting effects on perceived clarity. One could argue, for instance, that for perceiving clarity with respect to goal pursuit, one must not only discover that the reality is an obstacle towards the desired future, but furthermore, one must see how to address the reality in order to overcome it. We recently found that mental contrasting also strengthens the associations between the reality and behaviors instrumental for overcoming it (Kappes, Oettingen, et al., 2012; Kappes, Singmann, et al., 2012); a process which might be mainly responsible for expectancy-dependent mental contrasting effects on perceived clarity.

In Study 1, participants named their most important interpersonal life task, probably causing students to list life tasks with relatively high preexisting goal commitments and strivings (e.g., no participant named a life task with expectations lower than 2). When examining Fig. 2, for instance, we see that the effects of mental contrasting were most pronounced for participants with low expectations of success. Hence, one might suspect that the weakening of future–reality associations when expectations of success are low by mental contrasting is driving the effects reported in Study 1, but the strengthening effect of mental contrasting for the future–reality associations when expectations are high is less pronounced. To rule out this alternative explanation, in Study 2, we chose a desired future that was new to participants. Further, instead of using self-report measures of goal pursuit, in Study 2, we measured goal pursuit by other-rated indicators of actual behavior (Oettingen et al., 2009). Finally, strength of future–reality associations and of

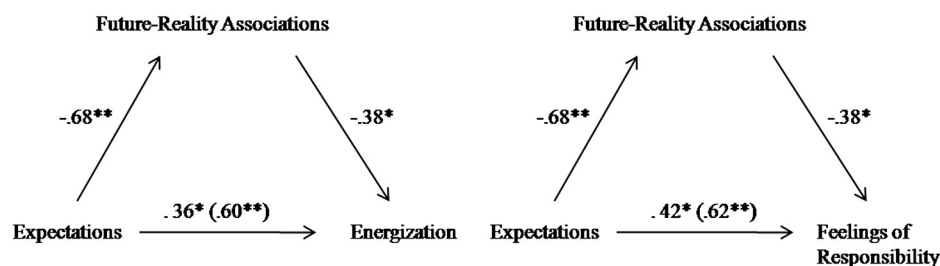


Fig. 3. Strength of future–reality associations as a mediator of the link between expectations and feelings of energization (left), and expectations and feelings of responsibility (right) in the mental contrasting condition (Study 1). Note that faster reaction times indicate stronger future–reality associations.

reality–future associations was each measured by only two trials on the lexical decision task in Study 1. To increase the reliability of our measure, we doubled the number of trials in Study 2.

Study 2: Strength of future–reality associations and new goals

We measured actual performance in the laboratory using a modified version (Oettingen et al., 2009) of the Trier Social Stress Test (Dickerson & Kemeny, 2004; Kirschbaum, Pirke, & Hellhammer, 1993). Specifically, in line with Oettingen et al. (2009), we invited undergraduate students to a study about a new recruitment tool, supposedly developed by human resource experts. We told students that part of the study entailed interviewing for a job in front of a camera and human resource experts would evaluate their performance afterwards. The wish to present oneself favorably as an ideal job candidate was used to induce the mental contrasting and the control conditions. Thereafter, students performed a lexical decision task, measuring the strength of future–reality associations, the strength of reality–future associations, and the accessibility of the future and the reality. Then, they had to present themselves in front of the camera. As our goal pursuit indicator, independent raters evaluated participants' performance.

We expected to replicate the findings by Oettingen et al. (2009) showing that mental contrasting strengthens the link between expectations of success and participants' performance on the job interview (Oettingen et al., 2009). Specifically, performance was related to motivational energization; one's readiness to invest effort. Furthermore, in Study 1, we showed that the link between expectations of success and energization was mediated by future–reality associations. Hence, we predicted that mental contrasting would increase the link between expectations of success and performance by affecting future–reality associations.

Methods

Participants

One hundred and fifteen students of a large German university (age $M = 26.96$, $SD = 9.44$, female = 75) received 8€ (approximately 11\$) in return for participating in the study. Participants were randomly assigned either to a mental contrasting condition ($n = 41$), a reverse contrasting condition ($n = 35$), or an irrelevant content condition ($n = 39$).

Procedure and measures

We invited students to a study presumably designed for the development of a human resource recruitment instrument. Their main task was to give a presentation in front of a camera about their professional skills, which then would be evaluated by human resource experts. Beforehand, they had to answer some questions about the upcoming presentations and write down some thoughts.

In the beginning, participants indicated how well they desired to present themselves in front of the camera, ranging from 1 (*sufficient*) to 7 (*excellent*), $M = 5.01$, $SD = 1.52$. Next, participants reported their expectations of success by indicating how likely they thought it was that they would present themselves in front of the camera as well as they desired, on a scale ranging from 1 (*not at all likely*) to 7 (*extremely likely*). All participants then had to list one aspect (i.e., future aspect) that they associated with performing at the desired level (participants named e.g., “feeling proud,” “boost in self-esteem”), and one aspect (i.e., reality aspect) that might prevent them from performing at the desired level (participants named e.g., “anxiety in front of a camera,” “feeling unprepared”). Finally, participants provided for both future and reality one word that best captured the meaning of the named aspect (i.e., a future word and a reality word).

Thereafter, we established three experimental conditions: a mental contrasting condition, a reverse contrasting condition, and an irrelevant

content condition. For the mental contrasting and the reverse contrasting condition we used the same instructions as in Study 1. Hence, participants in the mental contrasting condition wrote first about the desired future, then about the reality. Participants in the reverse contrasting condition wrote first about the reality, then about the desired future. This time participants in the irrelevant content condition wrote first about a positive meeting with a supervisor, and then about a recently experienced negative meeting with a supervisor.

Dependent variables: strength of mental associations

For measuring the strength of mental associations between future and reality, the strength of mental associations between reality and future, and the accessibility of future and reality, we again used a sequential priming paradigm with a lexical decision task. However, in order to increase the reliability of the measure, we added another block with the same trials as described in Study 1 (Table 1), which doubled the number of trials. Hence, we measured the strength of future–reality associations on four trials, the strength of reality–future associations on four trials, the accessibility of the future on four trials, and the accessibility of the reality on four trials. Further, 48 filler trials and 64 non-word trials were provided; the whole task comprised 128 trials. Also, we measured the accessibility indicators of the future and reality this time by priming participants with a string of Xs, instead of unrelated positive or negative words as in Study 1, and then provided either the future word or reality word as target.

Again, we tested if there were systematic differences between future words and reality words in length, frequency, and abstractness (interrater reliability for future: $r = .83$, for reality: $r = .69$). We found a difference between future and reality words in frequency, $F(1, 101) = 8.98$, $p = .003$, with future words more frequent than reality words, and a difference in abstractness, $F(1, 101) = 6.70$, $p = .01$, with future words being more abstract than reality words, but no difference in length, $F(1, 101) = .24$, $p = .81$. Hence, we redid the analysis presented below with adjusting for the difference in word frequency and abstractness when we examined the expectancy-dependent effects of mental contrasting on future–reality and reality–future associations, but did not observe any differences between x and y.

Participants were then told to present themselves in front of a camera and explain what qualified them as an ideal job candidate (Oettingen et al., 2009, Study 1). The experimenter read out the following instructions:

We start now with the presentation. You have up to seven minutes in front of the camera to introduce yourself and explain why you are an ideal job candidate: What makes you a valuable, modern professional candidate? Describe your professional strengths and potentials. To ensure anonymity, please try not to say your full name. Before we start, you have five minutes to prepare yourself for the talk and note down some thoughts. After these five minutes, the experimenter will come into the room, start the camera, and then leave the room again. Then, you have up to seven minutes to present yourself. You don't have to use all of the time. If you're done, please say “end” into the camera.

The experimenter then guided participants to a table where they found sheets of paper (to prepare for the presentation) and an alarm clock. After ensuring that participants understood what their task was, the experimenter set the alarm clock to 5 minutes, started it and put it on the participants' table, and then left the room. Five minutes later, the experimenter returned, started the camera, reset the alarm clock to 7 minutes, started it, and then left the room again. After seven minutes elapsed or after the participant contacted her, the experimenter guided participants to the computer to provide their demographics and answer funneled debriefing questions. At the end, participants were debriefed, paid, and thanked.

Dependent variables: quality of performance

To obtain an objective measure of performance, two independent raters blind to condition content-analyzed the videos and rated the overall performance of the participants. The raters based their evaluations on seven dimensions: mimic/gestures, structure of the presentation, integrations to one's own biography, talking speed, content, self-presentation, and expressions (see Oettingen et al., 2009, Study 1). For each dimension, examples for all levels of presentations were provided in a script. For example, a score of 1 was given when the participant's presentation included improper gestures, was confused and unstructured, failed to connect the participant's potential professional skills to his or her biography, included talking too fast or too slow, lacked relevant content, presented the participant in an unfavorable light, and contained inappropriate expressions such as slang. On the other hand, a score of 7 was assigned when the participant's presentation used substantive gestures, was clear and well structured, frequently connected the participant's professional skills to his or her biography, included talking at a moderate speed, contained highly relevant content, presented the participant in a favorable light, and comprised appropriate expressions. Two raters independently coded 30 presentations. Interrater reliability was high ($r = .83, p < .01$). One of the raters then coded 43 of the remaining videos, the other one coded 42 of the remaining videos.

Results

Data preparation

Again, only correct responses on the lexical decision trials were included in the analyses (error rate was 2.1%). Reaction times slower than 1500 ms or faster than 250 ms were excluded to lessen the influence of outliers (<0.3% of total trials). Gender and age had no significant main effects or interaction effects with any of the variables reported here, and thus will not be discussed further.

Descriptive analyses

We found mean reaction times of 721.55 ms ($SD = 197.61$ ms) on the strength of future–reality trials, of 704.14 ms ($SD = 120.62$ ms) on the strength of reality–future trials, of 714.30 ms ($SD = 219.53$ ms) on Xs-prime-future trials, and of 697.56 ms ($SD = 139.27$ ms) on Xs-prime-reality trials. Expectations ranged from 1 to 7 with $M = 3.82$

($SD = 1.49$). Reaction times on reality-only trials, an indicator of the accessibility of the reality, did not correlated with expectations of success, $r = -.06, p = .51$, or with participants' performance, $r = -.16, p = .10$. Reaction times on future-only trials, an indicator of the accessibility of the future, did also not correlated with expectations of success, $r = -.006, p = .96$, or with participants' performance, $r = -.15, p = .12$.

Strength of mental associations between future and reality

First, we tested whether mental contrasting again strengthened the link between expectations and future–reality associations. To ensure that the effects of mental contrasting on the associations between future and reality were not merely due to the accessibility of the reality word, we adjusted for the accessibility of the target (i.e., reality word), but also report the results without adjusting for the control variable in parentheses.

We used hierarchical regression analysis entering expectations, accessibility of the reality, and two dummy codes for the three conditions in the first step, and the two interaction terms between expectations and each condition in the second step. As predicted, adding the interaction terms significantly improved the model, $R^2_{change} = 3\%$ (9%), $F_{change}(2,101) = 4.79$ (5.65), $p = .01$ (.005) (Fig. 4, left side). In the mental contrasting condition expectations predicted the strength of future–reality associations (indicated by faster reaction times), $\beta = -.33$ (–.57), $t(101) = 3.49$ (3.85), $p = .001$ (<.001). Expectations did predict neither the strength of future–reality associations in the reverse contrasting condition, $\beta = .07$ (.02), $t(101) = .56$ (.13), $p = .58$ (.90), nor in the irrelevant content condition, $\beta = .03$ (.13), $t(101) = .23$ (.68), $p = .82$ (.50). The link between expectations and the strength of future–reality associations was stronger in the mental contrasting condition than in the reverse contrasting condition, $t(101) = 2.67$ (2.87), $p = .009$ (.005), and stronger than in the irrelevant content condition, $t(101) = 2.59$ (2.80), $p = .01$ (.006), whereas the link did not differ between the reverse contrasting and irrelevant content conditions, $t(101) = .28$ (.45), $p = .78$ (.65).

Strength of mental associations between reality and future

We further tested whether mental contrasting affected the strength of associations between reality and future. We adjusted again for the accessibility of the target (i.e., the future word) to exclude accessibility effects as an alternative explanation for the results (results without

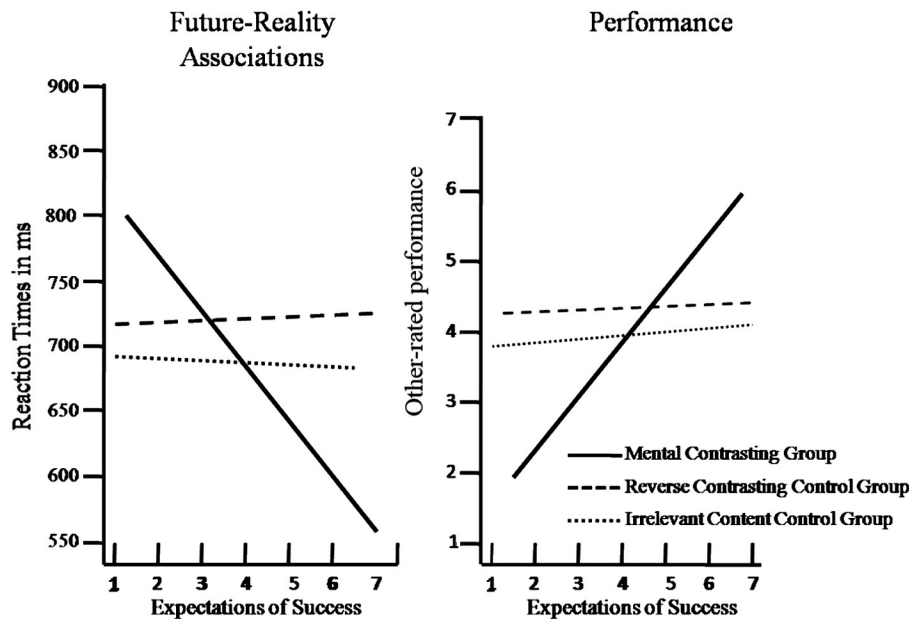


Fig. 4. Regression lines depict the link between expectations of success and strength of future–reality associations controlled for accessibility of the reality (left) and between expectations of success and other-rated performance (right) as a function of self-regulatory thought (Study 2).

adjusting for control variable in parentheses). Adding the interaction terms did not improve the model, $F_{\text{change}}(2,101) = .97 (.12)$, $p = .39 (.89)$ (Fig. 4, right side), and there was no main effect for expectations, $t(101) = 1.34 (.63)$, $p = .19 (.53)$.

Quality of performance

Next, we investigated whether mental contrasting made expectations of success relevant for quality of performance. Adding the interaction terms significantly improved the model, $R^2_{\text{change}} = 11%$, $F_{\text{change}}(2,103) = 7.45$, $p = .001$. In the mental contrasting condition expectations predicted quality of performance, $\beta = .63$, $t(103) = 5.14$, $p < .001$. Expectations did affect quality of performance neither in the reverse contrasting condition, $\beta = .01$, $t(103) = .05$, $p = .96$, nor in the irrelevant content condition, $\beta = .04$, $t(103) = .24$, $p = .81$. The link between expectations and quality of performance was stronger in the mental contrasting condition than in the reverse contrasting condition, $t(103) = 3.38$, $p = .001$, and stronger than in the irrelevant content condition, $t(103) = 3.14$, $p = .002$, whereas the link did not differ between the reverse contrasting and irrelevant content conditions, $t(103) = .11$, $p = .91$.

Strength of future–reality associations and quality of performance

We predicted that only in the mental contrasting condition, the associations between future and reality would predict the quality of performance. To test this hypothesis, we used hierarchical regression analysis to predict quality of performance entering strength of associations between future and reality, and two dummy codes for the three conditions in the first step, and the two interaction terms between strength of future–reality associations and each condition in the second step. We adjusted for reaction times on reality-only trials to exclude accessibility effects as an alternative explanation for the results (results without adjusting for control variable in parentheses).

As predicted, adding the interaction terms significantly improved the model, $R^2_{\text{change}} = 12%$ (12%), $F_{\text{change}}(2,103) = 7.98$ (8.19), $p = .001$ (.001). In the mental contrasting condition future–reality associations (stronger associations indicated by faster reaction times) predicted quality of performance, $\beta = -.78$ (–.75), $t(103) = 5.43$ (5.20), $p < .001$ (< .001). Future–reality associations did predict quality of performance neither in the reverse contrasting condition, $\beta = -.008$ (.03), $t(103) = .04$ (.20), $p = .97$ (.85), nor in the irrelevant content condition, $\beta = -.08$ (–.07), $t(103) = .38$ (.48), $p = .70$ (.63). Consequently, the link between the strength of future–reality associations and quality of performance was stronger in the mental contrasting condition than in the reverse contrasting condition, $t(103) = 3.58$ (3.71), $p = .001$ (< .001), and stronger than in the irrelevant content condition, $t(103) = 3.16$ (3.11), $p = .004$ (.002), whereas the link did not differ between the reverse contrasting and irrelevant content conditions, $t(103) = .73$ (.48), $p = .46$ (.63).

Mediational analysis

In a last step, we tested if the strength of future–reality associations mediated the link between expectations and rater-evaluated quality of performance in the mental contrasting condition. We applied the same mediational analysis as in Study 1, again adjusting for the accessibility of future and reality to exclude accessibility effects as an alternative explanation. The results show (Fig. 5) that the link between expectations of success and quality of performance ($\beta = .57$, $p < .001$) dropped below significance ($\beta = .25$, $p > .05$), when the strength of future–reality associations were entered into the regression analysis ($\beta = -.52$, $p < .001$). A bootstrap test further showed a significant indirect effect of expectations on quality of performance through the strength of future–reality associations, 95% CI bootstrap percentile = .06, .55.

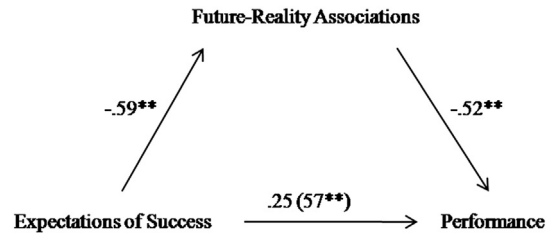


Fig. 5. Strength of future–reality associations as mediator of the link between expectations and other-rated performance in the mental contrasting condition (Study 2). Note that faster reaction times indicate stronger future–reality associations.

Discussion

Study 2 replicated the results of Study 1, using a desired future that was new to participants, and using a different goal pursuit indicator: behavior in the form of other-rated quality of performance. Again, in the mental contrasting condition, but not in the control conditions we found a strong link between expectations of success and the strength of future–reality associations as well as goal pursuit. Importantly, the strength of future–reality associations again mediated the link between expectations of success and goal pursuit in the mental contrasting condition. Whereas in Study 1, the strength of future–reality associations affected participants' cognition and feelings of goal pursuit and the goals were ongoing and long-term, in Study 2 they affected goal pursuit as measured by actual performance assessed by independent raters and the goals were new and short-term.

Taken together, the first two studies support the notion that mental contrasting increases the link between expectations of success and goal pursuit via the strength of future–reality associations. In Study 3, we followed a different logic to test whether the strength of future–reality associations impacts goal pursuits. We argued that these associations should stay strong until the goal is achieved, thereby ensuring the continued commitment to attain the goal. However, when the goal is attained, there is no need to continue striving for the goal; at this point the strength of future–reality associations should vanish.

Study 3: Strength of future–reality associations before and after goal attainment

In our last study, we examined mental contrasting effects on the link between expectations and the strength of future–reality associations before and after goal achievement. In line with previous research (Gollwitzer & Wicklund, 1985; Kawada, Oettingen, Gollwitzer, & Bargh, 2004; Lewin, 1935; Rothermund, 2003), not achieved goals were manipulated with negative feedback and achieved goals were manipulated with positive feedback. Negative feedback which signals that insufficient progress was made increases subsequent efforts, whereas positive feedback which signals that sufficient progress was made to attain the goal decreases subsequent efforts (Carver & Scheier, 1982; Fishbach, Eyal, & Finkelstein, 2010). Specifically, we used the goal of being more creative than the average college students. Consequently, not achieved goals were operationalized via bogus negative feedback stating that the creativity test that participants had just completed showed that their creative abilities were slightly below average. Achieved goals were operationalized via bogus positive feedback stating that the creativity test showed that participants' creative abilities were higher than average students. Hence, our negative and positive feedback, signaling that either the goal was not achieved or that the goal was achieved, should have activated or deactivated the goal.

We induced a mental contrasting and an irrelevant content condition by using the wish of being more creative than an average student. By elaborating future-unrelated content, the irrelevant content condition provided a baseline for comparing mental contrasting effects on the strength of future–reality associations to respective effects evoked

by the task instructions. After establishing the mental contrasting and control condition, participants took a creativity test which allowed us to provide the bogus feedback.

To test our hypothesis that the link between expectations of success and the strength of future–reality associations vanishes with goal achievement, we measured the strength of future–reality associations after the feedback manipulation. We predicted a strong link between expectations of success and the strength of future–reality associations after negative feedback (i.e., when the goal is not achieved), but not after positive feedback (i.e., when the goal is achieved) in the mental contrasting condition. This prediction is in line with our argument that the future–reality associations in the mental contrasting condition carry relational information about the future and the reality. In the case of negative feedback, the relation between the future and the reality remains the same as before, the reality stills need to be addressed to achieve the desired future. However, in the case of positive feedback, the relation between future and reality changed. Now, since the desired future is achieved, the reality is not an obstacle anymore, and hence, the mental association between future and reality should vanish.

Methods

Participants

One hundred forty-two students of a large American university (age $M = 20.14$, $SD = 6.78$; 103 female) participated in return for partial fulfillment of course credits. Participants were randomly assigned to either a mental contrasting condition ($n = 74$) or an irrelevant content condition ($n = 68$). The study had a 2 (self-regulatory thought: mental contrasting versus control) \times 2 (type of feedback: negative versus positive) between subject design.

Procedure and measures

We invited students to a study designed to learn more about how students think about creativity and how these thoughts relate to their creative performance. Their task was first to write down some of their thoughts about creativity and then perform four creativity tasks. Further, they learned that after the creativity task, they would receive feedback about their creativity. Finally, a short test of their verbal skills would be administered.

To establish the desired future of being more creative than the average student, participants read a brief introduction about what defines creativity and how it predicts success in different life domains; hence, being more creative than the average student would contribute to future success. In order to measure the expectations of success, participants indicated how likely it was that they would be more creative than the average student of their university on a 7-point scale, ranging from 1 (*not at all*) to 7 (*extremely likely*). Then, they named one future aspect that they associated with being more creative than the average student of their university (participants named e.g., “gaining self-respect” or “boost in self-esteem”) and one reality aspect that might prevent them from being more creative than the average student of their university (participants named e.g., “close-mindedness” or “laziness”). Thereafter, they provided one word that summarized the named future and reality best. Using the same instructions as in Study 1, we then established a mental contrasting and an irrelevant content condition.

We introduced the creativity test (Förster, Friedman, & Liberman, 2004) for which we made up the name Cambridge Creativity Test (CCT). Participants read the following description:

Next, we will ask you to work on four creativity tasks from the Cambridge Creativity Test (CCT). In the last two years, over 1000 students of your university have completed the same tasks from the CCT. Access to this database of scores allows us to accurately assess your creative abilities. We will give you your score and the percentile you are in after the test. On all of these tasks, you are asked to

provide as many creative solutions for the described problems as possible. The CCT defines creative as something that is unusual (i.e., not many people thought of it before), but also realistic (i.e., you can implement the solution in the real world).

On the top of the page, students saw a logo comprised of the three letters CCT, supposedly representing the logo of the Cambridge Creativity Test. Further, they read that they would have two minutes for each of the tasks. On each of the four creative tasks, participants were told to note as many unusual, but at the same time realistic and effective, solutions as they could. For example, participants had to note as many novel and creative uses of a brick as possible, and as many ways to greet a person as possible. Because participants had no standard to which to compare their performance they could not judge whether they had performed well or poorly on the test. This should increase the credibility of the feedback.

After the test, participants read that the computer was now calculating their creativity score by using the students' database. Additionally, they read that the computer analyzed their creativity by using two different scores: one indicated how conventional their answers were and the other indicated whether their answers were realistic and effective. The scores were supposedly based on a previously tested student sample of their university and rated by experts in the field of creativity. After two minutes, the feedback appeared on the computer screen. Students in the negative feedback condition read that they had a creativity score of 786, and learned that they were in the 43rd percentile of students of their university; their creativity was deemed slightly below average. In contrast, students in the positive feedback condition also read that they had a creativity score of 786, but learned that they were in the 87th percentile of students of their university. Hence, participants in this condition learned that their creativity was above average.

Immediately thereafter, participants performed a lexical decision task, supposedly to measure their verbal skills. This lexical decision task was the same as described in Study 2, with one exception: we added another block of trials to further improve the reliability of the measure. Hence, we measured the strength of the future–reality associations using six trials, the strength of the reality–future associations using six trials, as well as the accessibility of the future using six trials, and the accessibility of the reality using six trials. Further, 72 filler trials, and 96 non-word trials were provided. The whole task comprised 192 trials. Again, we tested if there were systematic differences between future words and reality words in length, frequency, and abstractness (interrater for future: $r = .91$, for reality: $r = .84$). However, we did not find any differences between future and reality words, $F_s < 2.06$, $p_s > .17$.

In a last step, participants noted their thoughts about the purpose of the study, whether they found something suspicious about it, and how credible they perceived the feedback. For the last question, the 7-point scale spanned from 1 (*not at all credible*) to 7 (*extremely credible*). Thereafter, we debriefed, thanked, and dismissed participants.

Results

Data preparation

Again, only correct responses on the lexical decision trials were included in the analyses (error rate was 2.3%). Reaction times slower than 1500 ms or faster than 250 ms were excluded to lessen the influence of outliers (<.05% of total trials). Gender and age had no significant main effects or interaction effects with any of the variables reported here, and thus will not be discussed further.

Descriptive analyses

We found mean reaction times of 581.81 ms ($SD = 152.14$ ms) on the strength of future–reality trials, of 544.39 ms ($SD = 120.62$ ms) on the strength of reality–future trials, of 546.27 ms ($SD = 147.16$ ms) on Xs-prime-future trials, and of 565.96 ms ($SD = 139.27$ ms) on

Xs-prime-reality trials. Expectations ranged from 1 to 7 with $M = 4.55$, ($SD = 1.37$).

Credibility of the feedback

First, we tested whether participants perceived the feedback as credible. None of the free responses indicated suspicion of the credibility of the feedback. However, six participants (four in the negative feedback condition and two in the positive feedback condition) rated the credibility of the feedback with a one or a two ($M = 5.1$, $SD = 1.2$). Excluding these participants from our analyses did not change the pattern of results presented below.

Strength of future–reality versus strength of reality–future associations

First, we tested our hypothesis that the mental contrasting effects on strength of future–reality associations would differ for not achieved goals (i.e., negative feedback condition) versus achieved goals (i.e., positive feedback condition). Using hierarchical regression analyses, we entered self-regulatory thought condition, expectations, type of feedback, and the accessibility of reality words (i.e., controlling for mere accessibility effects) in a first step, all the two-way interactions between self-regulatory thought condition, expectations, and type of feedback in a second step, and the three-way interaction of self-regulatory thought condition, expectations, and type of feedback in a third step. The results showed the expected three-way interaction effect, $t(125) = 2.16$, $p = .03$ (Fig. 6).

Next, we tested whether reality–future associations differed as a function of self-regulatory thought condition, expectations, and type of feedback. We again entered the self-regulatory thought condition, expectations, type of feedback, and accessibility of the future (i.e., controlling for mere accessibility effects) in the first step, all the two-way interactions between self-regulatory thought condition, expectations, and type of feedback in a second step, and the three-way interaction of self-regulatory thought condition, expectations, and type of feedback in a third step. The results showed no three-way interaction effect, $t(125) = .55$, $p = .58$.

Strength of mental associations and types of feedback

To decompose the three-way interaction effect between self-regulatory thought condition, expectations, and type of feedback, we

first compared the strength of future–reality associations for mental contrasting participants who received negative feedback versus positive feedback. We used hierarchical regression analysis entering expectations, accessibility of the reality (results without adjusting for control variable in parentheses), and one dummy code for the two types of feedback in the first step, and the interaction term between expectations and types of feedback in the second step.

As predicted, adding the interaction term significantly improved the model, $R^2_{change} = 8\%$ (6.5%), $F_{change}(1,62) = 7.12$ (4.46), $p = .01$ ($p = .04$). Expectation-dependence was stronger in mental contrasting participants who received negative feedback than in those who received positive feedback, $t(62) = 2.67$ (2.11), $p = .01$ (.04). In the negative feedback condition, expectations predicted the strength of future–reality associations (indicated by faster reaction times), $\beta = -.43$ (–.34), $t(62) = 2.34$ (1.70), $p = .02$ (.09). Expectations did not predict the strength of future–reality associations in the positive feedback condition, $\beta = .17$ (.19), $t(62) = 1.24$ (1.26), $p = .22$ (.21).

We then tested whether we would find similar differences between negative and positive feedback for participants in the irrelevant content condition. As predicted, adding the interaction term did not significantly improve the model, $F_{change}(1,62) = .03$ (.08), $p = .86$ (.78), and we did not find a main effect for expectations, $\beta = .05$ (–.06), $t(63) = .57$ (.65), $p = .57$ (.52).

Strength of mental associations between self-regulatory thought conditions

Next, we examined how the strength of future–reality associations differed between the mental contrasting and the irrelevant content condition first for participants who received negative feedback and then for those who received positive feedback. We controlled again for the accessibility of the reality word (i.e., the target) to exclude accessibility effects as an alternative explanation for the results (results without adjusting for control variable in parentheses).

We used hierarchical regression analysis entering expectations, reaction times on reality-only trials, and one dummy code for the two self-regulatory thought conditions in the first step, and the interaction term between expectations and self-regulatory thought condition in the second step. As predicted, adding the interaction term significantly improved the model, $R^2_{change} = 7\%$ (5%), $F_{change}(1,57) = 5.15$ (3.44), $p = .03$ (.07). In the mental contrasting condition expectations predicted

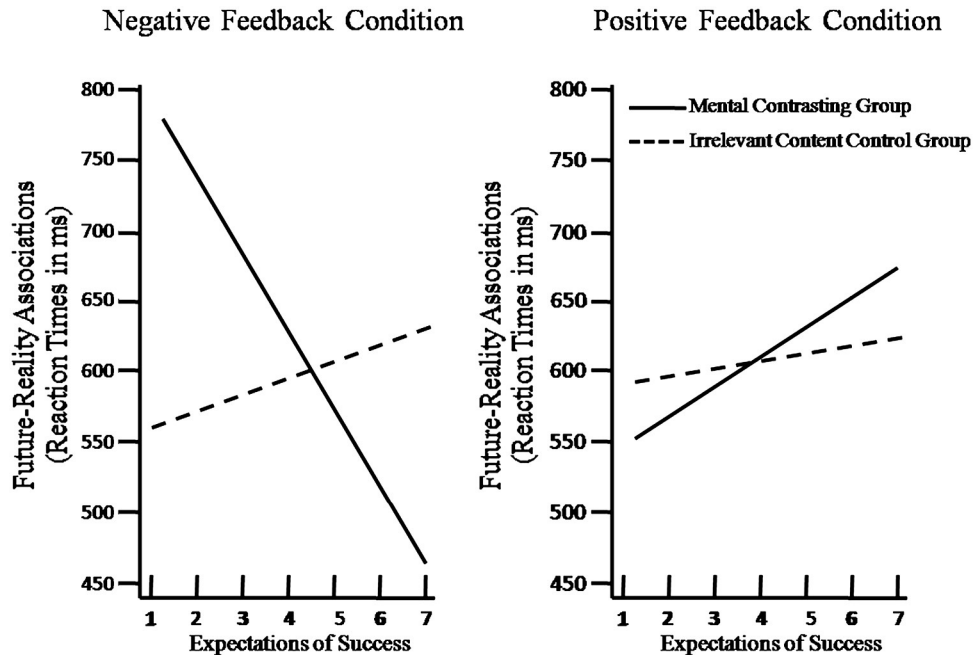


Fig. 6. Regression lines depict the link between expectations of success and strength of future–reality associations controlled for accessibility of the reality as a function of self-regulatory thought condition after negative feedback (left graph) and after positive feedback (right graph; Study 3).

the strength of future–reality associations (indicated by faster reaction times), $\beta = -.46$ ($-.39$), $t(57) = 3.33$, $p = .001$ (.03). Expectations did not predict the strength of future–reality associations in the irrelevant content condition, $\beta = .08$ (.07), $t(57) = .48$ (.41), $p = .63$ (.68). The link between expectations and the strength of future–reality associations was stronger in the mental contrasting condition than in the irrelevant content condition, $t(57) = 2.27$ (1.85), $p = .03$ (.07).

On the contrary, when applying the same analyses for the positive feedback condition (i.e., when the goal is achieved), we did not observe mental contrasting effects on the strength of future–reality associations. Specifically, adding the interaction terms did not improve the model, $F_{\text{change}}(1,67) = .25$ (.001), $p = .62$ (.99), and there was no a main effect for expectations, $t(67) = .19$ (1.19), $p = .85$ (.23) (Fig. 6).

Discussion

The link between expectations of success and the strength of future–reality associations in the mental contrasting condition differed when the goal was not achieved (i.e., after negative feedback) versus when it was achieved (i.e., after positive feedback). As predicted, we found a strong relation between expectations of success and the strength of future–reality associations after negative feedback, but no such relation after positive feedback. These findings indicate that the effects of mental contrasting on expectancy-dependency of the strength of future–reality associations prevailed after negative feedback and vanished after positive feedback. In the irrelevant content condition, the pattern of results did not differ between negative and positive feedback. After both types of feedback, irrelevant content condition participants showed expectancy-independent, intermediate reaction times on the future–reality trials.

Even though giving feedback has a long tradition in psychology as a manipulation for goal activation versus deactivation (Fishbach et al., 2010; Gollwitzer & Wicklund, 1985; Kawada et al., 2004; Rothermund, 2003), other variables might have been affected too, such as self-esteem or affect. However, the impact of the feedback manipulation on these variables leads to predictions different from our results. Feedback might have, for instance, changed self-esteem, weakened it in the case of negative feedback, and strengthened it in the case of positive feedback. Hence, one would predict that negative feedback, by decreasing self-esteem would impede goal pursuit (and thereby weaken future–reality associations), while positive feedback, by increasing self-esteem would further goal pursuit (and thereby strengthen future–reality associations). However, we found the opposite pattern of results.

Furthermore, feedback might alter participants' affect (Baumeister, Vohs, DeWall, & Zhang, 2007). For instance, negative feedback might have increased negative mood, which then increased processing of negative stimuli (Bower, 1981) such as reality words. Thereby, the negative feedback might have led to strengthened future–reality associations just by enhancing the accessibility of negative words such as the reality words. However, since we controlled for the accessibility of the reality words in our analyses, this explanation seems unlikely. Furthermore, heightened accessibility of negative words after negative feedback as a possible explanation also fails to account for a) the interaction effect of self-regulatory thought condition with expectations and b) the differences between the mental contrasting and irrelevant content conditions. Finally, if positive feedback enhanced the processing of positive words in general, we should have found an effect on the strength of reality–future associations, since the targets here were positive words. To summarize, the presented results seem to be due to the negative feedback sustaining goal pursuit, and the positive feedback reducing goal pursuit.

We found that in comparison to receiving negative feedback, receiving positive feedback weakened the strength of associations between future and reality. However, this weakening effect after students received positive feedback might have been only temporary. Specifically, students learned that they performed more creatively than the average student. However, such a creative performance might offer only temporary goal

achievement, and has to be reconfirmed on future occasions. On these future occasions, renewed goal pursuit will be needed in order to prove oneself more creative than the average. It is an open question to what extent future–reality associations, once established and then dissolved again, may become reactivated at other times and in different contexts.

Finally, an important moderator for the observed effects of mental contrasting on future–reality associations after negative feedback might be whether people see creativity as something that can be changed (incremental theory of creativity) or something that cannot be changed (entity theory of creativity). Only if people believe that they can change their creativity level by investing more effort, future–reality associations after negative feedback should remain strong, indicating that people are still striving for being more creative than the average. In contrast, if people believe that they cannot change their creativity level, they should take the negative feedback as an indicator that their creativity is below average, and that there is not much they can do about it. In this case, future–reality association after negative feedback might disappear as well, indicating that people gave up on the goal to be more creativity than the average.

General discussion

In three studies we observed that mental contrasting strengthens the link between expectation and goal pursuit by forming mental associations between future and reality. Specifically, the higher expectations of reaching the desired future were the stronger were future–reality associations in the mental contrasting condition. These future–reality associations in turn mediated the link between expectations of success and goal pursuit in the mental contrasting condition. The results applied to both wishes that are long-term and broad (Study 1, Study 3) and short-term and specific (Study 2), and to goal pursuit measured via self-report (Study 1) and objective indicators of performance (Study 2). Further, the link between expectations of success and the strength of associations between future and reality prevailed until the desired future was attained (Study 3). Across all studies, neither in the reverse contrasting condition nor in the irrelevant content condition did expectations of success relate to the strength of future–reality associations or goal pursuit.

Comparing the results of the two control conditions to those in the mental contrasting condition excludes several alternative explanations. For example, the results of the reverse contrasting condition showed that future and reality must be related to each other in a meaningful way (i.e., reality is standing in the way of the future). One might also argue that when, for instance, expectations are high the reverse contrasting instructions diminished associations between future and reality, rather than mental contrasting heightening them. However, the results of the irrelevant content condition, in which no manipulation was carried out, showed the same pattern of results as the reverse contrasting condition. To summarize, the pattern of results underscores our notion that mental contrasting strengthens future–reality associations when expectations of success are high, and weakens them when expectations of success are low.

Furthermore, in all of our studies we included measures to verify that we indeed measured mental contrasting effects on the strength of future–reality associations rather than on the accessibility of future and reality or on the processing of information in general. For instance, mental contrasting paired with high expectations might have increased the accessibility of goal-relevant information. By adjusting for the accessibility of the target in our analyses, we were able to rule out that the reported mental contrasting effects on the strength of future–reality associations were mere accessibility effects. Similarly, mental contrasting might also affect the general processing of future and reality, rather than establishing a specific mental association between them. However, the lack of mental contrasting effects on mental associations in the direction from reality to future speaks against this interpretation.

It is also important to note that we are not the first to find different effects on the strength of associations depending on the directionality of prime and target. For example, Fishbach, Friedman, and Kruglanski (2003) observed that goals do not activate temptations (i.e., goal–temptation associations), but temptations activate goals (i.e., temptation–goal associations). At first sight, these results seem to contradict our results in which reality aspects such as temptations did not activate desired futures. However, whereas our studies focus on mental associations newly formed via self-regulatory strategies, Fishbach et al. (2003) used well established goals that participants were already committed to, and studied overlearned associations that have previously been formed during repeated goal striving. In line with our results from Study 3 that mental associations between future and reality wax and wane with goal activation versus goal completion, their results suggest that during goal pursuit the activation of different associations might shift, some association might vanish and others might be established.

Relevant in this context are also findings by Webb and Sheeran (2007). They observed that mental associations between a situation and a behavior predicted subsequent performance in these situations, but associations between a behavior and a situation did not. Interestingly, these situation–behavior associations were established by a self-regulatory strategy (i.e., implementation intentions, Gollwitzer, 1999) which did not affect behavior–situation associations. In conclusion, it seems that at least some goal-relevant associations have different effects depending on the directionality they are measured.

Finally, in line with Kappes, Oettingen, et al. (2012), Kappes, Singmann, et al. (2012), Kappes et al. (2013), we used reverse contrasting and irrelevant content as control conditions. The reverse contrasting condition controlled for the content (i.e., the content was exactly the same, just the order of presentation was varied) and the irrelevant content condition controlled for the valence of affect (i.e., the order of presentation was exactly the same, just the content was varied). Interestingly, previous research showed that people spontaneously engage in reverse contrasting (Sevincer & Oettingen, 2013), and whether reverse contrasting was manipulated or measured, it led to goal pursuit independent of expectations (Oettingen, 2012). Thus we suppose that like reverse contrasting indulging and dwelling will equally fail to establish expectancy-dependent mental associations between future and reality.

It is worth noting that only in the mental contrasting condition, future–reality associations predicted goal pursuit. The lack of such correlations in the control conditions between future–reality associations and goal pursuit demanded that we conduct mediational analysis in the mental contrasting condition. These analyses showed that in the mental contrasting condition, the link between expectations of success and goal pursuit was mediated by the strength of future–reality associations. However, since our mediational approach is limited to the mental contrasting condition, we cannot state that the future–reality associations mediated the effects of the conditions on the link between expectations and goal pursuit. The results imply that the effects of future–reality associations on goal pursuit are specific to the mental contrasting conditions. In other words, the strength of mental associations between future and reality are relevant for goal pursuit only after being charged by mental contrasting. Hence, one might conclude that future–reality associations are a mechanism specific to mental contrasting effects on goal pursuit.

On first sight, the lack of correlation between expectations and goal pursuit in the control conditions seems to contradict existing literature showing that expectations positively relate to effort and successful performance (Bandura, 1997; Taylor & Brown, 1988). We assume that self-regulatory thought is a moderator of the expectation–goal pursuit relation: Mental contrasting strengthens the link, precisely by the cognitive processes described in the present studies. In fact, the correlations between expectations and goal pursuit reported in the literature are far from perfect implying that some of the participants in these studies might have spontaneously engaged in mental contrasting, while others indulged, dwelled, reverse contrasted or might have engaged in

irrelevant thought. Indeed, when measuring the frequency of various forms of self-regulatory thought, only about 10% to 30% of participants engage spontaneously in mental contrasting when prompted with a wish (Sevincer & Oettingen, 2013). These findings underscore the idea that mental contrasting is critical for translating expectations of success into goal pursuit.

Finally, it is important to highlight how the present mediational approach relates to previous research on mental contrasting. Specifically, if the mediator is assumed to work equally across all experimental conditions, moderated mediation should be used. In one study, for instance, we tested if the effects of mental contrasting on behavior are partially mediated by mental associations between the obstacle of reality, and a behavior instrumental in overcoming the obstacle (Kappes, Oettingen, et al., 2012; Kappes, Singmann, et al., 2012, Study 2). We predicted that mental contrasting instigates planning processes which establish habit-like associations between the obstacle of reality and a specified behavior, similar to forming implementation intentions (Gollwitzer, 1999; Gollwitzer & Sheeran, 2006). However, since in these studies the important meaning of the relation between obstacles and behavior have been a priori defined by the experimenters for all conditions, these obstacle–behavior associations should predict performance equally well across all conditions (i.e., mental contrasting and control conditions), independent of whether they were established by mental contrasting or not. Given the correlation between mediator (obstacle–behavior associations) and the dependent variable (behavior), we tested whether the expectancy-dependent effects of mental contrasting on behavior were mediated by obstacle–behavior associations; a moderated mediation analysis, and found the predicted mediation (see also Kappes et al., 2013).

Mental contrasting and the instigation of goal pursuit

The results imply that mental contrasting instigates goal pursuit by connecting the future to the reality, resulting in strong associations between future and reality. In Study 1, for instance, the strength of future–reality associations mediated the link between expectations of success and feelings of energization in the mental contrasting condition. Previous research showed that mental contrasting leads to expectancy-dependent energization measured by respective feelings and physiological indicators (Oettingen et al., 2001, 2009). Importantly, mental contrasting effects on energization indexed via systolic blood pressure emerged during the exercise of mental contrasting itself, immediately after participants had juxtaposed future and reality (Oettingen et al., 2009, Study 1). At this point, strong future–reality associations should have been established. The connected reality, acting as a reminder as soon as the desired future is brought to mind should have energized people to pursue and achieve their goals.

In the mental contrasting condition, the link between expectations and actual performance was also mediated by the strength of future–reality associations (Study 2). Beyond being a reminder of what needs to be done in order to achieve the desired future, the associations might help people prepare for goal pursuit. In line with this argument, recent studies found that mental contrasting paired with high expectations established strong associations between the reality and behaviors instrumental for overcoming the impeding reality which in turn instigated the behavior when the reality aspects were actually encountered (Kappes, Oettingen, et al., 2012; Kappes, Singmann, et al., 2012). Specifically, mental contrasting with high expectations led participants to form strong associations between their reality aspect (i.e., elevator when the desired future was fitness) and a behavior instrumental for overcoming the reality aspect (i.e., exercise; Study 2). When participants stepped out of the lab and encountered their reality aspect, the strongly formed mental associations predicted the instrumental behavior (i.e., participants took the stairs despite the elevator being right in front of them; Study 2). The presented results suggest that forming associations between future and reality might ready people to understand

how the reality prevents one from achieving the desired future, furthering behaviors would be helpful to overcome the reality.

Conclusion

The present research shows one mechanism by which mental contrasting achieves its self-regulatory power: It strengthens the mental association between the desired future and the present reality when expectations of success are high, and it weakens this association when expectations are low. Our results suggest that once the connection between future and reality is strengthened, people will invest in fulfilling their feasible wishes such as spending more time with their children, prepare for their job presentation, or take a creative writing class, and once the connection is weakened they will let go from unfeasible ones to potentially turn to more promising endeavors.

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