Mental Contrasting of Counterfactual Fantasies:

Letting go of the Past and Engaging in the Present

Dissertation zur Erlangung des Doktorgrades

an der Universität Hamburg,

Fakultät für Psychologie und Bewegungswissenschaft, Institut für Psychologie

vorgelegt von Nora Rebekka Krott

Hamburg, 2017

Tag der Disputation: 14. Juni 2017

Promotionsprüfungsausschuss

Vorsitz:	Prof. Dr. phil. Alexander R. Redlich
1. Dissertationsgutachten:	Prof. Dr. rer. nat. Gabriele Oettingen
2. Dissertationsgutachten:	Prof. Dr. rer. soc. Rosemarie Mielke
1. Disputationsgutachten:	PD Dr. phil. Stefanie Brassen
2. Disputationsgutachten:	Prof. Dr. rer. nat. Lars Schwabe

Table of Contents

Tables

Figures

Abstract

Positive counterfactuals about an alternative past are “if only” reconstructions of the factual past. When subsequent opportunities to restore the counterfactual past will arise, positive counterfactuals can be functional in preparing people to act. When subsequent opportunities to restore the counterfactual past are absent, however, they can be dysfunctional by leading to distress and difficulties in coping with everyday life. In those cases, letting go of the counterfactual past should shelter people from feelings of distress and help them to actively engage in their present life. In the present research, we used the self-regulation strategy of mental contrasting to help people let go of their counterfactual past and actively engage in their present life. In six experimental studies (Study-set 1), mental contrasting of positive fantasies about a counterfactual past led people to let go of their counterfactual past (Studies 1.1, 1.2, 1.3, and 1.4), and it attenuated negative counterfactual emotions (Studies 1.5 and 1.6). Building on these findings, we investigated cognitive and motivational variables affected by mental contrasting of positive fantasies about a counterfactual past. In an experimental study (Study 2), mental contrasting (vs. relevant control conditions) led people to form a positive implicit attitude towards their current reality. Further, in two experimental studies (Study-set 3), mental contrasting (vs. relevant control conditions) led people to feel energized regarding their present life. Finally, in three experimental studies (Study-set 4), mental contrasting (vs. relevant control conditions) led people to actively engage in their present life, specifically, to exert effort and successfully perform in the interpersonal domain (Study 4.1), the professional domain (Study 4.2), and the academic domain (Study 4.3). The results suggest that mental contrasting can help people let go of their counterfactual past and actively engage and succeed in their present life.

Keywords: counterfactual thinking, fantasies, lost opportunities, mental contrasting, self-regulation

Mental Contrasting of Counterfactual Fantasies: Letting go of the Past and Engaging in the Present

> Imagine a young man who has failed his job interview some time ago. Even though he knows that the position has been filled by now, he still feels frustrated and angry that he ended up without the job. He cannot help thinking: "…If only I had gotten that job, I would have made a career, and I would have been so much happier." Those thoughts might keep him from searching for job advertisements, from feeling motivated to apply for other jobs, and eventually from moving on to the various endeavors in his present life.

When people imagine alternative scenarios to past events, they engage in *counterfactuals* (Kahneman & Miller, 1986; Kahneman & Tversky, 1982; Roese, 1997). After negative life events, those counterfactuals often represent better alternative scenarios (*upward counterfactuals*; Nasco & Marsh, 1999; Roese, 1997; Roese & Hur, 1997). That is, people tend to imagine how negative outcomes could have turned out better. Those positive counterfactuals have traditionally been defined as conditionals, evaluating the desired imagined alternative against the present reality (Byrne, 2007). However, in some cases people might solely refer to the desired imagined alternative without considering the present reality. That is, people might mentally simulate and experience the counterfactuals as if they were real (*reflective mode*; Markman & McMullen, 2003, 2005; *"as if" thinking*; Markman & McMullen, 2007; *experiential mode*; McMullen, 1997; *simulation-based comparisons*; Summerville & Roese, 2008). Such mental simulations about a desired counterfactual past resemble mental simulations about a desired future outcome (Taylor, Pham, Rivkin, & Armor, 1998) or positive future fantasies (Oettingen, 2012). Positive future fantasies are free images about desired events that might happen in the future, and they have been distinguished from positive expectations, which are judgments that these events will occur in

the future (Oettingen & Mayer, 2002). In the present research, we use the term positive counterfactual fantasies to refer to free images about desired events or scenarios that could have happened in the past.

Functional and Dysfunctional Counterfactuals

Most research on counterfactual thinking has focused on functional aspects of positive counterfactuals. Whereas positive counterfactuals in first instance lead to negative affect, because the reality seems worse in contrast to the idealized counterfactual alternative (Roese, 1994; Roese & Morrison, 2009), they facilitate simulations of potential routes to better outcomes and thereby can prepare people for the future (Epstude & Roese, 2008). Specifically, the mental elaboration of a better alternative to a negative outcome might increase a person's perceived control over the outcome (Nasco & Marsh, 1999), inform the person about potential routes to improvement by producing causal inferences (Markman, Gavanski, Sherman, & McMullen, 1993; Roese & Olson, 1996; Wells & Gavanski, 1989), and eventually lead to specific intentions and behaviors towards restoring the alternative outcome (Roese, 1994; Smallman & Roese, 2009). The negative affect resulting from positive counterfactuals may thereby signal the need for behavior change (Markman & McMullen, 2003, 2005; Markman, McMullen, & Elizaga, 2008; see also *feelings as information*; Schwarz, 2001).

Anticipated Opportunities in Laboratory Settings

Positive counterfactuals can only successfully prepare people for the future when subsequent opportunities to restore the counterfactual past are likely to arise (Epstude & Jonas, 2015; Epstude & Roese, 2011). Accordingly, research has identified the anticipated subsequent opportunity to restore the counterfactual past as one key moderator of the preparative functions of positive counterfactuals (Markman et al., 1993; see also Markman, Karadogan, Lindberg, & Zell, 2009). Most studies on the preparative functions of positive

counterfactuals have focused on repeatable events in laboratory settings, in which participants anticipated that they could potentially improve their performance, such as in anagram tasks or exam performances. Specifically, after receiving negative feedback about a past performance in the first part of the experiment, participants were asked to generate positive counterfactuals, knowing that they would be provided with a subsequent opportunity to improve their performance in the second part of the experiment (e.g., Dyczewski & Markman, 2012; Markman et al., 1993; Markman et al., 2008; McMullen & Eppers, 2001; Nasco & Marsh, 1999; Roese, 1994).

Lost Opportunities in Everyday Life Settings

In contrast, the present research focuses on positive everyday life counterfactuals regarding lost opportunities, which we define as positive counterfactual pasts for which it is unlikely or impossible that they can be restored (for a similar definition see Beike, Markman, & Karadogan, 2009). In fact, in everyday life situations, people are often *not* provided with subsequent opportunities to restore the counterfactual past. Markman et al. (2009) state, "windows of opportunity are often quite bounded and finite. Courses end, college ends, and interpersonal relationships are often irrecoverably terminated, at which point the present and the future are shunted to the past, and the possibility for corrective action is lost." (p. 187). Such positive everyday life counterfactuals are generated not only after controllable negative events (e.g., "If only I had taken a different route home…"), but also after uncontrollable negative events (e.g., "If only my partner had not left me…") and may lead to feelings of distress and self-blame (Branscombe, Owen, Garstka, & Coleman, 1996; Branscombe, Wohl, Owen, Allison, & N'gbala, 2003; Callander, Brown, Tata, & Regan, 2007; Davis, Lehman, Wortman, Cohen Silver, & Thompson, 1995; Epstude & Jonas, 2015; Landman, Vandewater, Stewart, & Malley, 1995).

In the case of lost opportunities, that is, positive counterfactual pasts for which it is

unlikely or impossible that they can be restored, positive counterfactuals are associated with long-term regrets and difficulties to cope with everyday life (Markman et al., 2009; McMullen & Markman, 2002; see also Davis & Lehman, 1995; Roese et al., 2009; Sherman & McConnell, 1995).

Counterfactuals From a Goal Perspective

Counterfactuals have been viewed from a goal perspective. Both future goals and positive counterfactual pasts represent a desired state and for both, negative affect may signal the need to correct current behavior in order to attain this desired state (Epstude & Roese, 2007, 2008; Markman & McMullen, 2003). Thus, when subsequent opportunities to restore the counterfactual past are likely to arise, being committed to the counterfactual past might resemble being committed to an attainable goal. In contrast, when subsequent opportunities to restore the counterfactual past are unlikely or impossible to arise, being committed to the counterfactual past might resemble being committed to an unattainable goal. Being committed to unattainable goals leads to negative affect and depression (Brandstätter, Herrmann, & Schüler, 2013; Johnson, Carver, & Fulford, 2010; Jones, Papadakis, Orr, & Strauman, 2013; Strauman, 2002), while disengagement from unattainable goals benefits well-being and health (e.g., Brandstätter, 2003; Carver & Scheier, 1998; Miller & Wrosch, 2007; Wrosch, Miller, Scheier, & Brun de Pontet, 2007; Wrosch, Scheier, Carver, & Schulz, 2003; Wrosch, Scheier, & Miller, 2013; see also Klinger, 1975). Disengagement from unattainable goals also provides the opportunity to engage in other goal pursuits, which is associated with high subjective well-being (Wrosch, Scheier, Miller, Schulz, & Carver, 2003; see also Herrmann & Brandstätter, 2013; Huang & Bargh, 2014; Kruglanski et al., 2002). Similarly, being committed to attain a lost counterfactual past leads to negative affect and depression (Callander et al., 2007; Davis et al., 1995). Letting go of wanting to attain the counterfactual past should shelter people from those negative emotions

and provide them with the opportunity to engage in alternative endeavors provided by their present life (Markman et al., 2009; Sherman & McConnell, 1995).

In the present research, we used the self-regulation strategy of mental contrasting to help people let go of their lost counterfactual past and actively engage in their present life. Fantasy realization theory (Oettingen, 1999, 2012, 2014) identifies mental contrasting as a self-regulation strategy that helps people to wisely commit to those desired futures that are attainable, and to let go of those desired futures that are unattainable. Specifically, mental contrasting helps people to let go of unattainable desired futures by juxtaposing people's positive fantasies about the desired future with the obstacles of current reality that stand in the way of attaining the desired future. In the present research, we applied mental contrasting to people's positive fantasies about a desired counterfactual past. Mental contrasting should highlight the obstacles of current reality that stand in the way of the desired counterfactual past still coming true. By highlighting those obstacles, mental contrasting should elucidate that the past is forgone and cannot be brought back. Thus, people should be able to let go of the longed-for counterfactual past.

Mental Contrasting

When people mentally contrast, they first imagine the attainment of a desired future, and thereafter elaborate on the critical obstacle of their current reality that stands in the way of attaining their desired future. When the obstacle of current reality is surmountable (expectations of attaining the desired future are high), people fully commit to the desired future and vigorously strive to attain it. Important in the context of the present research, when the obstacle of current reality is difficult or impossible to overcome (expectations of attaining the desired future are low), people let go of wanting to attain the desired future and are free to commit to other endeavors (Oettingen, Pak, & Schnetter, 2001; review by Oettingen, 2012).

The theory of fantasy realization specifies three other modes of thought about a desired future. People may engage in indulging (imagining only the attainment of the desired future), in dwelling (elaborating only on the current reality), or reverse contrasting (elaborating on the current reality and then imagining the attainment of the desired future). In one-sided elaborations (i.e., indulging and dwelling), no discrepancy between the desired future and reality is created and thus commitment to the desired future should be unchanged, because no obstacle standing in the way is recognized. In reverse contrasting, the relational construct of current reality *standing in the way* of attaining the desired future is not created and thus commitment to the desired future should similarly be unchanged (review by Oettingen, 2012).

Mental contrasting has been shown to help people effectively select and commit to their goals across various domains (academic, interpersonal, health) as indicated by cognitive (e.g., making plans), affective (e.g., feelings of anticipated disappointment in case of failure), motivational (e.g., feelings of determination), physiological (energization assessed by cardiovascular measures), and behavioral indicators (e.g., exertion of effort, quality of performance; review by Oettingen, 2012, 2014).

Mental Contrasting of Counterfactual Fantasies

Important in the context of the present research, mental contrasting helps people let go of wanting to attain their desired future when the obstacle of current reality standing in the way of attaining the desired future is difficult or impossible to overcome and expectations of attaining the desired future are low (review by Oettingen, 2012). Extrapolating those findings to positive fantasies about a desired counterfactual past, mental contrasting should help people realize that the obstacle of current reality standing in the way of still attaining the desired counterfactual past is difficult or impossible to overcome and that expectations of attaining the desired counterfactual past are low. Mental contrasting should thus help people

let go of wanting to attain their desired counterfactual past. In contrast, the other three modes of thought (i.e., indulging in positive fantasies about the desired counterfactual past, dwelling on the current reality, or reverse contrasting the current reality with positive fantasies about the desired counterfactual past) should not unveil that the obstacle of current reality is difficult or impossible to overcome. Thus, they should not help people realize that expectations of still attaining the counterfactual past are low. Therefore, indulging, dwelling, and reverse contrasting should keep people to still wanting to attain the desired counterfactual past.

Mental Contrasting of Counterfactual Fantasies: Mechanisms

Previous research has shown that mental contrasting produces behavior change in line with the obstacles that exist in current reality. That is, mental contrasting enables people to let go of their desired future by making it clear that the obstacle of current reality is difficult or impossible to overcome. Mental contrasting thereby leads people to acknowledge their expectations of attaining the desired future, rather than changing levels of expectations (see also Oettingen et al., 2001). Mental contrasting effects are based on cognitive and motivational mechanisms, which should similarly hold for mental contrasting of counterfactual fantasies.

Cognitive mechanisms. Regarding positive fantasies about a desired future, when the obstacle of current reality is difficult or impossible to overcome (expectations of attaining the desired future are low), mental contrasting weakens the implicit associations between the desired future, the obstacle of current reality, and the instrumental means to overcome this obstacle. Further, mental contrasting weakens the meaning of current reality as an obstacle and leads people to form a positive attitude towards their current reality, indicating that they are now liberated from seeing their current reality as a negative obstacle that needs to be overcome. These effects, in turn, predict behavior change (A. Kappes & Oettingen, 2014; A.

Kappes, Singmann, & Oettingen, 2012; A. Kappes, Wendt, Reinelt, & Oettingen, 2013; Wittleder, A. Kappes, Wendt, & Oettingen, 2017). Extrapolating those findings to positive fantasies about a desired counterfactual past, mental contrasting should weaken the implicit association between the desired counterfactual past and the obstacle of current reality that stands in the way of still attaining the desired counterfactual past. People should thus let go of wanting to attain the desired counterfactual past. Further, mental contrasting should weaken the meaning of current reality as an obstacle and should lead people to form a positive attitude towards their current reality, indicating that they are now liberated from seeing their current reality as a negative obstacle that needs to be overcome.

Motivational mechanisms. Regarding positive fantasies about a desired future, when the obstacle of current reality is difficult or impossible to overcome (expectations of attaining the desired future are low), mental contrasting reduces people's levels of energy; now they are free and can invest their energy in other, more promising endeavors. These effects, in turn, predict behavior change (Oettingen et al., 2009). Again, extrapolating those findings to positive fantasies about a desired counterfactual past, mental contrasting, by reducing the energy to attain the desired counterfactual past, should enable people to invest their energy in more promising endeavors in their present life.

The Present Research

In the present research, we asked people to mentally contrast their positive fantasies about a desired counterfactual past with the obstacles of current reality standing in the way of attaining the desired counterfactual past. We hypothesized that mental contrasting of positive counterfactual fantasies should help people let go of their desired counterfactual past and actively engage in their present life. We investigated the effects of mental contrasting of positive counterfactual fantasies on people's commitment to their counterfactual past and on the negative counterfactual emotions that typically accompany

this commitment, such as regret and resentment. Specifically, we should observe that by letting go of the counterfactual past, people who mentally contrast should let go of negative counterfactual emotions. Further, we investigated the effects of mental contrasting of positive counterfactual fantasies on people's implicit cognition and motivation. Specifically, we should observe that by letting go of the counterfactual past, people who mentally contrast should form a positive attitude towards their current reality and should be energized to engage in their present life. Finally, we investigated the effect of mental contrasting of positive counterfactual fantasies on people's actual engagement in their present life. Specifically, we should observe that by letting go of the counterfactual past, people who mentally contrast should actively engage in their present life.

In Study-set 1, consisting of six experimental studies (N = 1,115; Mechanical Turk participants), we investigated mental contrasting effects on people's commitment to their counterfactual past (Studies 1.1, 1.2, 1.3, and 1.4) and on people's negative counterfactual emotions (Studies 1.5 and 1.6). In the following two Study-sets, we examined whether mental contrasting of positive counterfactual fantasies, similar to mental contrasting of positive future fantasies, instigates changes in implicit cognition and motivation. Specifically, in Study 2 (N = 154; laboratory participants), we investigated mental contrasting effects on people's implicit attitude towards their current reality. In Study-set 3, consisting of two experimental studies (N = 349; Mechanical Turk participants), we investigated mental contrasting effects on people's levels of energization regarding their present life. Finally, in Study-set 4, consisting of three experimental studies (N = 403; Mechanical Turk participants), we investigated mental contrasting effects on people's actual engagement in their present life. The ethical review committee of the Faculty of Psychology and Human Movement Science of the University of Hamburg approved all studies reported in this dissertation thesis.

Study-set 1: Letting go of the Counterfactual Past: Reduction of Commitment and Attenuation of Negative Counterfactual Emotions

In Study-set 1, we investigated the effects of mental contrasting on people's commitment to their counterfactual past and on the negative counterfactual emotions that typically accompany this commitment (see Roese, 1994). In cases in which subsequent opportunities to restore the desired counterfactual past exist, negative counterfactual emotions should be functional in motivating people to restore the counterfactual past (Markman & McMullen, 2003, 2005). However, in cases in which subsequent opportunities to restore the desired counterfactual past are absent, negative counterfactual emotions should be dysfunctional. Therefore, in Study-set 1, we applied mental contrasting to regulate those negative counterfactual emotions (see also *emotion-focused coping*; Lazarus & Folkman, 1984; or *secondary control coping*; Weisz, McCabe, & Dennig, 1994).

Related Models: Counterfactuals and Emotion-Regulation

One way to attenuate negative emotions resulting from positive counterfactuals is to generate *downward counterfactuals*, that is, to simulate even less desired counterfactual scenarios (Roese & Morrison, 2009). One can also generate *semifactuals*, that is, counterfactual scenarios that would have led to the same negative outcome (McCloy & Byrne, 2002). Findings on the regulatory mechanisms of downward counterfactuals as an emotion-focused coping strategy have, however, not been consistent (e.g., Mandel, 2003). Aggravating the problem, people often not even try to use downward counterfactuals; rather they spontaneously engage in positive (i.e., *upward*) counterfactuals (Nasco & Marsh, 1999; Summerville & Roese, 2008). Especially after negative life events, they imagine how those negative events could have been prevented (i.e., how things could have turned out better; e.g., Davis et al., 1995). We therefore assumed that mental contrasting should be useful in attenuating negative emotions resulting from positive counterfactual fantasies as they

naturally occur. By highlighting the obstacle of current reality that stands in the way of attaining the desired counterfactual past, mental contrasting should help people let go of the longed-for counterfactual past. Therefore, the painful contrast between the idealized counterfactual past and the current reality should melt down and with it the negative emotions accompanying this contrast.

In six experimental studies, participants were induced to mentally contrast their positive counterfactual fantasies with their current reality, to indulge in their positive counterfactual fantasies, to dwell on their current reality, or to reverse contrast their current reality with their positive counterfactual fantasies. We investigated the effects of mental contrasting on participants' disappointment (Studies 1.1, 1.2, 1.3, and 1.4), post-decisional regret (Study 1.5), and interpersonal resentment and regret (Study 1.6).

Study 1.1: Disappointment: Mental Contrasting vs. Indulging

Studies 1.1 to 1.4 examined the effect of mental contrasting on people's commitment to their counterfactual past. We measured commitment by participants' levels of disappointment regarding their counterfactual past. Disappointment is an indirect indicator of commitment (*anticipated disappointment* in case a goal is not attained, e.g., Berger, 1988; Brunstein & Gollwitzer, 1996; Gollwitzer & Kirchhof, 1998; Wicklund & Gollwitzer, 1982), and mental contrasting has been found to reduce people's commitment (indicated by their anticipated disappointment in case of failure) when they had low expectations of success (A. Kappes & Oettingen, 2014; Oettingen et al., 2001, Study 2). Disappointment (vs. relief) has also been investigated as a negative counterfactual emotion, experienced in situations in which a better counterfactual alternative to an outcome is envisioned (*affective contrast*; Roese, 1994; see also Kahneman & Miller, 1986).

In Study 1.1, participants were asked to name a positive alternative scenario to a negative event of their past, of which they thought that this alternative would have made

their life much better. They were then asked to either positively fantasize about the counterfactual scenario (indulging condition), or to mentally contrast their positive fantasies about the counterfactual scenario with the obstacle of current reality standing in the way of their counterfactual scenario coming true (mental contrasting condition).

We hypothesized that participants who mentally contrast (vs. indulge) their positive counterfactual fantasies with their current reality should realize that the obstacle of current reality is difficult or impossible to overcome and that expectations of attaining the counterfactual past are low. Thus, when asked to think about their counterfactual past compared with their current reality, they should be less disappointed, indicating reduced commitment to their counterfactual past.

Method Study 1.1

Power Analysis

Based on previous mental contrasting literature, we assumed that our experimental manipulation should exert a medium effect (f = 0.30, d = 0.60). We applied this effect size to an a priori power analysis for two groups within an ANOVA. The power analysis indicated that approximately 90 participants would be needed to achieve 80 % power (1 - β) at a .05 alpha level (α = .05). In Study 1.1, we recruited 97 participants.

Participants

Ninety-seven participants (44 females) completed the study online via Amazon's Mechanical Turk (MTurk). Participants were 21–78 years old (M_{age} = 39.19, SD_{age} = 12.78). They were randomly assigned to either a mental contrasting condition (n = 50) or an indulging condition (n = 47). All participants were told that they would take part in a survey about how people think about the past. Further, all participants completed informed consent to participate in the study.

Procedure and Materials

Mental exercise. All participants were asked to name a positive alternative scenario of which they thought that it would have made their life better. More specifically, all participants read:

> People often think about hypothetical scenarios that could have happened in their past and of which they think that they would have been for the better. Examples of those scenarios could be: "If only I had married that man/woman", "If only I had traveled more", "If only I had settled down to family life", "If only this negative event had not happened" etc. Is there any scenario of your past about which you think pretty frequently and of which you cannot stop thinking that this scenario would have made your life much better?

Participants named, for example, "If only I had gotten a PhD", or "If only my partner had stayed with me". After naming a scenario, participants indicated how often they thought about it ("How often do you think about the positive scenario you just named?") using a Likert-scale with anchor points from 1 (*rarely*), 2 (*monthly*), 3 (*several times a month*), 4 (*weekly*), 5 (*several times a week*), 6 (*daily*), to 7 (*all the time*). Participants also indicated the desirability of the scenario ("How desirable would the scenario have been?"), and their expectations of the scenario still coming true ("How likely do you think it is that the positive scenario you just named can still come true?"). Likert-scales ranged from 1 (*not at all desirable/not at all likely*) to 7 (*very desirable/very likely*).

Thereafter, participants in the mental contrasting and indulging conditions were asked to name the best aspect they associated with the scenario (participants named, e.g., "I would have had more doors open", "Happiness") and to elaborate on this aspect:

> Think about the best positive aspect you just named in more detail. Elaborate on the respective events or experiences of the scenario in your thoughts as

> intensively as possible! Let the mental images pass by in your thoughts and do not hesitate to give your thoughts and images free reign. Take as much time and space as you need to imagine and write down your thoughts and images.

Whereas participants in the indulging condition then were asked to name the second best aspect they associated with the scenario and elaborated on this positive aspect, participants in the mental contrasting condition were asked to name the main obstacle of their current reality standing in the way of their positive scenario coming true. Participants named, for example, "Lack of money", or "It's too late". They were then asked to elaborate on this obstacle:

> Now think about the obstacle you just named in more detail. Elaborate on the main obstacle as intensively as possible! Let the mental images pass by in your thoughts and do not hesitate to give your thoughts and images free reign. Take as much time and space as you need to imagine and write down your thoughts and images.

Disappointment. Following the procedure by Roese (1994), we assessed participants' disappointment by asking them how thinking about the positive scenario which they named in the beginning of the experiment made them feel *right now*. Participants indicated their answers on a Likert-scale ranging from 1 (*disappointed*) to 7 (*relieved*). Identical to Roese (1994), we also assessed four other affect ratings (i.e., *depressed – elated*, *negative – positive, unhappy – happy, hostile – agreeable*), but focused on disappointment in our analysis since disappointment reflects an indirect indicator of commitment. We reverse coded all Likert-scales so that high scores indicate high levels of disappointment and negative affect. Means for disappointment and global negative affect (i.e., the average of all five affect ratings) are depicted in Table 1. We observed a high reliability of the global

negative affect scale (α = .95).[1]

Results Study 1.1

Thought Frequency

Average frequency of thoughts about the positive counterfactual scenarios ranged from several times a month to weekly (*M* = 3.25, *SD* = 1.90), with no significant difference between the mental contrasting and indulging conditions, *p* = .947.

Desirability and Expectations

The counterfactual scenarios were rated as desirable (*M* = 6.05, *SD* = 1.16), with no significant difference between the mental contrasting and indulging conditions, *p* = .330. Desirability of the counterfactual scenarios correlated positively with thought frequency, *r*(96) = .35, *p* < .001, 95 % CI [0.19, 0.49], with people rating their scenario as highly desirable also reporting a high frequency of thoughts about it. On average, expectations of the counterfactual scenarios still coming true were, as expected, low (*M* = 2.99, *SD* = 2.27), with no significant difference between the mental contrasting and indulging conditions, *p* = .563.

Dependent Variable: Disappointment

We submitted the disappointment scores to a one-way ANOVA with condition (mental contrasting vs. indulging) as fixed between-subject factor. There was a significant effect of condition, $F(1, 95) = 8.35$, $p = .005$, $\omega^2 = .07$. Participants in the mental contrasting condition felt less disappointed (*M* = 3.94, *SD* = 1.62) compared with participants in the indulging condition (*M* = 4.85, *SD* = 1.47), 95 % CI [-1.54, -0.29], when asked how thinking

[1] As control variables, we assessed participants' mood (Brief Mood Introspection Scale, BMIS; Mayer & Gaschke, 1988), coping self-efficacy (Coping Self-Efficacy (CSE) scale; Chesney, Neilands, Chambers, Taylor, & Folkman, 2006), trait regret levels (Regret Scale; Schwartz et al., 2002), and trait resentment levels (Gratitude Resentment and Appreciation Test, GRAT-R; Watkins, Woodward, Stone, & Kolts, 2003) before and after the experimental manipulation, in order to ensure that our experimental effects would hold beyond baseline levels of these variables. Across the six studies within Study-set 1, our experimental effect remained significant when we entered our control variables as covariates in the analysis, all *p*s < .041.

about their positive scenario made them feel right now (Table 1).

Discussion Study 1.1

Participants who mentally contrasted (vs. indulged) their positive counterfactual fantasies with the obstacle of current reality experienced less disappointment when asked how thinking about the positive counterfactual past made them feel right now. Those results speak to the fact that mental contrasting (vs. indulging) led people to let go of their counterfactual past. In line with the findings by Roese (1994, Study 2), we obtained a significant effect of mental contrasting on the global negative affect measure. However, in line with our hypothesis, the strongest effect emerged on the indicator of commitment, that is, the disappointment item (see Table 1).

In Study 1.1, we asked participants to freely name a positive counterfactual fantasy they frequently engaged in. People tend to engage in counterfactual fantasies not only after controllable, but also after uncontrollable negative events (e.g., Callander et al., 2007; Davis et al., 1995). Importantly, controllability here refers to how controllable the actual negative event was at the time it happened. In Study 1.2, we aimed to conceptually replicate the findings of Study 1.1, and to extend those findings regarding counterfactual alternatives to negative events that participants deemed uncontrollable at the time.

Study 1.2: Disappointment: Mental Contrasting vs. Indulging, Dwelling, Control

We hypothesized that participants who mentally contrast (vs. indulge) should experience less disappointment, indicating reduced commitment to the counterfactual past. We reasoned that this pattern of results would hold even if the actual negative events were caused by uncontrollable factors. Finally, we included two additional conditions: a dwelling condition in which participants only elaborated on their current reality, and an additional control condition in order to investigate the direction of effects. In the control condition, participants named a positive counterfactual scenario, but elaborated on irrelevant content.

Method Study 1.2

Power Analysis

We based our power analysis on the assumption that the experimental manipulation should exert a medium effect ($f = 0.30$, $d = 0.60$). Applying this effect size to a power analysis of a one-way ANOVA with four groups indicated that approximately 164 participants would be needed to achieve 90 % power ($1 - \beta$) at a .05 alpha level ($\alpha = .05$). In Study 1.2, we recruited 218 participants.

Participants

Two hundred eighteen participants (133 females) completed the study online via Amazon's Mechanical Turk (MTurk). Participants were 20–77 years old ($M_{age} = 41.27$, $SD_{age} = 13.58$). They were randomly assigned to one of four conditions: mental contrasting ($n = 62$), indulging ($n = 49$), dwelling ($n = 50$), or control ($n = 57$). All participants were told that they would take part in a survey about how people think about the past. Further, all participants completed informed consent to participate in the study.

Procedure and Materials

Mental exercise. Instructions of the mental exercise were those described in Study 1.1 However, participants were asked to name a positive alternative scenario to a negative past event which was not controllable at the time and of which they think that this alternative would have made their life much better. Participants named, for example, "If only I had been blessed with good health", or "If only my dad hadn't died". Participants in the indulging condition were asked to name and elaborate on two positive aspects they associated with the alternative scenario (e.g., "A happier life", "My kids would have gotten to know their grandpa"), whereas participants in the dwelling condition were asked to name and elaborate on two obstacles standing in the way of their alternative scenario coming true (e.g., "Can't go back in time", "You can't undo death"). Participants in the mental contrasting condition

first named and elaborated on a positive aspect of their alternative scenario and thereafter named and elaborated on the main obstacle standing in the way of their alternative scenario coming true. Participants in the control condition named a positive alternative scenario and then elaborated on irrelevant content. Specifically, they were asked to elaborate on how a regular Saturday morning runs off.

Disappointment. We assessed participants' disappointment like in Study 1.1. Participants were asked how thinking about the positive scenario that they named in the beginning of the experiment made them feel *right now*. High scores indicate high levels of disappointment and negative affect. Means for disappointment and global negative affect are depicted in Table 1. We observed a high reliability of the global negative affect scale (α = .96).[2]

Results Study 1.2

Thought Frequency

Average frequency of thoughts about the positive counterfactual scenarios ranged from several times a month to weekly (M = 3.61, SD = 2.08), with no significant difference between the four conditions, p = .503.

Desirability and Expectations

The counterfactual scenarios were rated as desirable (M = 5.84, SD = 1.61), with no significant difference between the four conditions, p = .705. The desirability of the counterfactual scenarios correlated positively with the frequency of thoughts, $r(217) = .22$, p = .001, 95 % CI [0.09, 0.35], with people who rated the scenario as highly desirable also reporting a high frequency of thoughts about it. Expectations of the counterfactual scenarios still coming true were low (M = 3.06, SD = 2.30), with no significant difference between the

[2] In Studies 1.2-1.6, we assessed the same control variables as in Study 1.1, including an additional measure of participants' levels of depression (revised Center for Epidemiologic Depression Scale, CESD-R; Eaton, Smith, Ybarra, Muntaner, & Tien, 2004) in order to ensure that our experimental effects would also hold beyond participants' levels of depressive symptoms.

four conditions, $p = .746$.

Dependent Variable: Disappointment

We submitted the disappointment scores to a one-way ANOVA with condition (mental contrasting vs. indulging vs. dwelling vs. control) as fixed between-subject factor. There was a significant effect of condition, $F(3, 214) = 3.89$, $p = .010$, $\omega^2 = .04$. *Post-hoc* comparisons using LSD revealed that participants in the mental contrasting condition felt less disappointed ($M = 3.40$, $SD = 1.69$) compared with participants in the indulging condition ($M = 4.45$, $SD = 1.87$), $p = .003$, 95 % CI [0.36, 1.73], compared with participants in the dwelling condition ($M = 4.24$, $SD = 1.67$), $p = .016$, 95 % CI [0.16, 1.52], and compared with participants in the control condition ($M = 4.28$, $SD = 2.02$), $p = .009$, 95 % CI [0.22, 1.54], when thinking about their counterfactual alternatives. There were no significant differences in disappointment between the three other conditions, *p*s >.634 (Table 1).

Discussion Study 1.2

After uncontrollable negative events, mental contrasting of positive counterfactual alternatives with current reality helped to attenuate disappointment, indicating reduced commitment to the counterfactual past. One-sided elaborations, indulging and dwelling, did not attenuate disappointment, nor did elaborations on irrelevant content. Thus, we conceptually replicated the findings of Study 1.1, and also showed that mental contrasting attenuates disappointment about the counterfactual past, rather than indulging and dwelling heightening it.

One might argue that the emotional dynamics in the mental contrasting condition are different from those in the indulging and dwelling conditions. That is, whereas in the mental contrasting condition, participants elaborate on both the idealized counterfactual past and the current reality, participants in the indulging and dwelling conditions solely elaborate on either the idealized counterfactual past or the current reality. Thus, whereas in the mental

contrasting condition, an association is created between the counterfactual past and current reality, this should not take place in the indulging and dwelling conditions. In Study 1.3, we aimed to rule out that the difference in emotional dynamics between mental contrasting and the other conditions might have caused the differences in disappointment. Therefore, in Study 1.3 we aimed to replicate the findings of Study 1.2, and included a reverse contrasting condition, in which participants elaborated on the exact same content as mental contrasting participants, but in reversed order. In reverse contrasting, the current reality should not be perceived as an obstacle *standing in the way* of attaining the desired counterfactual past. Therefore, commitment to attain the counterfactual past should be unchanged.

Study 1.3: Disappointment: Mental Contrasting vs. Reverse Contrasting, Control

We hypothesized that participants who mentally contrast (vs. reverse contrast or elaborate on irrelevant content) should experience less disappointment, indicating reduced commitment to the counterfactual past. Like in Study 1.2, we asked participants to generate positive alternative scenarios to negative events that they deemed uncontrollable at the time.

Method Study 1.3

Power Analysis

Following the previous two studies, we based our power analysis on the assumption that the experimental manipulation should exert a medium effect (f = 0.30, d = 0.60). Applying this effect size to a power analysis of a one-way ANOVA with three groups indicated that approximately 177 participants would be needed to achieve 95 % power (1 - β) at a .05 alpha level (α = .05). In Study 1.3, we recruited 287 participants.

Participants

Two hundred eighty-seven participants (191 females) completed the study online via Amazon's Mechanical Turk (MTurk). Participants were aged 18–72 years (M_{age} = 37.03, SD_{age} = 12.49). Participants were randomly assigned to either a mental contrasting condition (*n*

= 103), a reverse contrasting condition (*n* = 101), or a control condition (*n* = 83). All participants were told that they would take part in a survey about how people think about the past. Further, all participants completed informed consent to participate in the study.

Procedure and Materials

Mental exercise. Instructions of the mental exercise were those described in Study 1.1. However, participants were asked to name a positive alternative scenario to a negative past event which was not controllable at the time. Participants named, for example, "If only my parents hadn't been fighting", or "If only my partner had stayed with me". Participants in the mental contrasting condition first named and elaborated on a positive aspect of their alternative scenario (e.g., "Happiness", "We would be together") and thereafter named and elaborated on the main obstacle standing in the way of their alternative scenario coming true (e.g., "Time has passed", "She is gone"). Participants in the reverse contrasting condition first named and elaborated on the main obstacle and thereafter named and elaborated on a positive aspect of their alternative scenario. Participants in the control condition elaborated on how a regular Saturday morning runs off.

Disappointment. We assessed participants' disappointment like in Study 1.1. Participants were asked how thinking about the positive scenario that they named in the beginning of the experiment made them feel *right now.* Following the procedure used by Roese (1994) and in contrast to Studies 1.1 and 1.2, we placed the *disappointed-relieved* item first within the affect scale in order to ensure a more sensitive test of the hypothesis. High scores indicate high levels of disappointment and negative affect. Means for disappointment and global negative affect are depicted in Table 2. We observed a high reliability of the global negative affect scale ($\alpha = .96$).

Results Study 1.3

Thought Frequency

Average frequency of thoughts about the positive counterfactual scenarios ranged from several times a month to weekly (M = 3.93, SD = 2.13), with no significant difference between the three conditions, p = .197.

Desirability and Expectations

The counterfactual scenarios were rated as desirable (M = 5.76, SD = 1.69), with no significant difference between the three conditions, p = .394. The desirability of the counterfactual scenarios correlated positively with the frequency of thoughts, $r(286) = .34$, $p < .001$, 95 % CI [0.23, 0.44], with people rating the scenario as highly desirable also reporting a high frequency of thoughts about it. Expectations of the counterfactual scenarios still coming true were moderate (M = 4.46, SD = 2.36), with no significant difference between the three conditions, p = .683.

Dependent Variable: Disappointment

We submitted the disappointment scores to a one-way ANOVA with condition (mental contrasting vs. reverse contrasting vs. control) as fixed between-subject factor. There was a significant effect of condition, $F(2, 284) = 4.57$, p = .011, ω^2 = .02. *Post-hoc* comparisons using LSD revealed that participants in the mental contrasting condition felt less disappointed (M = 3.22, SD = 1.87) compared with participants in the reverse contrasting condition (M = 3.95, SD = 1.77), p = .004, 95 % CI [0.24, 1.21], and compared with participants in the control condition (M = 3.75, SD = 1.61), p = .045, 95 % CI [0.01, 1.04], when thinking about their counterfactual alternatives. There was no significant difference in disappointment between the reverse contrasting and control conditions, p = .437 (Table 2).

Discussion Study 1.3

After uncontrollable negative events, mental contrasting of positive counterfactual

alternatives with current reality helped to attenuate disappointment, indicating reduced commitment to the counterfactual past. Participants who reverse contrasted elaborated on identical content but showed relatively higher disappointment about the counterfactual past. Those findings speak to mental contrasting achieving its effects by leading people to interpret their current reality as an obstacle standing in the way of still attaining the idealized counterfactual past. In Study 1.4, we aimed to replicate the findings of Study 1.3, and to extend those findings to controllable events.

Study 1.4: Disappointment: Mental Contrasting vs. Reverse Contrasting, Control (Conceptual Replication)

We hypothesized that participants who mentally contrast (vs. reverse contrast or elaborate on irrelevant content) should experience less disappointment, indicating reduced commitment to the counterfactual past. In contrast to Study 1.3, in Study 1.4, we asked participants to generate positive alternative scenarios to negative events that they felt were in their own control.

Method Study 1.4

Power Analysis

We based our power analysis on the assumption that the experimental manipulation should exert a medium effect ($f = 0.30$, $d = 0.60$). Applying this effect size to a power analysis of a one-way ANOVA with three groups indicated that approximately 177 participants would be needed to achieve 95 % power ($1 - \beta$) at a .05 alpha level ($\alpha = .05$). In Study 1.4, we recruited 267 participants.

Participants

Two hundred sixty-seven participants (163 females) completed the study online via Amazon's Mechanical Turk (MTurk). Participants were 19–83 years old ($M_{age} = 37.24$, $SD_{age} = 13.19$). Participants were randomly assigned to either a mental contrasting condition (*n*

= 85), a reverse contrasting condition (n = 70), or a control condition (n = 112). All participants were told that they would take part in a survey about how people think about the past. Further, all participants completed informed consent to participate in the study.

Procedure and Materials

Mental exercise. Instructions of the mental exercise were those described in Study 1.1. However, participants were asked to name a positive alternative scenario to a negative past event which was controllable. Participants named, for example, "If only I had gone to college", or "If only I had done more work". Participants in the mental contrasting condition first named and elaborated on a positive aspect of their alternative scenario (e.g., "More knowledge", "Pride") and thereafter named and elaborated on the main obstacle standing in the way of their alternative scenario coming true (e.g., "No money anymore", "No time"). Participants in the reverse contrasting condition first named and elaborated on the main obstacle and thereafter named and elaborated on a positive aspect of their alternative scenario. Participants in the control condition elaborated on how a regular Saturday morning runs off.

Disappointment. We assessed participants' disappointment like in Study 1.1. Participants rated how thinking about the positive scenario that they named in the beginning of the experiment made them feel *right now*. We again placed the *disappointed-relieved* item first within the affect scale. High scores indicate high levels of disappointment and negative affect. Means for disappointment and global negative affect are depicted in Table 2. We observed a high reliability of the global negative affect scale (α = .95).

Results Study 1.4

Thought Frequency

Average frequency of thoughts about the positive counterfactual scenarios ranged from several times a month to weekly (M = 3.91, SD = 2.05), with no significant difference

between the three conditions, $p = .765$.

Desirability and Expectations

The counterfactual scenarios were rated as desirable ($M = 5.78$, $SD = 1.48$), with no significant difference between the three conditions, $p = .150$. The desirability of the counterfactual scenarios correlated positively with the frequency of thoughts, $r(266) = .32$, $p < .001$, 95 % CI [0.21, 0.44], with people who rated their scenario as highly desirable also reporting a high frequency of thoughts about it. Expectations of the counterfactual scenarios still coming true were moderate ($M = 4.30$, $SD = 2.34$), with no significant difference between the three conditions, $p = .205$.

Dependent Variable: Disappointment

We submitted the disappointment scores to a one-way ANOVA with condition (mental contrasting vs. reverse contrasting vs. control) as fixed between-subject factor. There was a significant effect of condition, $F(2, 264) = 4.42$, $p = .013$, $\omega^2 = .02$. *Post-hoc* comparisons using LSD revealed that participants in the mental contrasting condition felt less disappointed ($M = 3.41$, $SD = 1.75$) compared with participants in the reverse contrasting condition ($M = 4.00$, $SD = 1.75$), $p = .043$, 95 % CI [0.02, 1.16], and compared with participants in the control condition ($M = 4.16$, $SD = 1.85$), $p = .004$, 95 % CI [0.25, 1.26] when thinking about their counterfactual alternatives. There was no significant difference in disappointment between the reverse contrasting and control conditions, $p = .557$ (Table 2).

Discussion Study 1.4

So far, we demonstrated that mental contrasting (vs. relevant control conditions) helped people let go of their counterfactual past, as indicated by reduced disappointment about the counterfactual past. Participants who mentally contrasted let go of their counterfactual past, irrespective of whether this counterfactual past pertained to a controllable or uncontrollable negative event. Hence, mental contrasting should also

attenuate other negative emotions that typically accompany the commitment to the counterfactual past. As an example, counterfactuals about alternatives to events for which people feel that they were responsible have been found to lead to feelings of regret (Zeelenberg, van Dijk, & Manstead, 1998; Zeelenberg et al., 1998; see also Markman et al., 2009; Zeelenberg & Pieters, 2007). Regret, in turn, has been associated with poor well-being (Jokisaari, 2004; Lecci, Okun, & Karoly, 1994; see also Schwartz et al., 2002). In Study 1.5, we investigated whether mentally contrasting counterfactual fantasies about a better alternative that participants could have chosen reduces their levels of post-decisional regret.

Study 1.5: Post-Decisional Regret

We hypothesized that participants who mentally contrast their counterfactual fantasies about an alternative better decision with their current reality should experience less post-decisional regret compared to participants who merely indulge in counterfactual fantasies about an alternative better decision and compared to participants who dwell on their current reality.

Method Study 1.5

Power Analysis

We based our power analysis on the assumption that the experimental manipulation should exert a medium effect ($f = 0.30$, $d = 0.60$). Applying this effect size to a power analysis of a one-way ANOVA with three groups indicated that approximately 111 participants would be needed to achieve 80 % power ($1 - \beta$) at a .05 alpha level ($\alpha = .05$). In Study 1.5, we recruited 130 participants.

Participants

One hundred thirty participants (54 females) completed the study online via Amazon's Mechanical Turk (MTurk). Participants were aged 21–70 years ($M_{age} = 39.02$, $SD_{age} = 11.80$). Participants were randomly assigned to either a mental contrasting condition ($n =$

50), an indulging condition (n = 39), or a dwelling condition (n = 41). All participants were told that they would take part in a survey about how people think about the past. Further, all participants completed informed consent to participate in the study.

Procedure and Materials

Mental exercise. Instructions of the mental exercise were those described in Study 1.1, except that participants were asked to name a positive alternative to a past decision of which they think that this alternative would have made their life much better. Participants named, for example, "If I had attended a different university", or "If I only had stayed with a particular job". Participants in the indulging condition thereafter named and elaborated on two positive aspects they associated with the alternative scenario (e.g., "It was my dream school", "I would be better off financially"), whereas participants in the dwelling condition were asked to name and elaborate on two obstacles of their current reality standing in the way of their alternative scenario coming true (e.g., "No money anymore", "Job no longer available"). Participants in the mental contrasting condition first named and elaborated on a positive aspect of their alternative scenario and thereafter named and elaborated on the main obstacle of their current reality standing in the way of their alternative scenario coming true.

Post-decisional regret. In order to measure post-decisional regret, we administered the Decision Regret Scale (Brehaut et al., 2003). Participants were asked to think again about the decision they actually made. They then responded to five statements regarding their decision, for example 'The choice did me a lot of harm' (reverse scored). Participants were asked to indicate their level of agreement with the statements on a Likert-scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). High scores on the scale reflect high levels of post-decisional regret. Means for post-decisional regret are depicted in Table 3. We observed a high reliability of the Decision Regret Scale (α = .90).

Results Study 1.5

Thought Frequency

Average frequency of thoughts about the positive counterfactual scenarios ranged from several times a month to weekly (M = 3.33, SD = 1.79), with no significant difference between the three conditions, p = .264.

Desirability and Expectations

The counterfactual scenarios were rated as desirable (M = 5.76, SD = 1.34), with no significant difference between the three conditions, p = .150. Desirability of the counterfactual scenarios correlated positively with the frequency of thoughts, $r(129) = .27$, p = .002, 95 % CI [0.12, 0.42], with people who rated the scenario as highly desirable also reporting a high frequency of thoughts about it. Expectations of the counterfactual scenarios still coming true were low to moderate (M = 3.55, SD = 2.33), with no significant difference between the three conditions, p = .938.

Dependent Variable: Post-Decisional Regret

We submitted the scores of post-decisional regret to a one-way ANOVA with condition (mental contrasting vs. indulging vs. dwelling) as fixed between-subject factor. There was a significant effect of condition, $F(2, 127) = 8.10$, $p < .001$, $\omega^2 = .10$. *Post-hoc* comparisons using LSD revealed that participants in the mental contrasting condition reported lower levels of post-decisional regret (M = 2.64, SD = 0.96) compared with participants in the indulging condition (M = 3.45, SD = 0.98), $p < .001$, 95 % CI [0.40, 1.21], and compared with participants in the dwelling condition (M = 3.16, SD = 0.94), p = .013, 95 % CI [0.11, 0.91]. There was no significant difference in levels of post-decisional regret between the indulging and dwelling conditions, p = .172. (Table 3).

Discussion Study 1.5

Participants who mentally contrasted their counterfactual fantasies about a better,

alternative decision with their current reality felt less post-decisional regret when they were asked to think again about the actual decision they made as compared to one-sided elaborations (i.e., indulging and dwelling). Expectations of revoking the made decision and still attaining the counterfactual alternative were low to moderate in the present study. Reduction of post-decisional regret should therefore be a suitable approach after such negative everyday life outcomes (i.e., *emotion-focused coping*, e.g., Lazarus & Folkman, 1984).

Although it has been suggested that people are particularly inclined to experience regret about events that are repeatable and thus entail subsequent opportunities to correct behavior (*opportunity principle*; Roese & Summerville, 2005), recent research has shown that this might not always be the case (e.g., Epstude & Jonas, 2015; Morrison & Roese, 2011). In fact, Beike et al. (2009) showed that the biggest regrets are actually experienced for lost opportunities that can no longer be changed or revoked. In line with the findings of Beike et al. (2009), we argue that in some cases, regret serves behavior regulation (see also Roese, Summerville, & Fessel, 2007) and can thus be helpful in guiding people's future behavior after aversive outcomes. For lost opportunities, however, regret is not beneficial, but rather leads to reduced life satisfaction and coping difficulties (Beike & Crone, 2008; Lecci et al., 1994; see also Markman et al., 2009; Roese et al., 2009). The findings suggest that mental contrasting is a self-regulatory tool to attenuate people's regret about lost opportunities.

Research on the experience of regret has suggested that in the short term, people tend to experience greater regret following actions (i.e., *commissions*), whereas in the long term, they experience greater regret following inactions (i.e., *omissions*; Gilovich & Medvec, 1994, 1995). In the present study, we asked participants to name better alternatives to any decisions they frequently thought about. In fact, participants reported alternatives to both

commissions (e.g., “If only I had not joined this company”) and omissions (e.g., “If only I had attended college”). Further, we did not assess the time that had passed since the decisions were made. Since we randomized our participants to the experimental conditions, we speculate that mental contrasting should equally attenuate regret following actions and inactions, as well as regret following decisions that were made recently or some time ago.

In everyday life, people not only experience regret after negative events for which they were responsible, but also after negative events for which they were not responsible. In those cases, positive counterfactuals may lead to negative emotions such as resentment, and in addition to self-blame which should in turn lead to feelings of regret (e.g., Branscombe et al., 2003; Davis, Lehman, Cohen Silver, Wortman, & Ellard, 1996; Janoff-Bulman, 1979). In Study 1.6, we therefore aimed to investigate effects of mental contrasting regarding negative events for which participants were not responsible. Specifically, we focused on negative events for which participants blamed another person and thus should feel interpersonal resentment.

Study 1.6: Interpersonal Resentment

In Study 1.6, we investigated mental contrasting effects regarding counterfactual fantasies about events for which participants blamed another person. We hypothesized that participants who mentally contrast their counterfactual fantasies with their current reality (vs. indulge or dwell) should experience less resentment against the person who caused the actual negative event as well as less regret about allowing the other person cause the event to happen.

Method Study 1.6

Power Analysis

We based our power analysis on the assumption that the experimental manipulation should exert a medium effect ($f = 0.30$, $d = 0.60$). Applying this effect size to a power

analysis of a one-way ANOVA with three groups indicated that approximately 111 participants would be needed to achieve 80 % power (1 - β) at a .05 alpha level ($\alpha = .05$). In Study 1.6, we recruited 116 participants.

Participants

One hundred sixteen participants (53 females) completed the study online via Amazon's Mechanical Turk (MTurk). Participants were 19–70 years old ($M_{age} = 34.80$, $SD_{age} = 11.44$). They were randomly assigned to either a mental contrasting condition ($n = 41$), an indulging condition ($n = 34$), or a dwelling condition ($n = 41$). All participants were told that they would take part in a survey about how people think about the past. Further, all participants completed informed consent to participate in the study.

Procedure and Materials

Mental exercise. Instructions of the mental exercise were those described in Study 1.1. However, participants were asked to name a positive alternative scenario to a negative past event caused by a specific person. Participants were further asked to name the person who was responsible for the actual negative event. Participants generated scenarios such as "If only this person hadn't wasted my time", or "If only she had saved money." Participants in the indulging condition thereafter named and elaborated on two positive aspects they associated with the alternative scenario to have happened (e.g., "We would have gotten closer", "I'd have more money"). Participants in the dwelling condition were asked to name and elaborate on two obstacles of their current reality standing in the way of their alternative scenario coming true (e.g., "Too late", "It already happened"). Participants in the mental contrasting condition first named and elaborated on a positive aspect of their alternative scenario and thereafter named and elaborated on the main obstacle standing in the way of their alternative scenario coming true.

Interpersonal resentment. We measured participants' resentment towards the named

person using six items of the Gratitude Resentment and Appreciation Test (GRAT-R; Watkins et al., 2003). The original scale consists of forty-four items. We selected those six items which in the original version of the scale were phrased specific enough so that we could adjust them to assess interpersonal resentment against a specific person, here, the person whom participants had named (e.g., 'I really feel like this person owes me something', 'I don't deserve the bad things that this person has caused'). Participants were asked to indicate their level of agreement to the six statements with regard to the person they named on a Likert-scale with anchor points of 1 (*I strongly disagree*), 5 (*I feel neutral about the statement*), and 9 (*I strongly agree*). High scores on the scale indicate high levels of interpersonal resentment. Means for interpersonal resentment are depicted in Table 3. We observed a low to moderate reliability of the six interpersonal resentment items ($\alpha = .40$). We will return to this point in the discussion.

Regret. We measured participants' regret regarding the negative event using four items of the Decision Regret Scale (Brehaut et al., 2003). The original scale consists of five items. We selected those four items that we could adjust to assess regret about the person whom participants had named (e.g., 'I regret that I did not stand up against this person', 'It was a bad decision to rely on this person'). Participants were asked to indicate their level of agreement to the statements on a Likert-scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). High scores on the scale reflect high levels of regret. Means for regret are depicted in Table 3. We observed a high reliability of the four regret items ($\alpha = .86$).

Results Study 1.6

Thought Frequency

Average frequency of thoughts about the positive counterfactual scenarios ranged from weekly to several times a week ($M = 4.11$, $SD = 2.03$), with no significant difference between the three conditions, $p = .854$.

Desirability and Expectations

The counterfactual scenarios were rated as desirable (M = 5.58, SD = 1.55), with no significant difference between the three conditions, p = .522. The desirability of the counterfactual scenarios correlated positively with the frequency of thoughts, $r(115) = .32$, $p < .001$, 95 % CI [0.14, 0.49], with people who rated their scenario as highly desirable also reporting a high frequency of thoughts about it. Expectations of the counterfactual scenarios still coming true were moderate (M = 4.32, SD = 2.19), with no significant difference between the three conditions, p = .285.

Dependent Variable: Interpersonal Resentment

We submitted the interpersonal resentment scores to a one-way ANOVA with condition (mental contrasting vs. indulging vs. dwelling) as fixed between-subject factor. There was a significant effect of condition, $F(2, 113) = 5.32$, p = .006, ω^2 = .07. *Post-hoc* comparisons using LSD revealed that participants in the mental contrasting condition reported lower levels of interpersonal resentment (M = 4.41, SD = 1.23) compared with participants in the indulging condition (M = 5.14, SD = 1.26), p = .009, 95 % CI [0.19, 1.28], and compared with participants in the dwelling condition (M = 5.18, SD = 1.07), p = .004, 95 % CI [0.25, 1.29]. There was no significant difference in levels of interpersonal resentment between the indulging and dwelling conditions, p = .894 (Table 3).

Dependent Variable: Regret

We submitted the regret scores to a one-way ANOVA with condition (mental contrasting vs. indulging vs. dwelling) as fixed between-subject factor. Three participants did not fill in all regret items, so we calculated the regret index for the remaining 113 participants. There was a significant effect of condition, $F(2, 110) = 3.29$, p = .041, ω^2 = .04. *Post-hoc* comparisons using LSD revealed that participants in the mental contrasting condition reported lower levels of regret (M = 2.92, SD = 1.18) compared with participants

in the indulging condition (M = 3.60, SD = 1.02), p = .013, 95 % CI [0.15, 1.21], but not compared with participants in the dwelling condition (M = 3.32, SD = 1.21), p = .122, though it trended in the predicted direction. There was no significant difference in levels of regret between the indulging and dwelling conditions, p = .307 (Table 3).

Discussion Study 1.6

For events for which participants blamed another person, mental contrasting of counterfactual fantasies led people to feel less resentment against the person deemed responsible for the event than indulging and dwelling. Since feelings of resentment form an obstacle to forgiveness, they can have detrimental effects for interpersonal relationships (Murphy, 1982; see also Sherman & McConnell, 1995). Mental contrasting might be useful in attenuating those feelings of resentment. The present findings should, however, be interpreted with some caution, since the reliability of the six resentment items was low to moderate. Future studies should replicate the present findings using a more robust measure of interpersonal resentment.

Mental contrasting also reduced levels of regret associated with the negative event as compared to indulging, with the difference between mental contrasting and dwelling trending in the predicted direction. Even though participants identified a specific person as the culprit for the negative event, they still tended to blame themselves for letting the person cause the negative event and experienced regret (see Branscombe et al., 2003). As self-blame and regret have been associated with poor well-being (e.g., Davis et al., 1995), mental contrasting might shelter people from these negative consequences. In sum, mental contrasting attenuated both resentment against the person who was identified as the wrongdoer and regret against oneself as the person who allowed for the wrongdoing.

Discussion Study-set 1

Across six studies, we observed that the self-regulation strategy of mental contrasting

helped people let go of their counterfactual past as measured by attenuated negative emotions. These results appeared for counterfactual alternatives to various negative life events (controllable and uncontrollable events, past decisions, events caused by another person), and for measures of commitment (disappointment) and counterfactual emotions (post-decisional regret, interpersonal resentment and regret). The effects occurred compared with relevant control conditions, in which participants either engaged in one-sided elaborations (i.e., indulged in their positive counterfactual fantasies or dwelled on their current reality), engaged in the exact same elaboration in reversed order (i.e., reverse contrasted their current reality with their positive counterfactual fantasies), or engaged in a neutral elaboration (i.e., elaborated on a regular Saturday morning).

We hypothesized that participants who mentally contrast their positive counterfactual fantasies with current reality (vs. indulge, dwell, or reverse contrast) would acknowledge that the obstacle of their current reality standing in the way of attaining their wished-for alternative would be overly difficult or impossible to overcome. Thus, they should liberate themselves of wanting to attain their counterfactual past. In fact, the obstacles which participants named were often difficult, or even impossible, to overcome (e.g., "It's too late", "Can't turn back time"). The relatively low expectations that the positive scenarios would still come true across our studies point to the argument that, in real life, people in fact engage in positive counterfactuals even after events that are immutable, or at least very unlikely to repeat (see also Davis et al., 1995; Markman et al., 2009).

Whereas in laboratory studies, counterfactuals are often generated about events that will be repeated within the same experimental setting (e.g., Dyczewski & Markman, 2012; Markman et al., 1993; Markman et al., 2008; McMullen & Eppers, 2001; Nasco & Marsh, 1999; Roese, 1994), we asked participants to generate everyday life counterfactuals about events that were unlikely to be repeated, or definitely over (i.e., lost opportunities). Still,

expectations that the positive counterfactual scenarios would still come true were low to moderate, but not at the lowest level of our expectation scales. Participants might have been reluctant to admit that their desired past is irrecoverably lost. Even though the expectations were not at the lowest level, mental contrasting helped people to attenuate their negative feelings against others and themselves.

Related Approaches

Emotion regulation. Research has suggested that goal commitment influences emotion regulation. Specifically, commitment to a current goal may change the relevance of emotional information in such a way that negative emotional information (e.g., anger) relevant to the current goal is upheld until the goal is either completed or relinquished (review by Koole, 2009). A similar argument might apply for commitment to a desired counterfactual past. Commitment to a desired counterfactual past should change the relevance of emotional information in such a way that negative emotional information (e.g., regret) relevant to the counterfactual past is upheld until either the counterfactual past has come true or it has become clear that the counterfactual past is not attainable anymore. In case of counterfactual pasts that are likely to come true, negative emotions (e.g., disappointment or regret) should prepare a person to attain the counterfactual past. When opportunities are lost, however, negative counterfactual emotions do not serve a preparative function (see Markman et al., 2009). In those cases, mental contrasting should be a useful tool to help people grasp that the counterfactual past is lost and that they can let go of their idealized past. Letting go in turn, should attenuate negative counterfactual emotions.

Effortful distraction. Drawing attention away from negative thoughts or feelings has been proven successful in regulating negative mood. Specifically, distraction with neutral material has been shown to reduce anger (Rusting & Nolen-Hoeksema, 1998) and depression (Nolen-Hoeksema & Morrow, 1993). Shifting attention to neutral material may

occupy working memory and thereby interrupt negative emotion-congruent cognitions (Van Dillen, Heslenfeld, & Koole, 2008; Van Dillen & Koole, 2007). Mental contrasting differs from distraction in various ways: Whereas distraction draws upon working memory and therefore requires mental effort, mental contrasting involves conscious mental imagery that leads to changes in implicit cognition. Thus, the mechanisms by which mental contrasting works do not require mental effort (A. Kappes & Oettingen, 2014; A. Kappes et al., 2012; A. Kappes et al., 2013). Whereas distraction addresses the symptoms of dysfunctional counterfactuals, mental contrasting addresses the causes of dysfunctional counterfactuals: the commitment to the lost counterfactual past.

Thought suppression. Mental contrasting clearly differs from the emotion regulation strategy of thought suppression. In fact, instructing people "not to think about" a certain content ironically increases thoughts about this content (*post-suppression rebound*; Wegner, Schneider, Carter, & White, 1987; review by Wenzlaff & Wegner, 2000). This effect is especially pronounced for emotional content (e.g., Davies & Clark, 1998; Roemer & Borkovec, 1994). Thus, neither should suppression be successful in helping people let go of a counterfactual past, nor should it attenuate negative counterfactual emotions.

Cognitive reappraisal. In order to come to terms with a counterfactual past, people might cognitively reappraise their counterfactual fantasies, their past, or their current reality (Gross, 1998; review by Koole, 2009). People might reappraise situational or contextual aspects (e.g., devalue their counterfactual fantasies or revalue their current reality). Alternatively, they might distance themselves and adopt a third-person perspective (Ochsner & Gross, 2008). Similar to distraction, cognitive reappraisal draws upon working memory resources (Schmeichel, Volokhov, & Demaree, 2008), but compared with distraction, it entails more long-term benefits for well-being (Gross & John, 2003). In contrast to cognitive reappraisal, mental contrasting does not instruct people to cognitively reappraise their

counterfactual fantasies, their past, or their current reality. Similarly, people who mentally contrast are not instructed to distance themselves from their counterfactual fantasies, but rather to freely imagine them as if they were real. The elaboration of the obstacle of current reality then forms the critical part of the mental contrasting procedure, leading people to realize that the desired counterfactual past is unlikely to come true. After negative events, a reappraisal of those events is often difficult. In those cases, mental contrasting might be a suitable tool to help people let go of their counterfactual past.

Lost possible selves. The concept of desired counterfactual pasts is similar to the concept of lost possible selves (King & Raspin, 2004). Research on lost possible selves has shown that the capacity to elaborate on lost goals is associated with enhanced ego-development, maturity, and with making meaning of life. Whereas the *elaboration* of lost possible selves entails positive consequences, the *salience* of lost possible selves is negatively related to well-being (King & Raspin, 2004; King & Smith, 2004). We go one step further in arguing that *how* people elaborate on their lost possible selves might differentially affect well-being: Whereas vivid elaboration of the lost possible self in the form of positive fantasies may lead to negative counterfactual emotions, elaboration in the form of mental contrasting might shelter people from those negative emotions. Furthermore, King and Hicks (2006) argue that well-being is best predicted by the capacity to let go of possible selves that could have been, and to commit to new goals. Mental contrasting might deem useful in situations in which people get preoccupied with their counterfactual fantasies in a way that those idealized fantasies about lost pasts hinder them from living in the here and now (see also Markman et al., 2009).

Conclusion Study-set 1

In six experimental studies, mental contrasting (vs. relevant control conditions) led people to let go of their counterfactual past and attenuated negative counterfactual emotions.

In Study 2, we wanted to build on those findings and investigate whether mental contrasting of positive counterfactual fantasies, similar to mental contrasting of positive future fantasies, instigates changes in implicit cognition. Specifically, we aimed to investigate whether mental contrasting of positive counterfactual fantasies affects people's implicit attitude towards their current reality.

Study 2: Letting go of the Counterfactual Past: Implicit Attitude Towards Current Reality

In Study 2, we investigated the effect of mental contrasting on people's implicit attitude towards their current reality. Mental contrasting produces behavior change that is based on cognitive mechanisms (review by Oettingen, 2012). Specifically, mental contrasting instigates changes in implicit cognition in line with the obstacle of current reality. Those changes in implicit cognition mediate behavior change.

Mental Contrasting Instigates Changes in Implicit Cognition

Mental contrasting of positive fantasies about a desired future with the obstacle of current reality modulates the strength of the implicit association between the desired future and the current reality. Specifically, when the obstacle of current reality is difficult or impossible to overcome (expectations of attaining the desired future are low), mental contrasting weakens the implicit association between the desired future and the current reality. Thus, even when people think about their desired future, the current reality does not become activated and thus fails to evoke effort allocation in order to attain the desired future (A. Kappes & Oettingen, 2014).

Further, mental contrasting of positive fantasies about a desired future with the obstacle of current reality modulates the strength of the implicit association between the obstacle of current reality and the instrumental means to overcome this obstacle. When the obstacle of current reality is difficult or impossible to overcome (expectations of attaining

the desired future are low), mental contrasting weakens the implicit association between the obstacle and the relevant means, so that people refrain from striving to overcome the obstacle (A. Kappes et al., 2012).

Lastly, mental contrasting of positive fantasies about a desired future with the obstacle of current reality modulates the meaning of current reality. When the obstacle of current reality is difficult or impossible to overcome (expectations of attaining the desired future are low), mental contrasting weakens the meaning of current reality as an obstacle, so that people do not see the current reality as an obstacle anymore and are free to engage in their current reality without wanting to overcome it (A. Kappes et al., 2013).

Important in the context of the present research, mental contrasting of positive fantasies about a desired future with the obstacle of current reality modulates people's attitude towards their current reality. When the obstacle of current reality is difficult or impossible to overcome (expectations of attaining the desired future are low), mental contrasting leads people to form a positive attitude towards their current reality. As an example, A. Kappes et al. (2013; Study 1) asked participants to mentally contrast a desired future (i.e., getting a desired grade in a given class) with the obstacle of current reality standing in the way of attaining their desired future (e.g., TV shows, dorm parties). A. Kappes et al. (2013) observed that when the obstacle of current reality was difficult or impossible to overcome (expectations of attaining the desired future were low) participants who mentally contrasted (vs. dwelled or reverse contrasted) formed a positive attitude towards their current reality, indicating that they were now liberated from seeing their current reality (i.e., TV shows or dorm parties) as a negative obstacle that needs to be overcome. The effects of mental contrasting on attitudes towards the current reality emerged when attitudes were measured explicitly (A. Kappes et al., 2013), and implicitly (Wittleder et al., 2017).

Implicit attitudes. Attitude has been defined as the summary evaluation of an object, involving the categorization of the object along an evaluative dimension (e.g., *favorable – unfavorable*). In this vein, people's attitudes towards objects determine whether they approach or avoid those objects (Allport, 1935; Fazio, 1986, 2001). Traditionally, the measurement of attitudes has relied on explicit measures, such as self-report questionnaires. Such explicit measures assess attitudes that are intentionally and deliberately generated (Ferguson, 2007). The use of such measures therefore assumes that people have both the ability and the motivation to report their attitudes accurately.

However, this assumption has been challenged (Fazio, 1990; Greenwald & Banaji, 1995; LaPiere, 1934; Nisbett & Wilson, 1977; Wicker, 1969). Therefore, recent research has started to assess attitudes that are unintentionally or implicitly generated (Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Ferguson, 2007; Greenwald, McGhee, & Schwartz, 1998; see also Neely, 1977). Many studies have thereby shown that implicit attitudes can be automatically activated upon the presence of the attitude object (e.g., Banse, 1999; Fazio, 2001; Fazio et al., 1986; Greenwald & Banaji, 1995). For example, studies using the Implicit Association Test (IAT; Greenwald et al., 1998) have assessed the strength of associations between certain attitude objects and attribute dimensions (e.g., *pleasant – unpleasant*), assuming that attitudes represent memory associations between target concepts and the concepts 'positive' and 'negative'. The IAT assesses the latencies with which people can employ two response keys, with each key assigned a dual meaning. If people are faster when an attitude object (e.g., "*flower*") and positive attributes are assigned to one response key than when the attitude object and negative attributes are assigned to one response key, this infers a relatively stronger association between the attitude object and the concept 'positive' versus 'negative', indicating a positive implicit attitude towards the object "*flower*".

Implicit attitudes and goals. Many studies have investigated implicit attitudes from a

motivational perspective, assuming that people's personal goals affect how they implicitly evaluate stimuli in the environment (Balcetis & Dunning, 2006; Ferguson & Bargh, 2004; Ferguson, Hassin, & Bargh, 2008; Ferguson & Wojnowicz, 2011; Ferguson & Zayas, 2009; see also Bargh, 2007). As an example, currently active goals have been shown to lead to positive implicit attitudes towards stimuli related to those goals (e.g., *evaluative readiness*; Ferguson, 2007, 2008; Ferguson & Wojnowicz, 2011; Sherman, Rose, Koch, Presson, & Chassin, 2003). Similarly, disengagement from a goal has been shown to result in less positive implicit attitudes towards stimuli related to that goal (Moore, Ferguson, & Chartrand, 2011). Those goal-dependent changes in implicit attitudes are functional in that they result in approach behavior and goal pursuit (Ferguson, 2007; Ferguson et al., 2008).

Accordingly, mental contrasting has been shown to affect people's implicit attitudes towards goal-related stimuli, that is, the current reality that stands in the way of attaining the goal. Specifically, when the obstacle of current reality is difficult or impossible to overcome (expectations of attaining the desired future are low), mental contrasting of positive fantasies about a desired future leads people to form a positive implicit attitude towards their current reality. Extrapolating those findings to positive fantasies about a desired counterfactual past, mental contrasting should help people realize that the obstacle of current reality is difficult or impossible to overcome. Thus, mental contrasting should lead people to form a positive implicit attitude towards their current reality.

In Study 2, participants were induced to mentally contrast their positive counterfactual fantasies with their current reality, to indulge in their positive counterfactual fantasies, or to elaborate on irrelevant content. We investigated the effect of mental contrasting on participants' implicit attitude towards their current reality.

Study 2: Implicit Attitude Towards Current Reality

Study 2 examined the effect of mental contrasting on people's implicit attitude towards

the current reality. Identical to Study 1.2, participants were asked to name a positive alternative scenario to a negative event of their past, which they deemed uncontrollable at the time. They were then asked to either positively fantasize about the counterfactual scenario (indulging condition), to mentally contrast their positive fantasies about the counterfactual scenario with the obstacle of current reality standing in the way of their counterfactual scenario coming true (mental contrasting condition), or to elaborate on irrelevant content (control condition). As dependent variable, we measured participants' implicit attitude towards their current reality with an extrinsic affective Simon task (EAST; De Houwer, 2003).

We hypothesized that participants who mentally contrast their positive counterfactual fantasies with their current reality (vs. indulge or elaborate on irrelevant content) should form a positive implicit attitude towards their current reality.

Method Study 2

Power Analysis

We based our power analysis on the assumption that the experimental manipulation should exert a medium effect ($f = 0.30$, $d = 0.60$). Applying this effect size to a power analysis of a repeated measures ANOVA with three groups indicated that approximately 132 participants would be needed to achieve 99 % power ($1 - \beta$) at a .05 alpha level ($\alpha = .05$). In Study 2, we recruited 154 participants.

Participants

Participants were recruited via advertisements at the University of Hamburg. One hundred fifty-four participants (114 females) completed the experiment. Participants were aged 18–57 years ($M_{age} = 24.99$, $SD_{age} = 6.03$). They were randomly assigned to either a mental contrasting condition ($n = 51$), an indulging condition ($n = 48$), or a control condition ($n = 55$). All participants were invited to the lab and were told that they would take part in a

computer-based experiment about how people think about the past. Further, all participants completed informed consent to participate in the study.

Procedure and Materials

Mental exercise. Participants were seated in front of a computer and received all written instructions on the computer screen. All participants were asked to name a positive alternative scenario to a negative past event which was not controllable at the time and of which they think that this alternative would have made their life much better. Participants named, for example, "If only I had not lost my best friend", or "If only my mother had been healthy". Thereafter, participants in all three conditions were asked to name the best aspect they associated with the alternative scenario (e.g., "Our relationship", "I would feel relieved"). We asked participants to summarize both the best aspect of their alternative scenario in one word (e.g., "Connectedness", "Happiness") and their current reality in one word (e.g., "Constraint", "Concern"). We presented both the idiosyncratic scenario words and the idiosyncratic reality words later in the EAST.

Participants in the mental contrasting and indulging conditions were thereafter asked to elaborate on the best aspect they associated with their alternative scenario. Whereas participants in the indulging condition then were asked to name the second best aspect they associated with the alternative scenario and elaborated on this positive aspect, participants in the mental contrasting condition were asked to name the main obstacle of their current reality standing in the way of their alternative scenario coming true. Participants named, for example, "Distance between us", or "It's impossible". They were then asked to elaborate on this obstacle. In the control condition, participants elaborated on irrelevant content. Specifically, we asked participants to elaborate on how their regular Saturday morning runs off. After the mental exercise, all participants were directed to the EAST.

Implicit attitude towards current reality. In order to assess participants' implicit

attitude towards their current reality, we used the EAST (De Houwer, 2003: see also De Houwer & Eelen, 1998). The EAST is a modified version of the Implicit Association Test (IAT; Greenwald et al., 1998). On some trials, participants are presented with white words, whereas on other trials, they are presented with words that are either colored yellow or blue. Participants are instructed to press a left or right key in response to the valence of the white words and in response to the color of the colored words. By assigning one key response to positive white words and the other response to negative white words, responses become extrinsically associated with positive or negative valence. For trials in which colored words are presented, participants have to give both the extrinsically positive response and the extrinsically negative response to each word, since each word is presented in both yellow and blue, thereby serving as its own control within the task (see De Houwer, 2003). Faster responses to a colored word when an extrinsically positive response is required compared to when an extrinsically negative response is required thus reflect a positive implicit attitude towards the presented colored word.

Materials. Based on the procedure by De Houwer (2003), on the white trials, five positive and five negative adjectives were presented. On the colored trials, we presented participants with their idiosyncratic scenario word, primarily to check that our hypothesized effect would be specific to the reality word. We assumed that participants in all three conditions would show a positive implicit attitude towards their alternative scenario. We presented participants with their idiosyncratic reality word in order to investigate differences in implicit attitudes towards the current reality between the three conditions. Further, we included a negative word (WAR), a positive word (FRIEND), and a neutral word (PHASE), in order to replicate standard EAST effects, that is, a negative implicit attitude towards negative words, a positive implicit attitude towards positive words, and no significantly positive or negative implicit attitude towards neutral words (De Houwer, 2003). Importantly,

we did not hypothesize any conditional differences in implicit attitudes towards the negative, positive, or neutral words. All words were capitalized and presented on a black background (see Appendix for all stimuli presented in Study 2).

Procedure. Participants were informed that words would be presented in the middle of the screen and that their task was to classify these words by pressing the good key (i.e., key P) or the bad key (i.e., key Q) depending on the meaning or the color of the words presented on the screen. If the word was white, the meaning of the word was important. Participants were asked to press the good key for white words with a positive meaning (e.g., HEALTHY) and to press the bad key for white words with a negative meaning (e.g., REPULSIVE). For the colored words, they were instructed to press the good or bad key depending on the color of the word. Half of the participants were instructed to press the good key in response to words colored in blue and the bad key in response to words colored in yellow. The other half of participants received the reversed color-response assignment. Participants were informed that if they made an incorrect response, a red cross would appear on the screen. Participants were asked to respond as quickly and accurately as possible.

The experiment started with a practice block of 20 trials, in which each of the ten white adjectives was presented twice. In a second practice block (20 trials), each of the target words was presented twice in yellow and twice in blue. The practice blocks were followed by 6 test blocks with 30 trials each, during which each of the target words was presented four times, twice in each color, and each white adjective was presented once. All stimuli were presented in random order. Each trial started with a white fixation cross for 500 ms and lasted until a response was given. The inter-trial interval was 1500 ms.[3]

[3] We assessed the same control variables as in Studies 1.2 – 1.6, before and after the experimental manipulation, in order to ensure that our experimental effects would hold beyond levels of these variables. Our experimental effect remained significant when we entered our control variables as covariates in the analysis, $p = .020$.

Results Study 2

Thought Frequency

Average frequency of thoughts about the positive counterfactual scenarios ranged from monthly to several times a month (M = 2.69, SD = 1.51), with no significant difference between the three conditions, p = .832.

Desirability and Expectations

The counterfactual scenarios were rated as desirable (M = 5.69, SD = 1.54), with no significant difference between the three conditions, p = .414. The desirability of the counterfactual scenarios correlated positively with the frequency of thoughts, $r(153) = .37$, $p < .001$, 95 % CI [0.26, 0.46], with people rating their scenario as highly desirable also reporting a high frequency of thoughts about it. Expectations of the counterfactual scenarios still coming true were low (M = 2.65, SD = 2.06), with no significant difference between the three conditions, p = .298.

Dependent Variable: Implicit Attitude Towards Current Reality

We analyzed the results of test trials on which colored words were presented. Reaction times below 300 ms and above 3000 ms were recoded to 300 ms and 3000 ms, respectively (De Houwer, 2003; Greenwald et al., 1998).[4] All latencies were log-transformed, including those from error data, since affective Simon effects often also emerge in error data (e.g., De Houwer & Eelen, 1998). We then calculated the mean log-transformed reaction times and error percentages separately for trials on which an extrinsically positive response was required and for trials on which an extrinsically negative response was required for each of the five target words. All relevant means are shown in Table 4.

Reaction times. We submitted the mean log-transformed reaction times to a 5

[4] Note that, upon visual inspection of the data, all reaction times ranged between 300 ms and 3000 ms, so that no recoding was necessary.

(stimulus: scenario vs. reality vs. negative (WAR) vs. positive (FRIEND) vs. neutral (PHASE)) x 2 (extrinsic response valence: positive vs. negative) x 2 (experimental half: first 90 trials vs. second 90 trials) ANOVA with repeated measures on all three variables and condition (mental contrasting vs. indulging vs. control) as fixed between-subject factor. There was a significant main effect of experimental half, $F(1, 151) = 80.92$, $p < .001$, $\eta^2 = .35$; reaction times tended to be faster in the second half of the experiment compared with the first half. The main effect of stimulus was also significant, $F(4, 604) = 6.07$, $p < .001$, $\eta^2 = .04$; with reaction times being faster for neutral and positive words compared with the idiosyncratic words. More importantly, there was a significant interaction between stimulus and extrinsic response valence, $F(4, 604) = 14.45$, $p < .001$, $\eta^2 = .09$, as well as a significant interaction between condition, stimulus, and extrinsic response valence, $F(8, 604) = 2.10$, $p = .034$, $\eta^2 = .03$. In order to follow up this interaction, we calculated EAST scores for each of the five stimuli separately, by deducting the mean log transformed reaction time on trials with an extrinsically positive response from the mean log-transformed reaction time on trials with an extrinsically negative response. A positive reaction time EAST score therefore indicates a positive implicit attitude. All effect size estimates *d* and 95 % confidence intervals for the reaction time EAST scores are based on the log-transformed data. For reasons of clarity, however, we report reaction time EAST scores based on the untransformed data.

A priori *t*-tests on the reaction time EAST scores revealed a marginally significant positive EAST score for the idiosyncratic scenario word, $M = 21.68$ ms, $t(153) = 1.93$, $p = .056$, 95 % CI [-0.0003, 0.02], $d = 0.16$, indicating a positive implicit attitude towards the counterfactual scenarios across conditions. There was a significantly negative EAST score for the idiosyncratic reality word, $M = -16.95$ ms, $t(153) = -2.15$, $p = .033$, 95 % CI [-0.02, -0.0009], $d = 0.17$, indicating a negative implicit attitude towards the current reality across

conditions. There was a significantly negative EAST score for the negative word (WAR), *M* = -41.80 ms, *t*(153) = -4.79, *p* < .001, 95 % CI [-0.03, -0.01], *d* = 0.39, and a significantly positive EAST score for the positive word (FRIEND), *M* = 28.77 ms, *t*(153) = 3.70, *p* < .001, 95 % CI [0.009, 0.03], *d* = 0.30. There was no significant EAST score for the neutral word (PHASE), *M* = 12.75 ms, *p* = .204.

We submitted the reaction time EAST scores to one-way ANOVAs with condition (mental contrasting vs. indulging vs. control) as fixed between-subject factor for each stimulus separately. As expected, there was no significant difference between the three conditions in reaction time EAST scores for the idiosyncratic scenario word, *p* = .263. All participants showed a positive implicit attitude towards their counterfactual scenario. There was, however, a significant effect of condition on the reaction time EAST scores for the idiosyncratic reality word, *F*(2, 151) = 3.82, p = .024, ω^2 = .04. *Post-hoc* comparisons using LSD revealed that participants in the mental contrasting condition showed more positive EAST scores for their idiosyncratic reality word (*M* = 21.00 ms), compared with participants in the indulging condition (*M* = -54.08 ms), *p* = .006, 95 % CI [0.01, 0.06], but not compared with participants in the control condition (*M* = -19.75 ms), *p* = .163, although the pattern trended in the expected direction. There was no significant difference between the indulging and control conditions, *p* = .153 (Figure 1).

Whereas reaction time EAST scores for the idiosyncratic reality word were not significantly different from zero in the mental contrasting condition, *t*(50) = 0.59, *p* = .560, they were significantly negative in the indulging condition, *t*(47) = -3.40, *p* = .001, 95 % CI [-0.05, -0.01], *d* = 0.49. In the control condition, the reaction time EAST scores for the idiosyncratic reality word trended in the negative direction, but did not reach significance, *t*(54) = -1.47, *p* = .147. Thus, whereas participants in the mental contrasting condition formed a neutral implicit attitude towards their current reality, which trended in the positive

direction, participants in the indulging condition formed a significantly negative implicit attitude towards their current reality. Participants in the control condition formed a neutral implicit attitude towards their current reality, which trended in the negative direction. There were no other differences between the three conditions regarding reaction time EAST scores for the negative, positive, or neutral words, all *p*s > .098.[5]

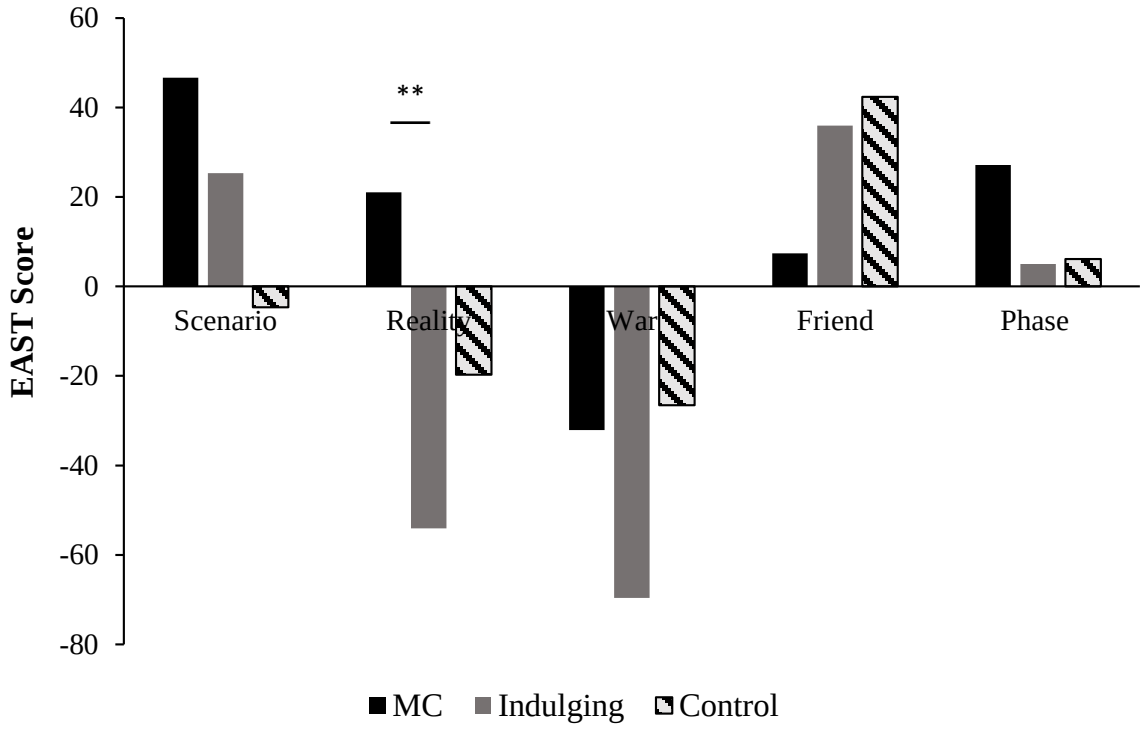

Figure 1. Study 2: Untransformed reaction time EAST scores for each stimulus in the mental contrasting, indulging, and control conditions. Positive EAST scores indicate a positive implicit attitude. ** $p < .01$. MC = Mental Contrasting.

Percentage errors. We submitted the percentage of errors to a 5 (stimulus: scenario vs. reality vs. negative vs. positive vs. neutral) x 2 (extrinsic response valence: positive vs. negative) x 2 (experimental half: first 90 trials vs. second 90 trials) ANOVA with repeated

[5] We also analyzed participants‘ idiosyncratic scenario and reality words using Linguistic Inquiry and Word Count (*LIWC*; Pennebaker, Francis, & Booth, 2001). There were no differences between the three conditions in positivity or negativity of either the idiosyncratic scenario words or the idiosyncratic reality words, all *p*s > .092. Our experimental effect on the reaction time EAST scores for the idiosyncratic reality word remained significant when we entered the positivity of the idiosyncratic reality words as covariate in the analysis, $p = .025$.

measures on all three variables and condition (mental contrasting vs. indulging vs. control) as fixed between-subject factor. There was a significant main effect of extrinsic response valence, $F(1, 151) = 3.93$, $p = .049$, $\eta^2 = .03$, with a higher percentage of errors on trials with an extrinsically positive response compared to those with an extrinsically negative response. There also was a significant interaction between stimulus and extrinsic response valence, $F(4, 604) = 16.72$, $p < .001$, $\eta^2 = .10$, but no significant interaction between condition, stimulus, and extrinsic response valence, $p = .945$. In order to follow up the interaction between stimulus and extrinsic response valence, we again calculated EAST scores for each of the five stimuli separately, by deducting the percentage of errors on trials with an extrinsically positive response from percentage of errors on trials with an extrinsically negative response. A positive error EAST score indicates a positive implicit attitude.

A priori *t*-tests on the error EAST scores revealed a significantly positive EAST score for the idiosyncratic scenario word, $M = 2.16$, $t(153) = 2.55$, $p = .012$, 95 % CI [0.49, 3.84], $d = 0.21$, indicating a positive implicit attitude towards the counterfactual scenarios across conditions. There was a significantly negative EAST score for the idiosyncratic reality word, $M = -2.33$, $t(153) = -2.61$, $p = .010$, 95 % CI [-4.09, -0.58], $d = 0.21$, indicating a negative implicit attitude towards the current reality across conditions. There was a significantly negative EAST score for the negative word, $M = -6.01$, $t(153) = -6.01$, $p < .001$, 95 % CI [-7.98, -4.03], $d = 0.48$, and a significantly positive EAST score for the positive word, $M = 2.60$, $t(153) = 3.08$, $p = .002$, 95 % CI [0.93, 4.26], $d = 0.25$. There was no significant EAST score for the neutral word, $M = -0.43$, $p = .561$. There were no significant differences between the three conditions in error EAST scores for any of the five stimuli, all *p*s > .617.

Discussion Study 2

In Study 2, we observed that mental contrasting (vs. indulging) led people to form a positive implicit attitude towards their current reality. The difference in implicit attitude

towards the current reality between participants in the mental contrasting and control conditions did not reach significance, although it trended in the expected direction. These results appeared for positive fantasies about counterfactual alternatives to life events that participants deemed uncontrollable at the time (see also Studies 1.2 and 1.3). Our findings stand in accordance with previous research that has assessed people's implicit attitudes towards idiosyncratic objects (e.g., Banse, 1999; De Houwer, 2003; Greenwald & Farnham, 2000; Wittleder et al., 2017). They also stand in accordance with research that has shown effects of specific contexts, such as interventions, on the formation of implicit attitudes (e.g., Blair, Ma, & Lenton, 2001; Dasgupta & Greenwald, 2001; Olson & Fazio, 2001; Rudman, Ashmore, & Gary, 2001).

In Study 2, participants who mentally contrasted did not show a significantly positive implicit attitude towards their current reality, although it trended in the positive direction. Further, mental contrasting participants did not show a significantly negative implicit attitude towards their counterfactual scenario. In fact, we did not expect that letting go of still wanting to attain the counterfactual past would lead to a negative implicit attitude towards the lost past. Similarly, in a study by Moore et al. (2011), disengagement from a goal did not lead to a significantly negative attitude towards that goal. We speculate that, with the help of mental contrasting, people should let go of wanting to attain their counterfactual past, while they can still show a positive attitude towards the counterfactual past (see also King & Raspin, 2004; King & Smith, 2004).

Related Approaches

Current reality as obstacle. The present study differs from previous studies on the effects of mental contrasting on implicit attitudes. First, in the studies by A. Kappes et al. (2013) and Wittleder et al. (2017), people who mentally contrasted a desired future with the obstacle of current reality (vs. reverse contrasted or dwelled) formed a positive attitude

towards the *obstacle* of current reality when this obstacle was difficult or impossible to overcome (expectations of attaining the desired future were low). Often, the obstacles were specific temptations (e.g., TV shows, procrastination) that stood in the way of successfully attaining personal health or achievement wishes (e.g., getting a desired grade in a given class). In contrast, in our study, people who mentally contrasted their desired counterfactual past with the obstacle of current reality (vs. indulged) formed a positive attitude towards their current reality *in general*. Similar to Study-set 1, the obstacles participants named were formidable and quite negative (e.g., "Time", "It's over"). Therefore, we did not expect a change in implicit attitudes towards those *obstacles*, but rather a change in implicit attitudes towards the current reality *in general*. Interestingly, the reality words participants named in the beginning of the experiment were never identical to the obstacles they later named during the mental contrasting procedure. Future studies should investigate whether mental contrasting of positive counterfactual fantasies also affects the implicit attitude towards the *obstacle* of current reality.

Secondly, A. Kappes et al. (2013) found that when the obstacle of current reality was difficult or impossible to overcome (expectations of attaining the desired future were low), mental contrasting weakened the meaning of current reality as an obstacle. In the present study, we did not assess the meaning of current reality as an obstacle. In the case of a lost counterfactual past, the obstacles might be so formidable and unsurmountable that mental contrasting does not weaken the meaning of current reality as an obstacle. Rather, mental contrasting might strengthen the meaning of current reality as an obstacle, leading people to realize that the counterfactual past is irrecoverably lost. Future studies should investigate whether mental contrasting of positive counterfactual fantasies affects the meaning of current reality as an obstacle.

Explicit vs. implicit attitudes. There is mixed evidence on the relation between

explicit and implicit measures of attitudes. For socially controversial objects, such as prejudice and stereotypes, correlations between explicit and implicit measures are oftentimes low (e.g., Dovidio, Kawakami, & Gaertner, 2002; Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997; Fazio, Jackson, Dunton, & Williams, 1995; Rudman & Kilianski, 2000). For socially noncontroversial objects, however, correlations might be higher (see Nosek, 2005). Whereas explicit attitude measures, such as questionnaires or feeling thermometers, are often subject to response bias caused by social desirability concerns (Fazio & Olson, 2003), implicit measures circumvent this bias, since they measure attitudes which people do not intentionally control or for which they might even lack awareness (Bargh, 1992; De Houwer, 2002; Greenwald & Banaji, 1995).

Some authors have suggested that explicit and implicit attitudes might not reflect dichotomous processes, but that their expression might merely rely on different measurement methods (Bargh, 1992; Fazio, 1990). According to the MODE model (Fazio, 1990), people either consciously deliberate or spontaneously generate attitudes towards a specific object, depending on the opportunity (e.g., time), and on the motivation (e.g., concern about a later evaluation) to consider consequences of their attitude expression. In contrast, dual process theories (e.g., Greenwald & Banaji, 1995; Greenwald & Farnham, 2000) argue that explicit and implicit attitudes reflect distinct cognitive processes, which might be related or unrelated depending on intrapersonal and interpersonal factors (e.g., Nosek, 2005). Such view gets support from neuropsychological evidence, which has shown distinct neural underpinnings of explicit and implicit attitudes (e.g., Cunningham et al., 2004; Phelps et al., 2000).

In the present study, we assessed participants' implicit attitudes towards their current reality, assuming that during the task, participants did not actively or intentionally consider their attitudes (see also Fazio et al., 1986). However, it could also be that participants were

aware of their attitudes towards their current reality during the task. Future studies might include explicit and implicit attitude measures in order to more thoroughly examine the nature of attitude change that is instigated by mental contrasting.

IAT vs. EAST. In the present study, we assessed participants' implicit attitudes using the EAST, which has been developed as a variant of the IAT (De Houwer, 2003). The IAT relies on a comparison of performance in two separate tasks. Therefore, it sometimes suffers from task-set switching costs that can be higher in incompatible (vs. compatible) task sets. Specifically, participants might use task recoding strategies that facilitate performance on the compatible task set (e.g., Mierke & Klauer, 2001; see also De Houwer, 2003). In contrast, the EAST measures associations within a single task, comparing performance on compatible with incompatible trials. Thus, the EAST might be less susceptible to task recoding strategies.

Further, the IAT provides a *relative* measure of implicit attitudes towards target objects, which is highly dependent on the choice of object pairs (Brendl, Markman, & Messner, 2001; De Houwer, 2002; Greenwald & Nosek, 2001). Specifically, in the context of the present research, we could have chosen participants' idiosyncratic reality- and scenario words as pair of attitude objects in an IAT. Participants' performance on the IAT might have been better when, for example, the idiosyncratic reality word and positive words were assigned to the first key, and the idiosyncratic scenario word and negative words were assigned to the second key, compared with the reverse assignment. This could indicate that participants form a positive implicit attitude towards their current reality and a negative implicit attitude towards their counterfactual scenario. However, it could also indicate that participants form a negative implicit attitude towards both their current reality and their counterfactual scenario, but that the implicit attitude towards their current reality is just less negative. Therefore, the IAT does not allow one to make inferences about the implicit

attitude towards one particular target object. In contrast, the EAST offers the possibility to assess implicit attitudes towards multiple objects within the same task. In the present research, we could simultaneously assess participants' implicit attitudes towards both: Their current reality and their counterfactual scenario.

The findings obtained by our EAST should, however, be interpreted with some caution. Some studies have successfully used the EAST to assess implicit attitudes towards various objects, such as alcohol in heavy drinkers (De Houwer, Crombez, Koster, & De Beul, 2004; De Houwer & De Bruycker, 2007a), self-esteem in depressed patients (De Raedt, Schacht, Franck, & De Houwer, 2006), and spiders in participants with fear of spiders (Huijding & de Jong, 2006). There is, however, mixed evidence regarding the consistency and reliability of EAST scores (De Houwer, 2003; De Houwer & De Bruycker, 2007b; Teige, Schnabel, Banse, & Asendorpf, 2004). Similarly, both the split-half reliabilities of the obtained EAST scores, as well as consistencies between reaction time and error EAST scores were low in the present study (all α's $< .45$). A replication of the obtained effect using more robust implicit measures, such as the IAT or a semantic priming procedure, might provide a clearer picture of the effect of mental contrasting of positive counterfactual fantasies on people's implicit attitude towards their current reality.

Implicit attitudes and behavior. Whereas explicit attitudes predict deliberative, controlled behaviors, implicit attitudes predict spontaneous, non-verbal behaviors that are hard to monitor and difficult to control (Ajzen, 1991; Dijksterhuis, Aarts, Bargh, & van Knippenberg, 2000; Dovidio et al., 2002; Dovidio et al., 1997; Fazio et al., 1995; Fazio et al., 1986; Greenwald & Farnham, 2000; LaPiere, 1934; McConnell & Leibold, 2001). In this vein, positive implicit attitudes towards a goal result in approach behavior and goal pursuit (e.g., Ferguson, 2007; Ferguson & Bargh, 2004; Ferguson et al., 2008).

To our knowledge, it has not yet been tested how disengagement from a goal affects

implicit attitudes towards other, alternative goals, and how this attitude change affects behavior. The present study provides preliminary evidence that by letting go of the counterfactual past, people who mentally contrast (vs. indulge) form a positive implicit attitude towards their current reality. This positive implicit attitude might, in turn, lead people who mentally contrast to approach their current reality. Future studies should shed light on this hypothesis.

Conclusion Study 2

In Study 2, mental contrasting (vs. indulging) led people to form a positive implicit attitude towards their current reality. Study 2 thus provides preliminary evidence that mental contrasting of positive counterfactual fantasies, similar to mental contrasting of positive future fantasies, instigates changes in implicit cognition. In Study-set 3, we wanted to build on those findings and investigate whether mental contrasting of positive counterfactual fantasies, similar to mental contrasting of positive future fantasies, instigates changes in motivation. Specifically, we aimed to investigate whether mental contrasting of positive counterfactual fantasies affects people's levels of energization regarding their present life.

Study-set 3: Letting go of the Counterfactual Past: Feeling Energized Regarding Present Life

In Study-set 3, we investigated the effect of mental contrasting on people's levels of energization regarding their present life. Mental contrasting produces behavior change that is based on motivational mechanisms (review by Oettingen, 2012). Specifically, mental contrasting instigates changes in energization in line with the obstacle of current reality. Those changes in energization mediate behavior change.

Mental Contrasting Instigates Changes in Energization

Energization is a concept with a long tradition in motivational psychology. According to Hull (1943), variations in people's behavior can be explained by two variables: direction

and intensity. Whereas direction determines whether people approach positive outcomes or avoid negative outcomes (Atkinson, 1957; Elliot, 2006; McClelland, 1985), intensity describes the force with which people approach or avoid certain outcomes. The intensity of behavior is thereby determined by the mobilization of energy. Derived from Cannon's (1915) concept of energy mobilization, energization has been defined as "the extent to which the organism as a whole is activated or aroused" (Duffy, 1934, p. 194). Energization can be caused not only by bodily need states (e.g., hunger; Hull, 1943), but also by novel stimuli, stimuli that prime action mindsets (e.g., Gendolla & Silvestrini, 2010), or simply by anticipating upcoming challenges (e.g., Contrada, Wright, & Glass, 1984). Energization has been assessed both by physiological measures (Duffy, 1934; Wright, 1996; Wright & Kirby, 2001; Wright, Murray, Storey, & Williams, 1997) and by self-report measures (*activity incitement*; Brunstein & Gollwitzer, 1996; *feelings of energization*; Oettingen et al., 2009, Study 2; *feelings of energy and vigor*; Thayer, 1978). Research has thereby found strong relations between physiological measures and self-report measures, such as subjective feelings of energization (Blascovich, 1990; Contrada et al., 1984).

Energization is a variable that fosters goal commitment (Locke & Latham, 1990; Locke, Latham, & Erez, 1988). In this vein, energization is a key variable affected by mental contrasting (Sevincer & Oettingen, 2015; review by Oettingen, 2012). Specifically, when the obstacle of current reality is difficult or impossible to overcome (expectations of attaining the desired future are low), mental contrasting of positive fantasies about a desired future lowers people's mobilization of energy regarding the desired future, so that people can invest their energy in other, more promising endeavors (Oettingen et al., 2009; Sevincer, Busatta, & Oettingen, 2014). Extrapolating those findings to positive fantasies about a desired counterfactual past, mental contrasting, by reducing the energy to attain the positive counterfactual past, should lead people to feel energized regarding their present life.

In two experimental studies, participants were induced to mentally contrast their positive counterfactual fantasies with their current reality, to indulge in their positive counterfactual fantasies, or to elaborate on irrelevant content. We investigated the effect of mental contrasting on participants' subjective feelings of energization regarding their present life.

Study 3.1: Feeling Energized: Mental Contrasting vs. Indulging

Study 3.1 examined the effect of mental contrasting on people's levels of energization regarding their present life. Identical to Study 1.1, participants were asked to name a positive alternative scenario they frequently think of. They were then asked to either positively fantasize about the counterfactual scenario (indulging condition), or to mentally contrast their positive fantasies about the counterfactual scenario with the obstacle of current reality standing in the way of their counterfactual scenario coming true (mental contrasting condition). As dependent variable, we measured participants' subjective feelings of energization regarding their present life.

We hypothesized that people who mentally contrast (vs. indulge) their positive counterfactual fantasies with their current reality should feel energized regarding their present life.

Method Study 3.1

Power Analysis

We based our power analysis on the assumption that the experimental manipulation should exert a medium effect ($f = 0.30$, $d = 0.60$). We applied this effect size to an a priori power analysis for two groups within an ANOVA. The power analysis indicated that approximately 148 participants would be needed to achieve 95 % power ($1 - \beta$) at a .05 alpha level ($\alpha = .05$). In Study 3.1, we recruited 166 participants.

Participants

One hundred sixty-six participants (112 females) completed the experiment online via Amazon's Mechanical Turk (MTurk). Participants were aged 18–68 years (M_{age} = 36.34, SD_{age} = 12.38). They were randomly assigned to either a mental contrasting condition (n = 77) or an indulging condition (n = 89). All participants were told that they would take part in a survey about how people think about the past. Further, all participants completed informed consent to participate in the study.

Procedure and Materials

Mental exercise. All participants were asked to name a positive alternative scenario of which they thought that it would have made their life much better. Participants named, for example, "If only I had stayed in Colorado", or "If only I had gotten accepted to college". Participants in the indulging condition were asked to name and elaborate on two positive aspects they associated with the alternative scenario (e.g., "Happiness and love", "More opportunities"). Participants in the mental contrasting condition first named and elaborated on a positive aspect of their alternative scenario and thereafter named and elaborated on the main obstacle standing in the way of their alternative scenario coming true. Participants named, for example, "My current life", or "It's too late".

Feeling energized. To obtain a measure of participants' subjective feelings of energization, we asked them after the mental exercise to indicate their levels of agreement to four statements: "Regarding your present life, how *active*/*energized*/*enthusiastic*/*motivated* do you feel?" (see also Oettingen et al., 2009, Study 2). All Likert-scales ranged from 1 (*not at all*) to 7 (*extremely*). High scores indicate strong feelings of energization regarding the present life. We observed a high reliability of the energization scale (α = .95).[6]

[6] In Studies 3.1 and 3.2, we also assessed the four energization items at baseline, to ensure that our groups did not differ in levels of energization before the mental exercise, all *p*s > .317 (internal consistencies: Study 3.1: α = .95; Study 3.2: α = .93). Further, we assessed the same control variables as in Study-set 1 before the experimental

Results Study 3.1

Thought Frequency

Average frequency of thoughts about the positive counterfactual scenarios ranged from several times a month to weekly (M = 3.65, SD = 1.89), with no significant difference between the mental contrasting and indulging conditions, p = .613.

Desirability and Expectations

The counterfactual scenarios were rated as desirable (M = 5.86, SD = 1.38), with no significant difference between the mental contrasting and indulging conditions, p = .947. Desirability of the counterfactual scenarios correlated positively with thought frequency, $r(165) = .17$, p = .034, 95 % CI [0.002, 0.36], with people rating their scenario as highly desirable also reporting a high frequency of thoughts about it. On average, expectations of the counterfactual scenarios still coming true were low to moderate (M = 3.36, SD = 2.26), with no significant difference between the mental contrasting and indulging conditions, p = .098.

In order to rule out a change in expectations caused by mental contrasting, we measured expectations a second time, directly after the mental exercise. There was no significant change in expectations across conditions from before the mental exercise (M = 3.36, SD = 2.26) to after the mental exercise (M = 3.42, SD = 2.17), p = .647. In addition, after the mental exercise, there was no significant difference in expectations between the mental contrasting and indulging conditions, p = .455 (for similar results see Oettingen et al., 2001).

Dependent Variable: Feeling Energized

We submitted feelings of energization to a one-way ANOVA with condition (mental

---

manipulation, in order to ensure that our experimental effects would hold beyond baseline levels of these variables. Our experimental effects remained significant (Study 3.1, p = .030; Study 3.2, p = .033), when we entered our control variables as covariates in the analysis.

contrasting vs. indulging) as fixed between-subject factor. There was a significant effect of condition, $F(1, 164) = 3.99$, $p = .047$, $\omega^2 = .02$. Participants in the mental contrasting condition felt more energized regarding their present life ($M = 4.09$, $SD = 1.60$) compared with participants in the indulging condition ($M = 3.57$, $SD = 1.77$), 95 % CI [0.01, 1.05].

Since we measured participants' feelings of energization at two time points, before and after the mental exercise, we submitted feelings of energization to a mixed ANOVA with condition (mental contrasting vs. indulging) as between-subject factor and time (before vs. after the mental exercise) as within-subject factor. There was a marginally significant condition by time interaction, $F(1, 164) = 3.56$, $p = .061$, $\eta^2 = .02$. To follow up this interaction, we computed a change score of feelings of energization, by deducting participants' baseline feelings of energization from their feelings of energization after the mental exercise. Positive scores indicate an increase in feelings of energization. We investigated the changes in feelings of energization for the mental contrasting and indulging conditions separately. For participants in the mental contrasting condition, there was no significant change in feelings of energization from before to after the mental exercise ($M_{change} = 0.03$, $SD_{change} = 0.96$), $p = .767$. For participants in the indulging condition, there was a significant decrease in feelings of energization from before to after the mental exercise ($M_{change} = -0.25$, $SD_{change} = 0.95$), $t(88) = -2.46$, $p = .016$, 95 % CI [-0.45, -0.05], $d = 0.26$. Indulging in their counterfactual scenarios thus led people to feel less energized regarding their present life (Figure 2).

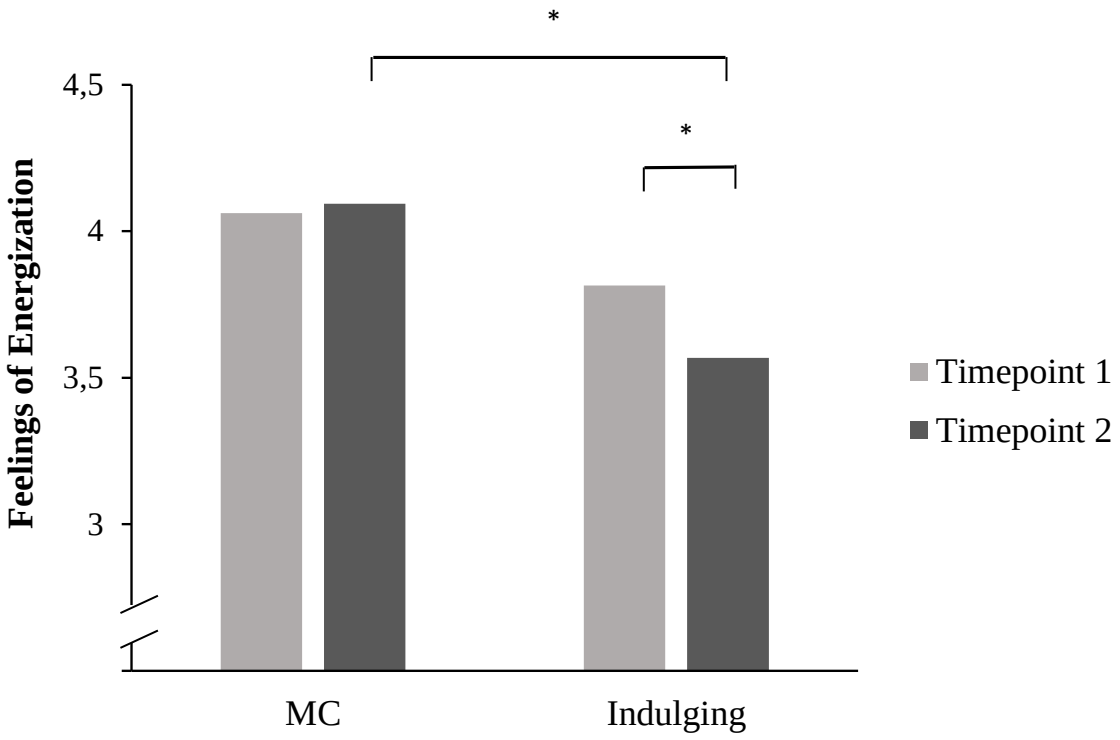

Figure 2. Study 3.1: Feelings of energization regarding present life as a function of condition and time. Feelings of energization are depicted before the mental exercise (Timepoint 1) and after the mental exercise (Timepoint 2). * $p < .05$. MC = Mental Contrasting.

Discussion Study 3.1

Participants who mentally contrasted their positive counterfactual fantasies with the obstacle of current reality felt more energized regarding their present life compared with participants who indulged in their positive counterfactual fantasies. Those results speak to the fact that mental contrasting (vs. indulging) led people to let go of their counterfactual past and to free up their resources in order to feel energized in the here and now. In contrast, for participants in the indulging condition, commitment to the counterfactual past should be unchanged and should therefore inhibit feelings of energization regarding the present life (see also Huang & Bargh, 2014; Kruglanski et al., 2002).

In Study 3.1, participants who indulged in their counterfactual fantasies felt thereafter less energized regarding their present life. Those findings are in accordance with previous research on the de-energizing effects of positive fantasies (H. B. Kappes & Oettingen, 2011).

In fact, H. B. Kappes and Oettingen (2011) observed decreases in levels of energization measured by systolic blood pressure (SBP; Study 1 & 2) and by self-report (Study 3 & 4) for participants who engaged in positive fantasies about successfully attaining a future wish.

In the present study, we did not observe a significant increase in feelings of energization for participants in the mental contrasting condition. Rather, their levels of energization remained stable from before to after the mental exercise. Previous studies, however, have found increases in levels of energization caused by mental contrasting (Sevincer et al., 2014). Similarly, we assumed that by letting go of the counterfactual past, mental contrasting participants should mobilize energy for endeavors in their present life, leading to an increase in feelings of energization regarding their present life (Oettingen et al., 2009; review by Oettingen, 2012).

In Study 3.2, we aimed to replicate our findings and to compare levels of energization for mental contrasting and indulging participants with those for participants in a control condition. In the control condition, participants named a positive counterfactual scenario, but elaborated on irrelevant content.

Study 3.2: Feeling Energized: Mental Contrasting vs. Indulging, Control

In Study 3.2, participants were asked to name a positive counterfactual scenario they frequently think of. They were then asked to either positively fantasize about their counterfactual scenario, to mentally contrast their positive fantasies about the counterfactual scenario, or to elaborate on irrelevant content (control condition). As dependent variable, we measured participants' subjective feelings of energization regarding their present life.

We hypothesized that people who mentally contrast (vs. indulge or elaborate on irrelevant content) should feel energized regarding their present life.

Method Study 3.2

Power Analysis

We based our power analysis on the assumption that the experimental manipulation should exert a medium effect ($f = 0.30$, $d = 0.60$). We applied this effect size to an a priori power analysis for three groups within an ANOVA. The power analysis indicated that approximately 177 participants would be needed to achieve 95 % power ($1 - \beta$) at a .05 alpha level ($\alpha = .05$). In Study 3.2, we recruited 183 participants.

Participants

One hundred eighty-three participants (123 females) completed the study online via Amazon's Mechanical Turk (MTurk). Participants were aged 18–73 years ($M_{age} = 35.96$, $SD_{age} = 12.27$) and were randomly assigned to either a mental contrasting condition ($n = 57$), an indulging condition ($n = 58$), or a control condition ($n = 68$). All participants were told that they would take part in a survey about how people think about the past. Further, all participants completed informed consent to participate in the study.

Procedure and Materials

Mental exercise. Instructions of the mental exercise were those described in Study 3.1. Participants were asked to name a positive alternative scenario of which they think that it would have made their life much better. Participants named, for example, "If only I had finished school", or "If only I had become a mother". Participants in the indulging condition were asked to name and elaborate on two positive aspects they associated with the alternative scenario (e.g., "More money", "Love"). Participants in the mental contrasting condition first named and elaborated on a positive aspect of their alternative scenario and thereafter named and elaborated on the main obstacle standing in the way of their alternative scenario coming true (e.g., "My debt", "No time"). Participants in the control condition named a positive alternative scenario and then were asked to elaborate on how a regular

Saturday morning runs off.

Feeling energized. Like in Study 3.1, we asked participants after the mental exercise to indicate their levels of agreement to four statements: "Regarding your present life, how *active*/*energized*/*enthusiastic*/*motivated* do you feel?" All Likert-scales ranged from 1 (*not at all*) to 7 (*extremely*). High scores indicate strong feelings of energization regarding the present life. We observed a high reliability of the energization scale ($\alpha = .95$).

Results Study 3.2

Thought Frequency

Average frequency of thoughts about the positive counterfactual scenarios ranged from several times a month to weekly ($M = 3.42$, $SD = 1.80$), with no significant difference between the three conditions, $p = .074$.

Desirability and Expectations

The counterfactual scenarios were rated as desirable ($M = 5.47$, $SD = 1.62$), with no significant difference between the three conditions, $p = .752$. Desirability of the counterfactual scenarios correlated positively with thought frequency, $r(183) = .34$, $p < .001$, 95 % CI [0.22, 0.46], with people rating their scenario as highly desirable also reporting a high frequency of thoughts about it. On average, expectations of the counterfactual scenarios still coming true were low ($M = 2.98$, $SD = 2.01$), with no significant difference between the three conditions, $p = .506$.

Dependent Variable: Feeling Energized

We submitted feelings of energization to a one-way ANOVA with condition (mental contrasting vs. indulging vs. control) as fixed between-subject factor. There was a significant effect of condition, $F(2, 180) = 3.76$, $p = .025$, $\omega^2 = .03$. *Post-hoc* comparisons using LSD revealed that participants in the mental contrasting condition felt more energized regarding their present life ($M = 4.42$, $SD = 1.62$) compared with participants in the indulging

condition (*M* = 3.69, *SD* = 1.41), *p* = .010, 95 % CI [0.18, 1.30], and compared with participants in the control condition (M = 3.84, SD = 1.53), *p* = .035, 95 % CI [0.04, 1.12]. There was no significant difference in feelings of energization between the indulging and control conditions, *p* = .566.

Like in Study 3.1, we submitted feelings of energization to a mixed ANOVA with condition (mental contrasting vs. indulging vs. control) as between-subject factor and time (before vs. after the mental exercise) as within-subject factor. There was a significant condition by time interaction, $F(2, 180) = 5.00$, $p = .008$, $\eta^2 = .05$. To follow up this interaction, we computed a change score of feelings of energization, by deducting participants' baseline feelings of energization from their feelings of energization after the mental exercise. Positive scores indicate an increase in feelings of energization. In order to follow up the changes in feelings of energization from before to after the mental exercise, we investigated them for the three conditions separately. For participants in the mental contrasting condition, there was a significant increase in feelings of energization from before to after the mental exercise ($M_{change} = 0.32$, $SD_{change} = 1.15$), $t(56) = 2.07$, $p = .043$, 95 % CI [0.01, 0.62], $d = 0.27$, indicating that mental contrasting led people to feel more energized regarding their present life. For participants in the indulging condition, there was a significant decrease in feelings of energization from before to after the mental exercise ($M_{change} = -0.33$, $SD_{change} = 1.05$), $t(57) = -2.37$, $p = .021$, 95 % CI [-0.60, -0.05], $d = 0.31$, indicating that indulging led people to feel less energized regarding their present life. For participants in the control condition, there was no significant change in feelings of energization from before to after the mental exercise ($M_{change} = 0.12$, $SD_{change} = 1.15$), $p = .402$ (Figure 3).

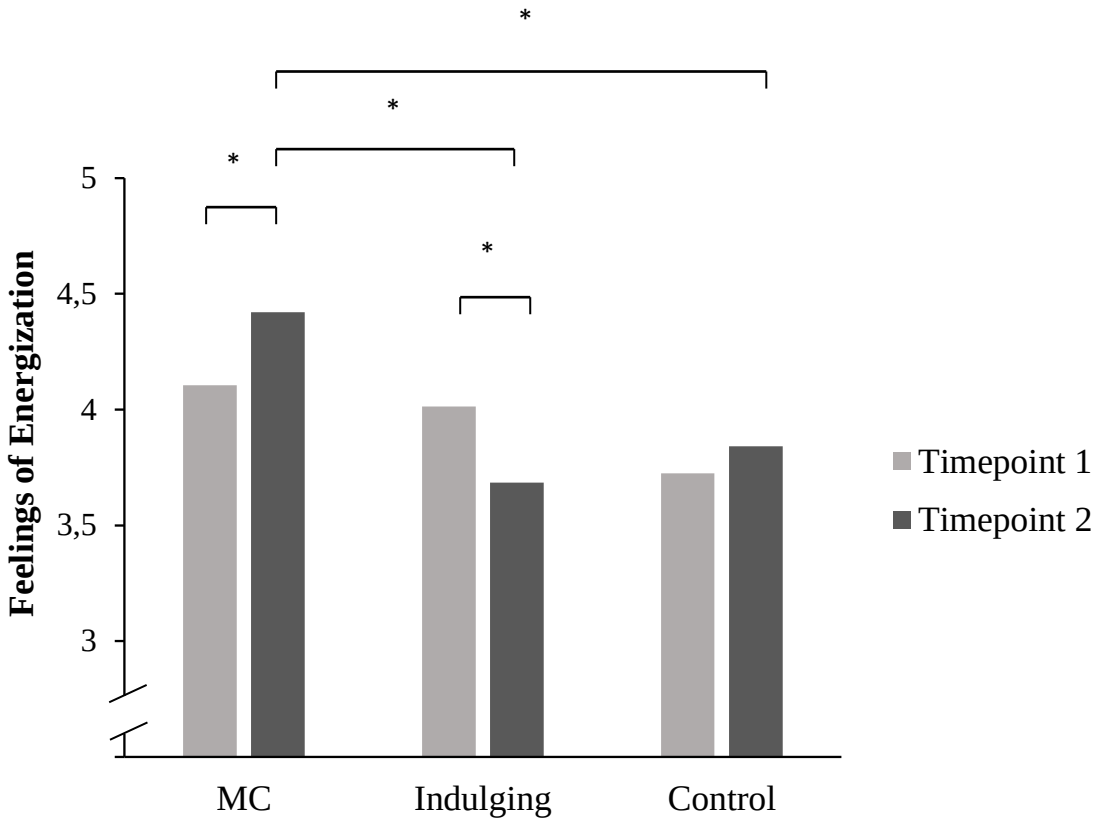

Figure 3. Study 3.2: Feelings of energization regarding present life as a function of condition and time. Feelings of energization are depicted before the mental exercise (Timepoint 1) and after the mental exercise (Timepoint 2). * $p < .05$. MC = Mental Contrasting.

Discussion Study 3.2

In Study 3.2, we could replicate the findings of Study 3.1, showing that participants who mentally contrasted their counterfactual fantasies with their current reality felt more energized regarding their present life compared with participants who indulged in their counterfactual fantasies and compared with participants who elaborated on irrelevant content. Those results speak to the fact that mental contrasting (vs. indulging or control) led people to let go of their counterfactual past and to free up their resources in order to invest their energy in their present life. Further, mental contrasting increased participants' feelings of energization (see Oettingen et al., 2009), whereas indulging decreased participants' feelings of energization (see H. B. Kappes & Oettingen, 2011). There was no significant change in feelings of energization for participants who elaborated on irrelevant content.

Discussion Study-set 3

Across two studies, we observed that mental contrasting led people to feel energized regarding their present life. These results appeared compared with relevant control conditions, in which participants either indulged in their positive counterfactual fantasies, or elaborated on irrelevant content. In line with previous research, we showed that whereas mental contrasting increased participants' feelings of energization regarding their present life, indulging in positive fantasies about the desired counterfactual past decreased participants' feelings of energization regarding their present life (H. B. Kappes & Oettingen, 2011; Oettingen et al., 2009).

In Study-set 3, we investigated mental contrasting effects on participants' subjective feelings of energization. A multitude of studies has assessed energization using physiological indicators (e.g., Oettingen et al., 2009; Wright, 1996; Wright & Kirby, 2001). Future studies should investigate whether mental contrasting of positive counterfactual fantasies increases people's levels of energization regarding their present life, assessed by physiological indicators (e.g., *systolic blood pressure* SBP; e.g., Sevincer et al., 2014). This might be especially important since physiological indicators and self-report indicators of energization do not always yield high correlations (Fairclough & Venables, 2006).

Related Approaches

Positive fantasies and energization. Positive fantasies about a desired future have been shown to be detrimental for effort and performance towards attaining the desired future (Oettingen & Mayer, 2002). Specifically, positive fantasies lead people to mentally enjoy the desired future in the here and now and thereby demobilize the energy that would be needed to attain the desired future (H. B. Kappes & Oettingen, 2011; Oettingen, Mayer, & Portnow, 2016). In the present research, we investigated positive fantasies about a desired counterfactual past. Similar to positive fantasies about a desired future, positive fantasies

about a desired counterfactual past should demobilize energy.

Since energization has been conceptualized by Hull (1943, 1952) as an unspecific activation or arousal state that indiscriminately facilitates behavior, positive fantasies about a desired counterfactual past should indiscriminately demobilize energy. That is, when subsequent opportunities to restore the desired counterfactual past exist, positive counterfactual fantasies should demobilize the energy needed to restore the desired counterfactual past (see also Markman & McMullen, 2003, 2005, 2007; McMullen, 1997; Markman et al., 2008). In contrast, when subsequent opportunities to restore the desired counterfactual past are absent, positive counterfactual fantasies should demobilize the energy to engage in other endeavors. Future studies should shed light on these hypotheses.

Motivational intensity theory. Motivational intensity theory (Brehm & Self, 1989) specifies the variables that predict motivational intensity, that is, the effort with which people perform a given task. The theory states that the effort that people invest in a task is proportional to the task demand, as long as success is possible and justified. The maximum amount of effort people exert is thereby limited by the importance of success (i.e., the incentive of completing the task). When task demand exceeds the amount of effort that people are willing to invest, people lower their effort investment. Therefore, people's effort investment is guided by an energy conservation principle (Brehm & Self, 1989; Silvestrini & Gendolla, 2013; Wright, 1996). The finding that mental contrasting leads to energization in line with the obstacle of current reality stands in accordance with motivational intensity theory. Specifically, people who mentally contrast their desired counterfactual past with the obstacle of current reality acknowledge that the obstacle of current reality is difficult or impossible to overcome (expectations of attaining the desired counterfactual past are low) and, in turn, let go of their desired counterfactual past. In line with the energy conservation principle, people now are free to invest their energy in other endeavors in their present life.

Importantly, research on mental contrasting extends findings from motivational intensity theory in that it proposes that mental processes differentially predict energy mobilization. Specifically, whereas people who mentally contrast let go of their counterfactual past and thereby conserve their energy for their present life, people who indulge in their fantasies about their counterfactual past do not conserve their energy for their present life and thus violate the principle of energy conservation. Further, motivational intensity theory focuses on *behavioral tasks in the present*, for which people can either invest or conserve their energy. In contrast, our research focuses on *lost opportunities in the past*, for which people cannot behaviorally invest their energy. Assuming that energization is strongly associated with commitment (e.g., Locke & Latham, 1990), this commitment to lost opportunities in the past should still prevent people from investing energy in their present life (see also Huang & Bargh, 2014; Kruglanski et al., 2002).

Biopsychosocial model of arousal. The biopsychosocial model of arousal (Blascovich & Tomaka, 1996) posits that people's physiological levels of energization regarding an upcoming task differ depending on how people appraise this upcoming task. When they appraise the upcoming task as a challenge and thus expect that they are able to cope with the task, they mobilize energy. In contrast, when they appraise the upcoming task as a threat and thus expect they are not able to cope with the task, they demobilize energy. The finding that mental contrasting leads to energization in line with the obstacle of current reality stands in accordance with the biopsychosocial model of arousal. Specifically, people who mentally contrast their desired counterfactual past with the obstacle of current reality let go of their counterfactual past when they realize that they are not able to overcome the obstacle of current reality. They are now free to mobilize energy for other challenges that arise in their present life.

Conclusion Study-set 3

In two experimental studies, mental contrasting (vs. indulging or control) led people to feel energized regarding their present life. Study-set 3 thus provides preliminary evidence that mental contrasting of positive counterfactual fantasies, similar to mental contrasting of positive future fantasies, instigates changes in motivation (i.e., energization). In Study-set 4, we wanted to build on those findings and investigate whether mental contrasting of positive counterfactual fantasies, similar to mental contrasting of positive future fantasies, instigates behavior change. Specifically, we aimed to investigate whether mental contrasting of positive counterfactual fantasies affects people's actual engagement in their present life.

Study-set 4: Letting go of the Counterfactual Past: Engagement in Present Life

In Study-set 4, we investigated the effect of mental contrasting on people's engagement in their present life. Because letting go of the counterfactual past should liberate people to actively engage in other endeavors, in Study-set 4 we investigated whether mental contrasting of positive counterfactual fantasies would help people to actively engage in their present life.

Related Model: Reflective Upward Counterfactuals and Performance

Positive counterfactual fantasies seem at first glance similar to reflective upward counterfactuals (*"as if" thinking*; Markman & McMullen, 2003, 2005, 2007). Markman et al. (2008) investigated the effects of reflective upward counterfactuals (mental simulations of the successful attainment of a desired counterfactual past) and evaluative upward counterfactuals (evaluations of the desired counterfactual past when compared to the current reality) on effort and performance. Reflective upward counterfactuals led to complacency, and thereby decreased effort and performance. Evaluative upward counterfactuals led to affective contrast, and thereby increased effort and performance.

The present research differs from Markman et al. (2008) theory and studies: First, Markman et al. (2008) asked participants to generate reflective upward counterfactuals in a laboratory setting, in which they anticipated a subsequent opportunity to restore the desired counterfactual past. Accordingly, Markman et al. (2008) assessed participants' effort and performance towards restoring the desired counterfactual past. In contrast, we asked participants to generate positive counterfactual fantasies in an everyday life setting, in which they did not anticipate a subsequent opportunity to restore the desired counterfactual past (see also Beike et al., 2009). Accordingly, we aimed to assess participants' effort and performance towards engaging in alternative tasks in their present life.

Secondly, Markman et al. (2008) view counterfactuals from a within person comparison perspective. They argue that counterfactuals are comparative thoughts that might either occur in a reflective or evaluative mode. Those modes, in turn, differentially predict effort and performance. In contrast, we view counterfactuals from a goal perspective. We argue that being committed to a lost counterfactual past might resemble being committed to an unattainable goal. Being committed vs. letting go of a lost counterfactual past should differentially predict effort and performance.

Thirdly, Markman et al. (2008) state that the effects of positive counterfactuals on effort and performance are based on evaluative and comparative processes. That is, people evaluate and compare the desired counterfactual past with their current reality, which, in turn, leads to effort and performance towards restoring the desired counterfactual past. Markman et al. (2008) propose that this effect is mediated by affective states. In contrast, the effects of mental contrasting on effort and performance are based on imagery, rather than on evaluative or comparative processes. Only when people vividly imagine both the desired counterfactual past, and the *obstacle* of current reality that stands in the way of attaining the desired counterfactual past, mental contrasting should lead to changes in effort and

performance (see also Oettingen et al., 2001). Further, mental contrasting effects are not mediated by affective states, but rather by cognitive and motivational processes. By understanding the hopeless situation of getting the counterfactual past back, people who mentally contrast let go of wanting to attain the counterfactual past. Building on these findings, we investigated whether mental contrasting propels people right back into their present life.

In three experimental studies, participants were induced to mentally contrast their positive counterfactual fantasies with their current reality, to indulge in their positive counterfactual fantasies, or to elaborate on irrelevant content. We investigated the effect of mental contrasting on participants' engagement in their present life. We operationalized engagement by successful performance in the interpersonal domain (Study 4.1), the professional domain (Study 4.2), and the academic domain (Study 4.3).

Study 4.1: Interpersonal Engagement

Study 4.1 examined the effect of mental contrasting on participants' performance in their present interpersonal life. Participants were asked to name a positive alternative scenario regarding their interpersonal life, which was defined as a better alternative to a negative event caused by another person. They were then asked to positively fantasize about the counterfactual scenario (indulging condition) or to mentally contrast their positive fantasies about the counterfactual scenario with the obstacle of current reality standing in the way of their counterfactual scenario coming true (mental contrasting condition).

In order to measure participants' engagement, we presented them with a second task, unrelated to the topic of the previous mental exercise. Specifically, after the mental exercise, we asked participants to write an authentic get-well letter to a close friend. We assessed the quality of participants' get-well letters by letting both the participants and two independent raters evaluate the quality of the letters. The raters focused on the quality of the letters'

contents, language, and on the empathy displayed by participants. We also assessed an objective measure of quality of the get-well letters. Since we asked participants to write an authentic get-well letter, another measure of quality of performance was authenticity. In order to assess how authentic participants' get-well letters were, we analyzed the language of the get-well letters using Linguistic Inquiry and Word Count (*LIWC*; Pennebaker et al., 2001).

We hypothesized that participants who mentally contrast (vs. indulge) their positive counterfactual fantasies with their current reality should more successfully perform the interpersonal task: They should write a high quality, authentic get-well letter to their friend.

Method Study 4.1

Power Analysis

We based our power analysis on the assumption that the experimental manipulation should exert a medium effect ($f = 0.30$, $d = 0.60$). We applied this effect size to an a priori power analysis for two groups within an ANOVA. The power analysis indicated that approximately 120 participants would be needed to achieve 90 % power (1 - β) at a .05 alpha level ($\alpha = .05$). In Study 4.1, we recruited 140 participants.

Participants

One hundred forty participants (90 females) completed the experiment online via Amazon's Mechanical Turk (MTurk). Participants were aged 18–63 years ($M_{age} = 36.34$, $SD_{age} = 11.06$). They were randomly assigned to either a mental contrasting condition ($n = 74$) or an indulging condition ($n = 66$). All participants were told that they would take part in a survey about how people think about the past. Further, all participants completed informed consent to participate in the study.

Procedure and Materials

Mental exercise. Instructions of the mental exercise were those described in Study

1.6. Participants were asked to name a positive alternative scenario to a negative past event caused by a specific person. Participants named, for example, “If only this person hadn’t rejected me”, or “If only he hadn’t hurt me.” Further, participants were asked to name the person who was responsible for the actual negative event. Participants in the indulging condition thereafter named and elaborated on two positive aspects they associated with the alternative scenario to have happened (e.g., “I would have felt strong”, “Love”). Participants in the mental contrasting condition first named and elaborated on a positive aspect of their alternative scenario and thereafter named and elaborated on the main obstacle standing in the way of their alternative scenario coming true. Participants named, for example, “Time and distance”, or “That time has passed”.

Performance get-well letter. After the mental exercise, participants were directed to the second part of the experiment. We instructed participants to proceed to the next screen as soon as they were ready (see Sevincer et al., 2014 for a similar procedure). On the next screen, all participants read:

> Your best friend had a car accident and has to stay at the hospital for a few weeks. Please write an authentic letter and send him/her your best wishes for a speedy recovery. You can write up to 250 words.

Participants were asked to write the get-well letter to their friend in the designated space and to proceed to the next screen as soon as they were ready.

Self-rated performance. Participants were asked to evaluate the get-well letter they wrote by indicating their level of agreement to four statements: “My get-well letter was meaningful”, “I used inappropriate language” (reverse coded), “I honestly stated my best wishes for a speedy recovery”, “The get-well letter would be greatly appreciated by my friend”. All statements were rated on Likert-scales ranging from 1 (*not at all true*) to 7 (*very true*). High scores on the Likert-scales indicate a positive evaluation of the get-well letter.

Other-rated performance. Additionally to participants' self-rated performance, we asked two independent raters blind to the condition of the participants to code the get-well letters based on Oettingen et al. (2009), Sevincer et al. (2014), and Sevincer and Oettingen (2013). The get-well letters were coded on a Likert-scale ranging from 1 (*very poor performance*) to 4 (*moderate performance*) to 7 (*excellent performance*). Specifically, a "1" indicated that participants did not write about their friend's recovery, used inappropriate language, and did not show empathy for their friend. For example, they wrote about themselves, used slang or swear words, and made indifferent remarks about their friend's recovery. A "4" meant that participants partly wrote about their friend's recovery, used moderately appropriate language, and were empathetic only to some extent. For example, they mentioned their friend's recovery but also wrote about unrelated topics, used slang or swear words only rarely and formally expressed concern about their friend's recovery. A "7" meant that participants focused on their friend's recovery, chose appropriate language, and honestly displayed empathy for their friend. For example, they wrote in detail about their friend's accident and current condition, used warm and personal language, and offered help to their friend or promised to visit.

Authenticity. We analyzed participants' get-well letters using Linguistic Inquiry and Word Count (*LIWC*; Pennebaker et al., 2001). We used a multivariate linguistic profile developed and validated by Newman, Pennebaker, Berry, and Richards (2003) to assess how authentic the get-well letters were. The authenticity score developed by Newman et al. (2003) is based on findings that more authentic communication is characterized by more first-person singular pronouns (e.g., I, me), more positive emotion words (e.g., happy, good), more exclusive words (e.g., but, except), and less motion words (e.g., walk, move). The authenticity score has shown to reliably differentiate between authentic and deceptive communication, with a mean of $M = 61.32$ in natural speech (Pennebaker, Boyd, Jordan, &

Blackburn, 2015). High authenticity scores indicate honest and disclosing get-well letters.[7]

Results Study 4.1

Thought Frequency

Average frequency of thoughts about the positive counterfactual scenarios ranged from several times a month to weekly (M = 3.54, SD = 1.98), with no significant difference between the mental contrasting and indulging conditions, p = .744.

Desirability and Expectations

The counterfactual scenarios were rated as desirable (M = 5.79, SD = 1.61), with no significant difference between the mental contrasting and indulging conditions, p = .625. Desirability of the counterfactual scenarios correlated positively with thought frequency, $r(139) = .34$, $p < .001$, 95 % CI [0.21, 0.46], with people rating their scenario as highly desirable also reporting a high frequency of thoughts about it. On average, expectations of the counterfactual scenarios still coming true were low to moderate (M = 3.26, SD = 2.19), with no significant difference between the mental contrasting and indulging conditions, p = .166.

Dependent Variable: Performance Get-Well Letter

Self-rated performance. Reliability of the scale was low to moderate (α = .44). We therefore dropped one item ("I used inappropriate language") from the scale. Dropping the item improved reliability to α = .77. We submitted the self-rated performance to a one-way ANOVA with condition (mental contrasting vs. indulging) as fixed between-subject factor. There was no significant effect of condition on self-rated performance, p = .638. All participants rated their performance as strong (M = 6.05, SD = 1.02).

Other-rated performance. Since inter-rater reliability was high (α = .96), we

[7] In Study-set 4, we assessed the same control variables as in Study-set 1 before the experimental manipulation, in order to ensure that our experimental effects would hold beyond baseline levels of these variables. Our experimental effects remained significant (Study 4.1, p = .001; Study 4.3, p = .026) or marginally significant (Study 4.2, p = .089), when we entered our control variables as covariates in the analysis.

combined scores of both raters into one other-rated performance score. Four participants were excluded from the analysis because they did not write a get-well letter. For the remaining 136 participants, other-rated performance correlated positively with self-rated performance, $r(135) = .42$, $p < .001$, 95 % CI [0.26, 0.56]. We submitted the other-rated performance to a one-way ANOVA with condition (mental contrasting vs. indulging) as fixed between-subject factor. There was a significant effect of condition, $F(1, 134) = 14.34$, $p < .001$, $\omega^2 = .09$. Participants in the mental contrasting condition showed a stronger performance ($M = 4.61$, $SD = 1.28$) compared with participants in the indulging condition ($M = 3.72$, $SD = 1.44$), 95 % CI [0.42, 1.34] (Table 5). [8]

Authenticity. The authenticity scores correlated positively with other-rated performance, $r(135) = .27$, $p = .002$, 95 % CI [0.11, 0.42]. We submitted the authenticity scores to a one-way ANOVA with condition (mental contrasting vs. indulging) as fixed between-subject factor. There was a trend for a condition effect, $F(1, 134) = 2.82$, $p = .096$. Participants in the mental contrasting condition tended to write a more authentic get-well letter ($M = 54.96$, $SD = 29.11$) compared with participants in the indulging condition ($M = 46.99$, $SD = 25.93$; Table 5).

Discussion Study 4.1

Participants who mentally contrasted their positive counterfactual fantasies about a better alternative to a negative interpersonal event performed more successfully on an interpersonal task in their present life compared with participants who indulged in their counterfactual fantasies. Specifically, mental contrasting (vs. indulging) participants wrote a more qualitative and authentic get-well letter to a close friend. Those results speak to the fact that mental contrasting (vs. indulging) led people to let go of their counterfactual past and to

[8] Additional measures were administered before the letter task. Since they are not the focus of the present dissertation thesis, they are not addressed further here.

free up their resources in order to actively engage in their present life.

Performance on the get-well letters coded by two independent raters differed significantly between mental contrasting and indulging participants, with mental contrasting participants writing a more qualitative get-well letter compared to indulging participants. The difference in authenticity trended in the expected direction. There was no significant difference between the two conditions in their self-reported performance. Since all participants evaluated their get-well letters very positively, we speculate that social desirability might have been influencing participants' self-report (see McCambridge, de Bruin, & Witton, 2012; Weber & Cook, 1972), resulting in a ceiling effect for the self-report variable.

In the present research, we chose an interpersonal task to measure engagement in the present life, assuming that letting go of a desired alternative to a negative interpersonal event should liberate people to actively engage in their interpersonal life in the here and now. The effect of mental contrasting on active engagement should, however, hold across various life domains. In Study 4.1, we asked participants to name a positive counterfactual alternative to a negative event in their interpersonal life. In Study 4.2, we aimed to conceptually replicate the findings of Study 4.1, and to investigate positive counterfactual alternatives to negative events in participants' work life.

Study 4.2: Professional Engagement

In Study 4.2, we aimed to conceptually replicate the findings of Study 4.1, and to extend those findings to the professional domain. We recruited participants who were currently unemployed and asked them to name positive counterfactual scenarios regarding lost job opportunities. They were then asked to positively fantasize about the counterfactual scenario (indulging condition) or to mentally contrast their positive fantasies about the counterfactual scenario with the obstacle of current reality standing in the way of their

counterfactual scenario coming true (mental contrasting condition).

We measured professional engagement by presenting participants with a professional task. Specifically, we directed participants to a second, unrelated task in which they were asked to write an authentic letter of application for a job.

We hypothesized that participants who mentally contrast (vs. indulge) their positive counterfactual fantasies about lost job opportunities, should let go of wanting to restore those lost job opportunities and actively work towards a job in their present life. Participants who mentally contrast (vs. indulge) should write a high quality, authentic application letter.

Method Study 4.2

Power Analysis

We based our power analysis on the assumption that the experimental manipulation should exert a medium effect (f = 0.30, d = 0.60). We applied this effect size to an a priori power analysis for two groups within an ANOVA. The power analysis indicated that approximately 120 participants would be needed to achieve 90 % power (1 - β) at a .05 alpha level (α = .05). In Study 4.2, we recruited 120 participants.

Participants

We invited participants who were currently unemployed to take part in the survey. One hundred twenty participants (58 females) completed the study online via Amazon's Mechanical Turk (MTurk). Participants were aged 18–75 years (M_{age} = 32.67, SD_{age} = 11.51) and were randomly assigned to either a mental contrasting condition (n = 61) or an indulging condition (n = 59). All participants were told that they would take part in a survey about how people think about the past. Further, all participants completed informed consent to participate in the study.

Procedure and Materials

Mental exercise. Instructions of the mental exercise were those described in Study

4.1. However, participants were asked to name an alternative positive scenario to a negative event that happened in their work life. They were asked to think of an alternative scenario which would have made their life much better. Participants named, for example, “If only I hadn’t quit my job”, or “If only I had been hired”. Participants in the indulging condition were asked to name and elaborate on two positive aspects they associated with the alternative scenario (e.g., “I would still have a career”, “An independent income”). Participants in the mental contrasting condition first named and elaborated on a positive aspect of their alternative scenario and thereafter named and elaborated on the main obstacle standing in the way of their alternative scenario coming true (e.g., “Retirement”, “I am too old”).

Performance application letter. After the mental exercise, all participants were directed to the second part of the experiment. We instructed participants to proceed to the next screen as soon as they were ready. Specifically, all participants read:

> One day you read the newspaper and find exactly the job offer that perfectly suits your qualifications, salary requirements, and personal interests. Please write an authentic letter of application in which you state your motivation for this job and also explain why you would be the best candidate for this job. You can write up to 250 words.

Participants were asked to write the letter of application in the designated space and to proceed to the next screen as soon as they were ready.

Self-rated performance. Participants were asked to evaluate their letter of application by indicating their level of agreement to four statements: “My application letter was meaningful”, “I used inappropriate language” (reverse coded), “I honestly stated my qualifications and motivation for getting that job”, “The application letter would be greatly appreciated by the employer”. All statements were rated on Likert-scales ranging from 1 (*not*

at all true) to 7 (*very true*). High scores on the Likert-scales indicate a positive evaluation of the application letter.

Other-rated performance. Like in Study 4.1, we let two independent raters code the application letters (see Oettingen et al., 2009; Sevincer, et al., 2014; Sevincer & Oettingen, 2013). The application letters were rated on a Likert-scale ranging from 1 (*very poor performance*) to 4 (*moderate performance*) to 7 (*excellent performance*). Specifically, a "1" indicated that participants did not state any qualifications they had, used inappropriate language, and did not show any motivation to get the job. For example, they only wrote about work-unrelated content, used slang or swear words, and made indifferent remarks regarding their motivation to get the job. A "4" meant that participants partly wrote about their qualifications, used moderately appropriate language, and showed their motivation only to some extent. For example, they mentioned their qualifications but also wrote about work-unrelated content, used slang or swear words only rarely, and formally expressed their motivation. A "7" meant that participants focused on their qualifications to get the job, chose appropriate language, and honestly displayed their motivation to get the job. For example, they wrote in detail about their qualifications and interests, provided information about their skills and experiences, used professional language, and explicitly stated their motivation by explaining why they would be the best candidate for the job.

Authenticity. Like in Study 4.1, we analyzed participants' application letters using Linguistic Inquiry and Word Count (*LIWC*; Pennebaker et al., 2001). We used the linguistic profile developed by Newman et al. (2003) to assess how authentic the application letters were. High authenticity scores indicate honest and disclosing application letters.

Results Study 4.2

Thought Frequency

Average frequency of thoughts about the positive counterfactual scenarios ranged from

several times a month to weekly (M = 3.62, SD = 1.79), with no significant difference between the mental contrasting and indulging conditions, p = .732.

Desirability and Expectations

The counterfactual scenarios were rated as desirable (M = 5.30, SD = 1.67), with no significant difference between the mental contrasting and indulging conditions, p = .366. Desirability of the counterfactual scenarios correlated positively with thought frequency, $r(119) = .43$, $p < .001$, 95 % CI [0.27, 0.57], with people rating their scenario as highly desirable also reporting a high frequency of thoughts about it. On average, expectations of the counterfactual scenarios still coming true were low to moderate (M = 3.52, SD = 2.20), with no significant difference between the mental contrasting and indulging conditions, p = .201.

Dependent Variable: Performance Application Letter

Self-rated performance. Similar to Study 4.1, the reliability of the scale was moderate (α = .63). We therefore dropped one item ("I used inappropriate language") from the scale. Dropping the item improved reliability to α = .82. We submitted the self-rated performance to a one-way ANOVA with condition (mental contrasting vs. indulging) as fixed between-subject factor. There was no significant effect of condition on self-rated performance, p = .390. Participants rated their performance as relatively strong (M = 5.04, SD = 1.42).

Other-rated performance. Inter-rater reliability was high (α = .88), and thus we combined scores of both raters into one other-rated performance score. Nine participants were excluded from the analysis because they did not write an application letter. For the remaining 111 participants, other-rated performance correlated only weakly with self-rated performance, $r(110) = .17$, p = .067. We submitted the other-rated performance to a one-way ANOVA with condition (mental contrasting vs. indulging) as fixed between-subject factor.

There was a significant effect of condition, $F(1, 109) = 5.25$, $p = .024$, $\omega^2 = .04$. Participants in the mental contrasting condition showed a stronger performance ($M = 4.58$, $SD = 1.40$) compared with participants in the indulging condition ($M = 3.94$, $SD = 1.56$), 95 % CI [0.09, 1.20] (Table 5). [9]

Authenticity. The authenticity scores correlated positively with other-rated performance, $r(110) = .24$, $p = .012$, 95 % CI [0.06, 0.41]. We submitted the authenticity scores to a one-way ANOVA with condition (mental contrasting vs. indulging) as fixed between-subject factor. There was a marginally significant effect of condition, $F(1, 109) = 3.74$, $p = .056$. Participants in the mental contrasting condition wrote a more authentic letter ($M = 60.64$, $SD = 26.81$) compared with participants in the indulging condition ($M = 50.33$, $SD = 29.34$; Table 5).

Discussion Study 4.2

In Study 4.2, we conceptually replicated the findings of Study 4.1 and extended those findings to the professional domain. Participants who mentally contrasted their positive counterfactual fantasies about a lost job opportunity were more successful in solving a present task related to a current job compared with participants who indulged in their positive counterfactual fantasies. Specifically, mental contrasting (vs. indulging) participants wrote a high quality, authentic application letter. The results speak to the fact that mental contrasting (vs. indulging) led people to free up their resources in order to actively engage in their present life.

Similar to Study 4.1, we obtained significant and marginally significant differences between the two conditions in other-rated performance and authenticity of the letters, whereas there was no significant difference between the two conditions in self-rated

[9] Like in Study 4.1, additional measures were administered before the letter task. Since they are not the focus of the present dissertation thesis, they are not addressed further here.

performance. Since all participants evaluated their application letters very positively, we assume that, again, social desirability might have influenced participants' self-report, resulting in a ceiling effect for the self-report variable.

In Study 4.2, we focused on participants who were currently unemployed and might therefore form a risk group for indulging in lost job opportunities. In fact, recent findings by Roese and Summerville (2005) and Beike et al. (2009) suggest that people experience the biggest regrets about lost opportunities in the education and career domains. Mental contrasting might be useful in helping people let go of those lost opportunities and actively work towards jobs in the here and now.

In Studies 4.1 and 4.2, we asked participants to name counterfactual fantasies regarding highly specific past events. In Study 4.3, we aimed to conceptually replicate the findings and to extend them to a broader range of counterfactual fantasies. We assume that mental contrasting should lead to active engagement in the present life, independent of the domains of both the counterfactual fantasies and the presented tasks, as they appear in present life. Therefore, in Study 4.3, we asked participants to name any counterfactual fantasies they frequently think of. We assessed engagement in the present life as effort and performance in an unrelated problem-solving task. We chose Raven matrices as a problem-solving task in the academic domain. The Raven test assesses general analytical reasoning (Raven, 1976, 2000). Thus, it does not relate to any specific domain of counterfactual fantasies.

Study 4.3: Academic Engagement

In Study 4.3, we asked participants to name and elaborate on any positive counterfactual scenario they frequently think of and thereafter measured their performance on a problem-solving task. In comparison to participants who indulged in positive fantasies about their counterfactual scenarios, those who mentally contrasted should let go of their

counterfactual past and be free to actively engage in a given task in the here and now.

We hypothesized that participants who mentally contrast (vs. indulge) should perform better on the problem-solving task. We included a control condition in order to investigate the direction of effects. In the control condition, participants elaborated on irrelevant content.

Method Study 4.3

Power Analysis

We based our power analysis on the assumption that the experimental manipulation should exert a medium effect ($f = 0.30$, $d = 0.60$). Applying this effect size to a power analysis of a one-way ANOVA with three groups indicated that approximately 144 participants would be needed to achieve 90 % power ($1 - \beta$) at a .05 alpha level ($\alpha = .05$). In Study 4.3, we recruited 143 participants.

Participants

One hundred forty-three participants (89 females) completed the study online via Amazon's Mechanical Turk (MTurk). Participants were aged 18–66 years ($M_{age} = 35.87$, $SD_{age} = 11.98$) and were randomly assigned to either a mental contrasting condition ($n = 45$), an indulging condition ($n = 47$), or a control condition ($n = 51$). All participants were told that they would take part in a survey about how people think about the past. Further, all participants completed informed consent to participate in the study.

Procedure and Materials

Mental exercise. Instructions of the mental exercise were those described in Studies 4.1 and 4.2. However, participants were asked to name any positive alternative scenario of which they think that this alternative would have made their life much better. Participants named, for example, "If only I had married again", or "If only I had gotten that promotion". Participants in the indulging condition were asked to name and elaborate on two positive

aspects they associated with their alternative scenario (e.g., “I would have a home”, “Improvement”). Participants in the mental contrasting condition first named and elaborated on a positive aspect of their alternative scenario and thereafter named and elaborated on the main obstacle standing in the way of their alternative scenario coming true (e.g., “Current relationship”, “My present job”). Participants in the control condition named a positive alternative scenario and then were asked to elaborate on how their regular Saturday morning runs off.

Task performance. After the mental exercise, all participants were directed to a second, unrelated task. Participants were presented with ten items from Standard Progressive Matrices (Raven, 1965). We chose ten matrices from categories of medium difficulty (i.e., C, D, & E) in order to ensure enough variance within our sample. We told participants that solving those matrices would require some effort and asked them to solve as many matrices correctly as possible. We then asked participants how motivated they were to perform well on the upcoming task using a Likert-scale from 1 (*not at all motivated*) to 7 (*very motivated*). For each participant, we computed the number of matrices solved correctly as an indicator of successful task performance and the total time spent on the task (in seconds) as an indicator of task persistence. The total time spent on the task was thereby calculated as the sum of time spent on each of the ten matrices.

Results Study 4.3

Thought Frequency

Average frequency of thoughts about the positive counterfactual scenarios ranged from several times a month to weekly (M = 3.22, SD = 1.76), with no significant difference between the three conditions, p = .935.

Desirability and Expectations

The counterfactual scenarios were rated as desirable (M = 5.81, SD = 1.46), with no

significant difference between the three conditions, $p = .917$. Desirability of the counterfactual scenarios correlated positively with thought frequency, $r(142) = .26$, $p = .002$, 95 % CI [0.12, 0.39], with people rating their scenario as highly desirable also reporting a high frequency of thoughts about it. On average, expectations of the counterfactual scenarios still coming true were low to moderate ($M = 3.27$, $SD = 2.39$), $p = .059$.

Dependent Variable: Task Performance

We submitted participants' task performance (i.e., the number of matrices solved correctly) to a one-way ANOVA with condition (mental contrasting vs. indulging vs. control) as fixed between-subject factor. There was a significant effect of condition, $F(2, 140) = 5.16$, $p = .007$, $\omega^2 = .06$. *Post-hoc* comparisons using LSD revealed that participants in the mental contrasting condition solved more matrices correctly ($M = 6.51$, $SD = 1.77$) compared with participants in the indulging condition ($M = 5.51$, $SD = 2.11$), $p = .027$, 95 % CI [0.12, 1.88], and compared with participants in the control condition ($M = 5.14$, $SD = 2.45$), $p = .002$, 95 % CI [0.51, 2.24]. There was no significant difference in task performance between the indulging and control conditions, $p = .390$ (Table 6).

We further submitted participants' task persistence (i.e., the total time spent on the task) to a one-way ANOVA with condition (mental contrasting vs. indulging vs. control) as fixed between-subject factor. There was a marginally significant effect of condition, $F(2, 140) = 2.78$, $p = .066$. *Post-hoc* comparisons using LSD revealed that participants in the mental contrasting condition spent more time on the task ($M = 238.60$, $SD = 127.45$) compared with participants in the indulging condition ($M = 193.61$, $SD = 89.63$), $p = .052$, 95 % CI [-0.42, 90.41], and compared with participants in the control condition ($M = 190.40$, $SD = 110.83$), $p = .034$, 95 % CI [3.66, 92.74]. There was no significant difference between the indulging and control conditions in time spent on the task, $p = .886$ (Table 6). Time spent on the task also correlated positively with task performance, $r(142) = .49$, $p <$

.001, 95 % CI [0.35, 0.61].

Next, we tested whether the effect of condition (mental contrasting vs. other) on task performance was mediated by the time spent on the task. To test this mediation, we followed a bootstrapping procedure using the SPSS PROCESS macro provided by Hayes (2013). The indirect effect of condition (mental contrasting vs. other) on task performance through time spent on the task was significantly different from 0, 95 % CI [0.07, 0.90], with 5,000 iterations. Within the mediation model, the direct effect of condition on task performance was still significant, 95 % CI [0.08, 1.47] (Figure 4). Thus, mental contrasting (vs. the other conditions) led participants to spend more time on the task, which partially explained their relatively better performance.

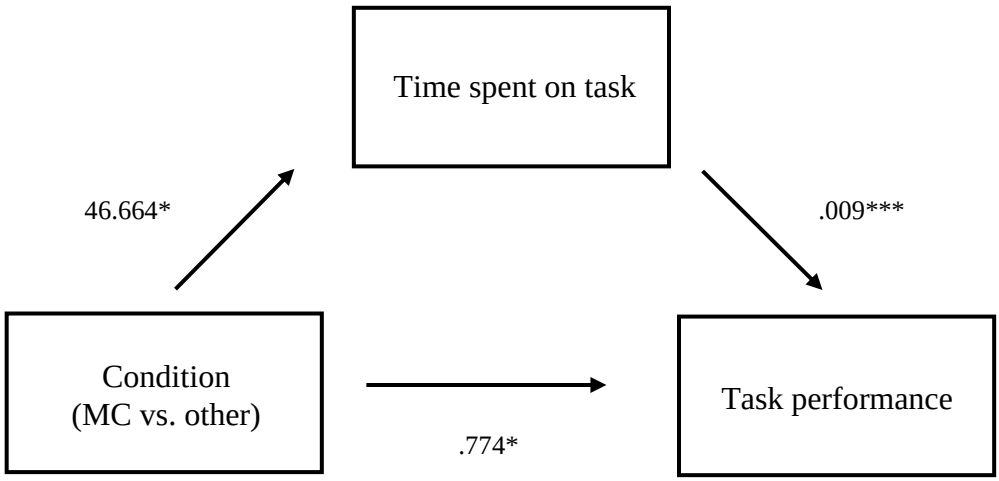

Figure 4. Study 4.3: Time spent on task as a mediator of the effect of condition (MC vs. other) on task performance. *$p < .05$, **$p < .01$, ***$p < .001$. MC = Mental Contrasting.

After establishing the three conditions, right before participants started to work on the Standard Progressive Matrices, we had asked them how motivated they were to perform well. We submitted the motivation scores to a one-way ANOVA with condition (mental contrasting vs. indulging vs. control) as fixed between-subject factor. There was a marginally significant effect of condition, $F(2, 140) = 2.79$, $p = .065$. *Post-hoc* comparisons

using LSD revealed that participants in the mental contrasting condition reported marginally higher levels of motivation to perform well (M = 5.96, SD = 1.60) compared with participants in the indulging condition (M = 5.36, SD = 1.59), p = .055, 95 % CI [-0.01, 1.20], but not compared with participants in the control condition (M = 6.00, SD = 1.22), p = .883. Participants in the control condition also reported higher levels of motivation compared with participants in the indulging condition, p = .034, 95 % CI [0.05, 1.23]. There were no significant correlations between motivation to perform well on the task and actual task persistence or performance, all ps > .474.

Discussion Study 4.3

In Study 4.3, we conceptually replicated the findings of Studies 4.1 and 4.2 and extended those findings to the academic domain. Participants in the mental contrasting condition solved more matrices correctly compared with participants in the indulging and control conditions. Although scores on the Raven's test have been suggested to reflect general cognitive ability which is relatively stable over time (Raven, 2000), the present study shows that participants who mentally contrasted their positive fantasies about the desired counterfactual past showed better scores than those who were wrapped in fantasies about the desired counterfactual past or did not receive any instructions. Other research has confirmed that self-regulation strategies can change Raven scores. Planning in the form of implementation intentions also had performance enhancing effects on Raven matrices (Bayer & Gollwitzer, 2007; Wieber, Odenthal, & Gollwitzer, 2010).

The effect of mental contrasting on task performance was partially mediated by task persistence. Mental contrasting led participants to be more persistent and, in turn, to solve more matrices correctly compared with participants in the other two conditions. Those results speak to the fact that participants who mentally contrast let go of their counterfactual past and were free to invest their energy and effort in their present life, participants in the

indulging and control conditions were not as able to invest energy and effort in their present life. Within the mediation model, the direct effect of condition on task performance was still significant. Thus, the effort invested in the problem-solving task only partially explained the variance between the conditions in task performance. Presumably, other variables besides effort have led mental contrasting participants to perform better on the problem-solving task. We speculate that by letting go of wanting to attain the counterfactual past, participants in the mental contrasting condition more decisively focused on the current task, which might have helped their performance. Future studies should shed light on this hypothesis.

Discussion Study-set 4

Across three studies, we observed that mental contrasting helped people to actively engage in their present life. These results appeared for counterfactual alternatives to various life events (interpersonal and work-related events), and for various measures of engagement (high-quality performance on a get-well letter, high-quality performance on an application letter, and persistence and successful performance on a problem-solving task). The effects occurred compared with relevant control conditions, in which participants either indulged in their positive counterfactual alternatives, or elaborated on irrelevant content. Further, we identified the investment of effort as measured by task persistence as a mediator for the effect of mental contrasting on task performance.

Related Approaches

Low and high expectations. Most research on counterfactuals differentiates between situations in which people do vs. do not anticipate subsequent opportunities to attain the desired counterfactual past (Markman et al., 1993; Markman et al., 2009). Similarly, our research differentiates between situations in which people have high vs. low expectations of attaining the desired counterfactual past (see also Oettingen, 2012; Oettingen & Mayer, 2002). In the present studies, expectations of attaining the counterfactual past were low to

moderate, speaking to the assumption that we investigated lost opportunities.

It would be interesting to investigate effects of mental contrasting in situations in which people have *high* expectations of attaining the desired counterfactual past and thus anticipate subsequent opportunities to restore the counterfactual past. In those cases, mental contrasting (vs. indulging) should lead to more effort and better performance explicitly towards restoring the desired counterfactual past rather than to alternative and unrelated tasks. Indulging in positive fantasies about the desired counterfactual past should decrease effort and performance towards restoring the desired counterfactual past (Oettingen & Mayer, 2002; Markman et al., 2008; McMullen & Eppers, 2001). Positive fantasies should not provide people with the energy they need to actively strive to attain the desired counterfactual past (H. B. Kappes & Oettingen, 2011). Mental contrasting should give people clarity whether they can or cannot restore the desired counterfactual past, and, in turn, provide them with the energy either to restore the counterfactual past or to pursue a more promising project in their present life (Oettingen et al., 2001). In sum, mental contrasting might help people to discriminate between future and lost opportunities. It should help people to restore those counterfactual pasts that can be restored, and to let go of those counterfactual pasts that are lost. Future studies should shed light on these hypotheses.

Outcome and process simulations. Traditionally, positive counterfactuals have been defined as conditionals in which alternative antecedents to a past event are simulated so that the respective event turns out better (Byrne, 2007; Kahneman & Miller, 1986). By that, the causal relation between the antecedent and the desired alternative past is strengthened (Roese & Olson, 1996; Wells & Gavanski, 1989) and specific intentions to attain the desired alternative past emerge (Smallman & Roese, 2009). Mental simulations of the specific antecedents that could have led to the attainment of a desired alternative past are similar to mental simulations of the specific steps that lead to attainment of a goal (i.e., *process*

simulations; Taylor et al., 1998). Similar to process simulations, positive counterfactuals focusing on antecedents of the desired alternative past facilitate problem-solving and intention formation, and in turn, facilitate the attainment of the desired alternative past (see also Taylor & Schneider, 1989).

In contrast, the present research focuses on mental simulations of the successful attainment of a desired alternative past (Markman & McMullen, 2003, 2005, 2007; McMullen, 1997). They are similar to mental simulations of the successful attainment of a goal (i.e., *outcome simulations*; Taylor et al., 1998). Similar to outcome simulations, positive counterfactuals focusing on the successful attainment of the desired alternative past should not facilitate problem-solving or intention formation, and in turn, should not facilitate the attainment of the desired alternative past (Markman et al., 2008; Taylor et al., 1998). Importantly, they should neither confront people with the steps that need to be taken in order to attain the desired alternative past, nor with the obstacles of current reality that might stand in the way of attaining the desired alternative past.

Conclusion Study-set 4

In three experimental studies, mental contrasting (vs. indulging or control) led people to actively engage in their present life. Study-set 4 thus provides preliminary evidence that mental contrasting of positive counterfactual fantasies, similar to mental contrasting of positive future fantasies, instigates behavior change, that is, active engagement in the present life. We further identified the investment of effort as a mediator for mental contrasting effects on active engagement in the present life.

General Discussion

In the present research, we asked people to mentally contrast their positive fantasies about a desired counterfactual past with the obstacles of current reality standing in the way of attaining the desired counterfactual past. We hypothesized and observed that mental

contrasting of positive counterfactual fantasies helps people let go of their desired counterfactual past and actively engage in their present life. Specifically, we found that people who mentally contrasted (vs. indulged, dwelled, reverse contrasted, or elaborated on irrelevant content) let go of their desired counterfactual past and of the accompanying negative counterfactual emotions (Study-set 1). Further, people who mentally contrasted (vs. indulged or elaborated on irrelevant content) formed a positive implicit attitude towards their current reality (Study 2) and felt energized regarding their present life (Study-set 3). Finally, people who mentally contrasted (vs. indulged or elaborated on irrelevant content) actively engaged in their present life (Study-set 4).

The present research adds to the literature on mental contrasting in two ways: First, to our knowledge, our studies are the first to specifically test how mental contrasting unfolds its effects on emotions, cognition, motivation, and behavior in case the obstacles of current reality are difficult or impossible to overcome (expectations of success are low). Secondly, our studies are the first to apply the self-regulation strategy of mental contrasting to positive fantasies about a desired counterfactual past (rather than to positive fantasies about a desired future). The present research also adds to the literature on counterfactual thinking by proposing the self-regulation strategy of mental contrasting as a tool to help people let go of a lost counterfactual past.

In Study 3.1, we observed that mental contrasting of positive counterfactual fantasies, similar to mental contrasting of positive future fantasies, does not work by changing levels of expectations (see also Oettingen et al., 2001; review by Oettingen, 2012). Rather, our results speak to the assumption that mental contrasting of positive counterfactual fantasies helps people realize that the obstacles of current reality are difficult or impossible to overcome. In contrast, indulging, dwelling, reverse contrasting, and elaborating on irrelevant content fail to bring the unwelcome news that the longed-for counterfactual past is lost. In

fact, free thoughts and images can occur irrespectively of the existing low expectations. That is, people can freely indulge in positive fantasies about a desired counterfactual past or dwell on the impeding reality, even though the counterfactual past is unlikely to ever come true (see also Oettingen & Mayer, 2002). Letting go of unfeasible projects is helpful for leading a constructive life when other more promising ones exist (Janoff-Bulman & Brickman, 1982; Wrosch et al., 2003). By highlighting the obstacles of current reality that stand in the way of still attaining the counterfactual past, mental contrasting liberates people to engage in other, more promising endeavors that arise in their present life.

Positive Fantasies about a Lost Counterfactual Past

Already in 1890, William James differentiated free thoughts and images from beliefs: "Everyone knows the difference between imagining a thing and believing in its existence, between supposing a proposition and acquiescing in its truth" (James, 1890, p. 283). Free thoughts and images may thereby pertain to the future or to the past. Accordingly, positive future fantasies are defined as free thoughts and images about desired events that might happen in the future (Oettingen, 2012). In the present research, we defined positive counterfactual fantasies as free thoughts and images about desired events or scenarios that could have happened in the past.

In line with this definition of positive counterfactual fantasies, we observed a high desirability of the counterfactual scenarios that participants named across the studies reported in this dissertation thesis. Further, we observed a moderate to high thought frequency about the counterfactual scenarios (i.e., from several times a month to several times a week) across the studies reported in this dissertation thesis. These positive fantasies about wished-for pasts, just like positive fantasies about wished-for futures (Oettingen, 1999, 2012), may hinder people from engaging in their life in the here and now.

Letting go of a Lost Counterfactual Past

In the present research, we used the self-regulation strategy of mental contrasting to help people let go of a lost counterfactual past. In Study-set 1, we observed that mental contrasting helped people let go of their counterfactual past, indicated by reduced commitment to their counterfactual past. Importantly, by *letting go*, we mean *letting go of wanting to attain* the counterfactual past (see also Berger, 1988; Brandstätter, 2003; Brunstein & Gollwitzer, 1996; Klinger, 1975). Thus, we did not aim for people to suppress thoughts and images about the counterfactual past (review by Wenzlaff & Wegner, 2000), or to devalue their counterfactual past (Gross, 1998; review by Koole, 2009). Accordingly, in Study 2 we observed that people who mentally contrasted still showed a positive implicit attitude towards their counterfactual past. That is, people who mentally contrast should let go of wanting to attain the lost counterfactual past, while they should still be able to learn from the counterfactual elaboration and make meaning of the respective life event (see also King & Raspin, 2004; King & Smith, 2004).

In sum, in the present research, we viewed people's positive counterfactuals from a goal perspective. Specifically, we inferred that letting go of the counterfactual past in cases in which this past is unlikely or impossible to still come true should liberate people to engage in more promising endeavors that arise in their present life.

Self-Regulation: Implications and Interventions

Mental contrasting is a self-regulation strategy that people can apply to their future wishes in everyday life (see Oettingen, 2014). Specifically, mental contrasting helps people to wisely select and commit to those future wishes that are feasible, and to let go of those future wishes that are unfeasible. Similarly, we propose that people can apply mental contrasting to their wished-for counterfactual pasts in everyday life. Specifically, mental contrasting should help people to wisely select and commit to those wished-for

counterfactual pasts that are likely to be restored, and to let go of those wished-for counterfactual pasts that are unlikely or impossible to be restored.

Mental contrasting should be differentiated from clinical interventions that help people cope with extremely stressful or even traumatic life events, such as bereavement, to which counterfactual thoughts are a common response (Branscombe et al., 1996; Branscombe et al., 2003; Callander et al., 2007; Davis et al., 1995; Wayment, 2004; see also Dalgleish, 2004; Lichtenthal, Cruess, & Prigerson, 2004; Shear et al., 2011). In the case of such severe traumatic life events, clinical interventions, such as cognitive-behavioral therapy (CBT), might be necessary to help people find meaning in negative life events and integrate them into a coherent and adaptive framework (Lazarus & Folkman, 1984; Tait & Silver, 1989; see also Butler, Chapman, Forman, & Beck, 2006; Horowitz, Marmar, Weiss, DeWitt, & Rosenbaum, 1984; Stroebe & Schut, 1999). Davis et al. (1995) state that after negative life events, "it seems important to consider whether there are any specific interventions that might facilitate a shift from undoing thoughts to more adaptive cognitions" (p. 123). We propose that mental contrasting might be a suitable tool that can be applied both by people in their everyday life, and possibly also as an additional tool in coping interventions.

Limitations and Future Research

In the present research, we measured short-term effects of mental contrasting of positive counterfactual fantasies on commitment, counterfactual emotions, implicit cognition, motivation, and behavior. Assuming that people who mentally contrast understand that their counterfactual past will not come true and, in turn, let go of their counterfactual past, it might be important to investigate whether mental contrasting effects prove to be stable in the long term. Further, regarding mental contrasting effects on active engagement in the present life, the tasks we presented to participants were quite artificial. Future studies should investigate whether mental contrasting of positive counterfactual fantasies helps

people to actively engage in their present life within personally relevant, everyday life contexts. Specifically, mental contrasting should help people let go of their counterfactual past and actively strive to attain alternative wishes and goals.

Further, more studies are needed to assess the mechanisms by which mental contrasting of positive counterfactual fantasies leads people to actively engage in their present life. Previous research on mental contrasting of positive future fantasies has focused on changes in implicit cognition and energization (review by Oettingen, 2012). Future studies should investigate whether those mechanisms also hold for mental contrasting of positive counterfactual fantasies. Changes in implicit cognition might mediate the effect of mental contrasting of positive counterfactual fantasies on active engagement. Specifically, mental contrasting of positive counterfactual fantasies should lead people to form a positive attitude towards their current reality, which, in turn, should lead them to approach endeavors that arise in their present life (see also Ferguson, 2007; Ferguson et al., 2008). Similarly, changes in energization might mediate the effect of mental contrasting of positive counterfactual fantasies on active engagement. Specifically, mental contrasting of positive counterfactual fantasies should lead people to feel more energized regarding their present life, which, in turn, should translate into effort and performance towards engaging in the present life (see also Oettingen et al., 2009). In this vein, in Study 4.3, we showed that the energy and effort invested in a task in present life acted as a mediator for mental contrasting effects on successful task performance. Future studies should more thoroughly examine possible cognitive and motivational mechanisms that lead people who mentally contrast their positive counterfactual fantasies with the obstacle of current reality to actively engage in their present life.

General Conclusion

Referring back to the example of the young man who failed his job interview, and who is still engaged in counterfactual fantasies, such as “If I had gotten that job”, or “If only I had performed better at the interview”. The present research suggest that mental contrasting might be a useful tool to help him come to terms with his longed-for counterfactual past. Specifically, by mentally contrasting his counterfactual fantasies with the obstacle of current reality, he might feel less frustrated and angry. Further, he might search for job advertisements and feel motivated to apply for other jobs. Eventually, mental contrasting might help him to actively engage in the various endeavors in his present life.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50,* 179–211.

Allport, G. W. (1935). Attitudes. In C. Murchison (Ed.), *Handbook of social psychology* (pp. 798–844). Worcester, MA: Clark University Press.

Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review, 64,* 369–372.

Balcetis, E., & Dunning, D. (2006). See what you want to see: Motivational influences on visual perception. *Journal of Personality and Social Psychology, 9,* 612–625.

Banse, R. (1999). Automatic evaluation of self and significant others: Affective priming in close relationships. *Journal of Social and Personal Relationships, 16,* 803–821.

Bargh, J. A. (1992). The ecology of automaticity: Toward establishing the conditions needed to produce automatic processing effects. *The American Journal of Psychology, 105,* 181–199.

Bargh, J. A. (2007). *Social psychology and the unconscious: The automaticity of higher mental processes.* New York: Psychology Press.

Bayer, U., & Gollwitzer, P. M. (2007). Boosting scholastic test scores by willpower: The role of implementation intentions. *Self and Identity, 6,* 1–19.

Beike, D. R., & Crone, T. S. (2008). When experienced regret refuses to fade: Regrets of action and attempting to forget open life regrets. *Journal of Experimental Social Psychology, 44,* 1545–1550.

Beike, D. R., Markman, K. D., & Karadogan, F. (2009). What we regret most are lost opportunities: A theory of regret intensity. *Personality and Social Psychology Bulletin, 35,* 385–397.

Berger, C. R. (1988). Planning, affect, and social action generation. In L. Donohue, H. E.

Sypher, & T. E. Higgins (Eds.), *Communication, social cognition, and affect* (pp. 93–116). Hillsdale, NY: Erlbaum.

Blair, I. V., Ma, J. E., & Lenton, A. P. (2001). Imagining stereotypes away: The moderation of implicit stereotypes through mental imagery. *Journal of Personality and Social Psychology, 81*, 828–841.

Blascovich, J. (1990). Individual differences in physiological arousal and perception of arousal: Missing links in Jamesian notions of arousal-based behaviors. *Personality and Social Psychology Bulletin, 16,* 665–675.

Blascovich, J., & Tomaka, J. (1996). The biopsychosocial model of arousal regulation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (pp.1–51). New York: Academic.

Brandstätter, V. (2003). *Persistenz und Zielablösung [Persistence and goal disengagement]*. Göttingen, Germany: Hogrefe.

Brandstätter, V., Herrmann, M., & Schüler, J. (2013). The struggle of giving up personal goals: Affective, physiological, and cognitive consequences of an action crisis. *Personality and Social Psychology Bulletin, 39,* 1668–1682.

Branscombe, N. R., Owen, S., Garstka, T. A., & Coleman, J. (1996). Rape and accident counterfactuals: Who might have done otherwise and would it have changed the outcome? *Journal of Applied Social Psychology, 26*, 1042–1067.

Branscombe, N. R., Wohl, M. J. A., Owen, S., Allison, J. A., & N'gbala, A. (2003). Counterfactual thinking, blame assignment, and well-being in rape victims. *Basic and Applied Social Psychology, 25*, 265–273.

Brehaut, J. C., O'Connor, A. M., Wood, T. J., Hack, T. F., Siminoff, L., Gordon, E., & Feldman-Stewart, D. (2003). Validation of a decision regret scale. *Medical Decision Making, 23*, 281–292.

Brehm, J. W., & Self, E. A. (1989). The intensity of motivation. *Annual Review of Psychology, 40,* 109–131.

Brendl, C. M., Markman, A. B., & Messner, C. (2001). How do indirect measures of evaluation work? Evaluating the inference of prejudice in the Implicit Association Test. *Journal of Personality and Social Psychology, 81,* 760–773.

Brunstein, J. C., & Gollwitzer, P. M. (1996). Effects of failure on subsequent performance: The importance of self-defining goals. *Journal of Personality and Social Psychology, 70,* 395–407.

Butler, A. C., Chapman, J. E., Forman, E. M., & Beck, A. T. (2006). The empirical status of cognitive-behavioral therapy: A review of meta-analyses. *Clinical Psychology Review, 26,* 17–31.

Byrne, R. M. J. (2007). Precis of *the rational imagination: How people create alternatives to reality*. *Behavioral and Brain Sciences, 30,* 439–480.

Callander, G., Brown, G. P., Tata, P., & Regan, L. (2007). Counterfactual thinking and psychological distress following recurrent miscarriage. *Journal of Reproductive and Infant Psychology, 25,* 51–65.

Cannon, W. B. (1915). *Bodily changes in pain, hunger, fear, and rage: An account of recent researches into the function of emotional excitement*. New York: Appleton.

Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York: Cambridge University Press.

Chesney, M. A., Neilands, T. B., Chambers, D. B., Taylor, J. M., & Folkman, S. (2006). A validity and reliability study of the coping self-efficacy scale. *British Journal of Health Psychology, 11,* 421–437.

Contrada, R. J., Wright, R. A., & Glass, D. C. (1984). Task difficulty, type A behavior pattern, and cardiovascular response. *Psychophysiology, 21,* 638–646.

Cunningham, W. A., Johnson, M. K., Raye, C. L., Gatenby, J. C., Gore, J. C., & Banaji, M. R. (2004). Separable neural components in the processing of black and white faces. *Psychological Science, 15*, 806–813.

Dagleish, T. (2004). What might not have been: An investigation of the nature of counterfactual thinking in survivors of trauma. *Psychological Medicine, 34*, 1215–1225.

Dasgupta, N., & Greenwald, A. G. (2001). On the malleability of automatic attitudes: Combating automatic prejudice with images of admired and disliked individuals. *Journal of Personality and Social Psychology, 81*, 800–814.

Davies, M. I., & Clark, D. M. (1998). Thought suppression produces a rebound effect with analogue post-traumatic intrusions. *Behaviour Research and Therapy, 36*, 571–582.

Davis, C. G., & Lehman, D. R. (1995). Counterfactual thinking and coping with traumatic life events. In N. J. Roese & J. M. Olson (Eds.), *What might have been: The social psychology of counterfactual thinking* (pp.199–231). Mahwah, NJ: Erlbaum.

Davis, C. G., Lehman, D. R., Cohen Silver, R., Wortman, C. B., & Ellard, J. H. (1996). Self-blame following a traumatic event: the role of perceived avoidability. *Personality and Social Psychology Bulletin, 22*, 557–567.

Davis, C. G., Lehman, D. R., Wortman, C. B., Cohen Silver, R., & Thompson, S. C. (1995). The undoing of traumatic life events. *Personality and Social Psychology Bulletin, 21*, 109–124.

De Houwer, J. (2002). The Implicit Association Test as a tool for studying dysfunctional associations in psychopathology: Strengths and limitations. *Journal of Behavior Therapy and Experimental Psychiatry, 33*, 115–133.

De Houwer, J. (2003). The extrinsic affective Simon task. *Experimental Psychology, 50*, 77–85.

De Houwer, J., Crombez, G., Koster, E. H. W., & De Beul, N. (2004). Implicit alcohol-related cognitions in a clinical sample of heavy drinkers. *Journal of Behavior Therapy and Experimental Psychiatry, 35,* 275–286.

De Houwer, J., & De Bruycker, E. (2007a). The identification-EAST as a valid measure of implicit attitudes toward alcohol-related stimuli. *Journal of Behavior Therapy and Experimental Psychiatry, 38,* 133–143.

De Houwer, J., & De Bruycker, E. (2007b). The Implicit Association Test outperforms the extrinsic affective Simon task as an implicit measure of inter-individual differences in attitudes. *British Journal of Social Psychology, 46,* 401–421.

De Houwer, J., & Eelen, P. (1998). An affective variant of the Simon paradigm. *Cognition and Emotion, 12,* 45–61.

De Raedt, R., Schacht, R., Franck, E., & De Houwer, J. (2006). Self-esteem and depression revisited: Implicit positive self-esteem in depressed patients? *Behavior Research and Therapy, 44,* 1017–1028.

Dijksterhuis, A., Aarts, H., Bargh, J. A., & van Knippenberg, A. (2000). On the relation between associative strength and automatic behavior. *Journal of Experimental Social Psychology, 36,* 531–544.

Dovidio, J. F., Kawakami, K., & Gaertner, S. L. (2002). Implicit and explicit prejudice and interracial interaction. *Journal of Personality and Social Psychology, 82,* 62–68.

Dovidio, J. F., Kawakami, K., Johnson, C., Johnson, B., & Howard, A. (1997). On the nature of prejudice: Automatic and controlled processes. *Journal of Experimental Social Psychology, 33,* 510–540.

Duffy, E. (1934). Emotion: An example of the need of reorientation in psychology. *Psychological Review, 41,* 184–198.

Dyczewski, E. A., & Markman, K. D. (2012). General attainability beliefs moderate the

motivational effects of counterfactual thinking. *Journal of Experimental Social Psychology, 48,* 1217–1220.

Eaton, W. W., Smith, C., Ybarra, M., Muntaner, C., & Tien, A. (2004). Center for epidemiologic studies depression scale: Review and revision (CESD and CESD-R). In M. E. Maruish (Ed.), *The use of psychological testing for treatment planning and outcomes assessment* (3rd Ed.), Volume 3: Instruments for Adults, pp. 363–377. Mahwah, NJ: Erlbaum.

Elliot, A. J. (2006). The hierarchical model of approach-avoidance motivation. *Motivation and Emotion, 30,* 111–116.

Epstude, K., & Jonas, K. (2015). Regret and counterfactual thinking in the face of inevitability: The case of HIV-positive men. *Social Psychological and Personality Science, 6,* 157–163.

Epstude, K., & Roese, N. J. (2007). Beyond rationality: Counterfactual thinking and behavior regulation [Peer commentary on journal article "Precis of *the rational imagination: How people create alternatives to reality*" by R. M. J. Byrne]. *Behavioral and Brain Sciences, 30,* 457–458.

Epstude, K., & Roese, N. J. (2008). The functional theory of counterfactual thinking. *Personality and Social Psychology Review, 12,* 168–192.

Epstude, K., & Roese, N. J. (2011). When goal pursuit fails. The functions of counterfactual thought in intention formation. *Social Psychology, 42,* 19–27.

Fairclough, S. H., & Venables, L. (2006). Prediction of subjective states from psychophysiology: A multivariate approach. *Biological Psychology, 71,* 100–110.

Fazio, R. H. (1986). How do attitudes guide behavior? In M. Sorrentino & E. T. Higgins (Eds.), *Handbook of motivation and cognition* (pp. 204–243). New York: Guilford Press.

Fazio, R. H. (1990). Multiple processes by which attitudes guide behavior: The MODE model as an integrative framework. *Advances in Experimental Social Psychology, 23,* 75–109.

Fazio, R. H. (2001). On the automatic activation of associated evaluations: An overview. *Cognition and Emotion, 15,* 115–141.

Fazio, R. H., Jackson, J. R., Dunton, B. C., & Williams, C. J. (1995). Variability in automatic activation as an unobtrusive measure of racial attitudes: A bona fide pipeline? *Journal of Personality and Social Psychology, 69,* 1013–1027.

Fazio, R. H., & Olson, M. A. (2003). Implicit measures in social cognition research: Their meaning and use. *Annual Review of Psychology, 54,* 297–327.

Fazio, R. H., Sanbonmatsu, D. M., Powell, M. C., & Kardes, F. R. (1986). On the automatic activation of attitudes. *Journal of Personality and Social Psychology, 50,* 229–238.

Ferguson, M. J. (2007). On the automatic evaluation of end-states. *Journal of Personality and Social Psychology, 92,* 596–611.

Ferguson, M. J. (2008). On becoming ready to pursue a goal you don't know you have: Effects of nonconscious goals on evaluative readiness. *Journal of Personality and Social Psychology, 6,* 1268–1294.

Ferguson, M. J., & Bargh, J. A. (2004). Liking is for doing: The effects of goal pursuit on automatic evaluation. *Journal of Personality and Social Psychology, 87,* 557–572.

Ferguson, M. J., Hassin, R., & Bargh, J. A. (2008). Implicit motivation: Past, present, and future. In J. Shah & W. Gardner (Eds.), *Handbook of motivation science* (pp. 150–166). New York: Guilford.

Ferguson, M. J., & Wojnowicz, M. T. (2011). The when and how of evaluative readiness: A social cognitive neuroscience perspective. *Social and Personality Psychology Compass, 5,* 1018–1038.

Ferguson, M. J., & Zayas, V. (2009). Automatic evaluation. *Current Directions in Psychological Science, 18,* 362–366.

Gendolla, G. H. E., & Silvestrini, N. (2010). The implicit "go": Masked action cues directly mobilize mental effort. *Psychological Science, 21*, 1389–1393.

Gilovich, T., & Medvec, V. H. (1994). The temporal pattern to the experience of regret. *Journal of Personality and Social Psychology, 67*, 357–365.

Gilovich, T., & Medvec, V. H. (1995). The experience of regret: What, when, and why. *Psychological Review, 102*, 379–395.

Gollwitzer, P. M., & Kirchhof, O. (1998). The willful pursuit of identity. In J. Heckhausen & C. S. Dweck (Eds.), *Motivation and self-regulation across the life span* (pp. 389–423). Cambridge, England: Cambridge University Press.

Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review, 102,* 4–27.

Greenwald, A. G., & Farnham, S. D. (2000). Using the Implicit Association Test to measure self-esteem and self-concept. *Journal of Personality and Social Psychology, 79*, 1022–1038.

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology, 74,* 1464–1480.

Greenwald, A. G., & Nosek, B. A. (2001). Health of the implicit association test at age 3. *Zeitschrift für Experimentelle Psychologie, 48,* 85–93.

Gross, J. J. (1998). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology, 74,* 224–237.

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation

processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85,* 348–362.

Hayes, A. F. (2013). *An introduction to mediation, moderation, and conditional process analysis: A regression-based approach.* New York: Guilford.

Herrmann, M., & Brandstätter, V. (2013). Overcoming action crises in personal goals – Longitudinal evidence on a mediating mechanism between action orientation and well-being. *Journal of Research and Personality, 57,* 881–893.

Horowitz, M. J., Marmar, C., Weiss, D. S., DeWitt, K. N., & Rosenbaum, R. (1984). Brief psychotherapy of bereavement reactions. The relationship of process to outcome. *Archives of General Psychiatry, 41*, 438–448.

Huang, J. Y., & Bargh, J. A. (2014). The selfish goal: Autonomously operating motivational structures as the proximate cause of human judgement and behavior. *Behavioral and Brain Sciences, 37,* 121–175.

Huijding, J., & de Jong, P. J. (2006). Specific predictive power of automatic spider-related affective associations for controllable and uncontrollable fear responses toward spiders. *Behavior Research and Therapy, 44*, 161–176.

Hull, C. L. (1943). *Principles of behavior.* New York: Appleton-Century-Crofts.

Hull, C. L. (1952). *A behavior system: An introduction to behavior theory concerning the individual organism.* New Haven: Yale University Press.

James, W. (1890). *Principles of psychology*. New York: Holt.

Janoff-Bulman, R. (1979). Characterological versus behavioral self-blame: Inquiries into depression and rape. *Journal of Personality and Social Psychology, 37,* 1798–1809.

Janoff-Bulman, R., & Brickman, P. (1982). Expectations and what people learn from failure. In N. T. Feather (Ed.), *Expectations and actions: Expectancy-value models in psychology*. Hillsdale, NJ: Lawrence Erlbaum.

Johnson, S. L., Carver, C. S., & Fulford, D. (2010). Goal dysregulation in the affective disorders. In A. M. Kring & D. M. Sloan (Eds.), *Emotion regulation and psychopathology. A transdiagnostic approach to etiology and treatment* (pp. 204–228). New York: Guilford.

Jokisaari, M. (2004). Regrets and subjective well-being: A life course approach. *Journal of Adult Development, 11,* 281–288.

Jones, N. P, Papadakis, A. A., Orr, C. A., & Strauman, T. J. (2013). Cognitive processes in response to goal failure: A study of ruminative thought and its affective consequences. *Journal of Social and Clinical Psychology, 32,* 1–19.

Kahneman, D., & Miller, D. T. (1986). Norm theory: Comparing reality to its alternatives. *Psychological Review, 93,* 136–153.

Kahneman, D., & Tversky, A. (1982). The simulation heuristic. In D. Kahneman, P. Slovic, & A. Tversky (Eds.), *Judgment under uncertainty: Heuristics and biases* (pp. 201–208). New York: Cambridge University Press.

Kappes, A., & Oettingen, G. (2014). The emergence of goal pursuit: Mental contrasting connects future and reality. *Journal of Experimental Social Psychology, 54*, 25–39.

Kappes, A., Singmann, H., & Oettingen, G. (2012). Mental contrasting instigates goal pursuit by linking obstacles of reality with instrumental behavior. *Journal of Experimental Social Psychology, 48,* 811–818.

Kappes, A., Wendt, M., Reinelt, T., & Oettingen, G. (2013). Mental contrasting changes the meaning of reality. *Journal of Experimental Social Psychology, 49,* 797–810.

Kappes, H. B., & Oettingen, G. (2011). Positive fantasies about idealized futures sap energy. *Journal of Experimental Social Psychology, 47,* 719–729.

King, L. A., & Hicks, J. A. (2006). Narrating the self in the past and the future: Implications for maturity. *Research in Human Development, 3,* 121–138.

King, L. A., & Raspin, C. (2004). Lost and found possible selves, subjective well-being, and ego development in divorced women. *Journal of Personality, 72,* 603–632.

King, L. A., & Smith, N. G. (2004). Gay and straight possible selves: Goals, identity, subjective well-being, and personality development. *Journal of Personality, 72*, 967–994.

Klinger, E. (1975). Consequences of commitment to and disengagement from incentives. *Psychological Review, 82*, 1–25.

Koole, S. L. (2009). The psychology of emotion regulation: An integrative review. *Cognition and Emotion, 23,* 4–41.

Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., & Sleeth-Keppler, D. (2002). A theory of goal-systems: Implications for social cognitions, affect, and action. In M. Zanna (Ed.), *Advances in Experimental Social Psychology, 34* (pp. 331–376). New York: Academic Press.

Landman, J., Vandewater, E. A., Stewart, A. J., & Malley, J. E. (1995). Missed opportunities: Psychological ramifications of counterfactual thought in midlife women. *Journal of Adult Development, 2*, 87–97.

LaPiere, R. T. (1934). Attitudes vs. actions. *Social Forces, 13,* 230-237.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping.* New York: Springer.

Lecci, L., Okun, M. A., & Karoly, P. (1994). Life regrets and current goals as predictors of psychological adjustment. *Journal of Personality and Social Psychology, 66,* 731–741.

Lichtenthal, W. G., Cruess, D. G., & Prigerson, H. G. (2004). A case for establishing complicated grief as a distinct mental disorder in *DSM-V. Clinical Psychological Review, 24,* 637–662.

Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting and task performance*. Upper Saddle River, NJ: Prentice Hall.

Locke, E. A., Latham, G. P., & Erez, M. (1988). The determinants of goal commitment. *Academy of Management Review, 13,* 23–39.

Mandel, D. R. (2003). Counterfactuals, emotions, and context. *Cognition and Emotion, 17,* 139–159.

Markman, K. D., Gavanski, I., Sherman, S. J., & McMullen, M. N. (1993). The mental simulation of better and worse possible worlds. *Journal of Experimental Social Psychology, 29,* 87–109.

Markman, K. D., Karadogan, F., Lindberg, M. J., & Zell, E. (2009). Counterfactual thinking: Function and dysfunction. In K. D. Markman, W. M. P. Klein, & J. A. Suhr (Eds.), *Handbook of Imagination and Mental Simulation, 1,* 175–193.

Markman, K. D., & McMullen, M. N. (2003). A reflection and evaluation model of comparative thinking. *Personality and Social Psychology Review, 7,* 244–267.

Markman, K. D., & McMullen, M. N. (2005). Reflective and evaluative modes of mental simulation. In D. R. Mandel, D. J. Hilton, & P. Catellani (Eds.), *The psychology of counterfactual thinking* (pp. 77–93). Routledge.

Markman, K. D., & McMullen, M. N. (2007). Counterfactuals need not be comparative: The case of "as if" [Peer commentary on journal article "Precis of *the rational imagination: How people create alternatives to reality*" by R. M. J. Byrne]. *Behavioral and Brain Sciences, 30,* 461–462.

Markman, K. D., McMullen, M. N., & Elizaga, R. A. (2008). Counterfactual thinking, persistence, and performance: A test of the reflection and evaluation model. *Journal of Experimental Social Psychology,* 44, 421–428.

Mayer, J. D., & Gaschke, Y. N. (1988). The experience and meta-experience of mood. *Journal of Personality and Social Psychology, 55,* 102–111.

McCambridge, J., de Bruin, M, & Witton, J. (2012). The effects of demand characteristics on research participant behaviours in non-laboratory settings: A systematic review. *PLoS ONE, 7,* e39116. doi:10.1371/journal.pone.0039116.

McClelland, D. C. (1985). How motives, skills, and values determine what people do. *American Psychologist, 41,* 812–825.

McCloy, R., & Byrne, R. M. J. (2002). Semifactual "even if" thinking. *Thinking and Reasoning, 8,* 41–67.

McConnell, A. R., & Leibold, J. M. (2001). Relations among the Implicit Association Test, discriminatory behavior, and explicit measures of racial attitudes. *Journal of Experimental Social Psychology, 37,* 435–442.

McMullen, M. N. (1997). Affective contrast and assimilation in counterfactual thinking. *Journal of Experimental Social Psychology, 33,* 77–100.

McMullen, M. N., & Eppers, N. (2001). *The impact of counterfactual thinking on motivation and task persistence.* Paper presented at the American Psychological Association Conference, San Francisco, CA.

McMullen, M. N., & Markman, K. D. (2002). Affective impact of close counterfactuals: Implications of possible futures for possible pasts. *Journal of Experimental Social Psychology, 38,* 64–70.

Mierke, J., & Klauer, K. C. (2001). Implicit association measurement with the IAT: Evidence for effects of executive control processes. *Zeitschrift für Experimentelle Psychologie, 48,* 107–122.

Miller, G. E., & Wrosch, C. (2007). You've gotta know when to fold'em: Goal disengagement and systemic inflammation in adolescence. *Psychological Science, 18,* 773–777.

Moore, S. G., Ferguson, M. J., & Chartrand, T. L. (2011). Affect in the aftermath: How goal pursuit influences automatic evaluations. *Cognition and Emotion, 25,* 453–465.

Morrison, M., & Roese, N. J. (2011). Regrets of the typical American: Findings from a nationally representative sample. *Social Psychological and Personality Science, 2,* 576–583.

Murphy, J. G. (1982). Forgiveness and resentment. *Midwest Studies in Philosophy, 1,* 503–516.

Nasco, S. A., & Marsh, K. L. (1999). Gaining control through counterfactual thinking. *Personality and Social Psychology Bulletin, 25,* 557–569.

Neely, J. H. (1977). Semantic priming and retrieval from lexical memory: Roles of inhibitionless spreading activation and limited-capacity attention. *Journal of Experimental Psychology: General, 106,* 226–254.

Newman, M. L., Pennebaker, J. W., Berry, D. S., & Richards, J. M. (2003). Lying words: Predicting deception from linguistic styles. *Personality and Social Psychology Bulletin, 29,* 665–675.

Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review, 84,* 231–259.

Nolen-Hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition and Emotion, 7,* 561–570.

Nosek, B. A. (2005). Moderators of the relationship between implicit and explicit evaluation. *Journal of Experimental Psychology: General, 134,* 565–584.

Ochsner, K. N., & Gross, J. J. (2008). Cognitive emotion regulation: Insights from social cognitive and affective neuroscience. *Current Directions in Psychological Science, 17,* 153–158.

Oettingen, G. (1999). Free fantasies about the future and the emergence of developmental

goals. In J. Brandtstädter & R. M. Lerner (Eds.), *Action and self-development: Theory and research through the life span* (pp. 315–342). Thousand Oaks, CA: Sage.

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

Oettingen, G. (2014). *Rethinking positive thinking: Inside the new science of motivation*. New York, NY: Penguin Random House.

Oettingen, G., & Mayer, D. (2002). The motivating function of thinking about the future: Expectations versus fantasies. *Journal of Personality and Social Psychology, 83,* 1198–1212.

Oettingen, G., Mayer, D., & Portnow, S. (2016). Pleasure now, pain later: Positive fantasies about the future predict symptoms of depression. *Psychological Science, 27*, 345–353.

Oettingen, G., Mayer, D., Sevincer, A. T., Stephens, E. J., Pak, H., & Hagenah, M. (2009). Mental contrasting and goal commitment: The mediating role of energization. *Personality and Social Psychology Bulletin, 35,* 608–622.

Oettingen, G., Pak, H., & Schnetter, K. (2001). Self-regulation of goal setting: Turning free fantasies about the future into binding goals. *Journal of Personality and Social Psychology, 80,* 736–753.

Olson, M. A., & Fazio, R. H. (2001). Implicit attitude formation through classical conditioning. *Psychological Science, 12,* 413–417.

Pennebaker, J.W., Boyd, R. L., Jordan, K., & Blackburn, K. (2015). *The development and psychometric properties of LIWC2015*. Austin, TX: University of Texas at Austin.

Pennebaker, J. W., Francis, M. E., & Booth, R. J. (2001). *Linguistic inquiry and word count: LIWC 2001*. Mahwah, NJ: Lawrence Erlbaum.

Phelps, E. A., O'Connor, K. J., Cunningham, W. A., Funayama, E. S., Gatenby, J. C., Gore, J. C., & Banaji, M. R. (2000). Performance on indirect measures of race evaluation predicts amygdala activation. *Journal of Cognitive Neuroscience, 12*, 729–738.

Raven, J. C. (1965). *Advanced progressive matrices, sets I and II.* London: H. K. Lewis.

Raven, J. C. (1976). *Advanced progressive matrices. Set II*. Oxford, UK: Oxford Psychologists Press.

Raven, J. C (2000). The Raven's progressive matrices: Change and stability over culture and time. *Cognitive Psychology, 41*, 1–48.

Roemer, L., & Borkovec, T. D. (1994). Effects of suppressing thoughts about emotional material. *Journal of Abnormal Psychology, 103*, 467–474.

Roese, N. J. (1994). The functional basis of counterfactual thinking. *Journal of Personality and Social Psychology, 66,* 805–818.

Roese, N. J. (1997). Counterfactual thinking. *Psychological Bulletin, 121,* 133-148.

Roese, N. J., Epstude, K., Fessel, F., Morrison, M., Smallman, R., & Summerville, A., … Segerstrom, S. (2009). Repetitive regret, depression, and anxiety. Findings from a nationally representative survey. *Journal of Social and Clinical Psychology, 28*, 671–688.

Roese, N. J., & Hur, T. (1997). Affective determinants of counterfactual thinking. *Social Cognition, 15,* 274–290.

Roese, N. J., & Morrison, M. (2009). The psychology of counterfactual thinking. *Historical Social Research, 2,* 16–26.

Roese, N. J., & Olson, J. M. (1996). Counterfactuals, causal attributions, and the hindsight bias: A conceptual integration. *Journal of Experimental Social Psychology, 32*, 197–227.

Roese, N. J., & Summerville, A. (2005). What we regret most…and why. *Personality and*

Social Psychology Bulletin, 31, 1273–1285.

Roese, N. J., Summerville, A., & Fessel, F. (2007). Regret and behavior: Comment on Zeelenberg and Pieters. *Journal of Consumer Psychology, 17*, 25–28.

Rudman, L. A., Ashmore, R. D., & Gary, M. L. (2001). "Unlearning" automatic biases: The malleability of implicit prejudice and stereotypes. *Journal of Personality and Social Psychology, 81*, 856–868.

Rudman, L. A., & Kilianski, S. E. (2000). Implicit and explicit attitudes toward female authority. *Personality and Social Psychology Bulletin, 25*, 1315–1328.

Rusting, C. L., & Nolen-Hoeksema, S. (1998). Regulation responses to anger: Effects of rumination and distraction on angry mood. *Journal of Personality and Social Psychology, 74*, 790–803.

Schmeichel, B. J., Volokhov, R. N., & Demaree, H. A. (2008). Working memory capacity and the self-regulation of emotional expression and experience. *Journal of Personality and Social Psychology, 95,* 1526–1540.

Schwartz, B., Ward, A., Monterosso, J., Lyubomirsky, S., White, K., & Lehman, D. R. (2002). Maximizing versus satisficing: Happiness is a matter of choice. *Journal of Personality and Social Psychology, 83*, 1178–1197.

Schwarz, N. (2001). Feelings as information: Implications for affective influences on information processing. In L. L. Martin & G. L. Clore (Eds.), *Theories of mood and cognition: A user's handbook* (pp. 159–176). Mahwah, NJ: Erlbaum.

Sevincer, A. T., Busatta, P. D., & Oettingen, G. (2014). Mental contrasting and transfer of energization. *Personality and Social Psychology Bulletin, 40*, 139–152.

Sevincer, A. T., & Oettingen, G. (2013). Spontaneous mental contrasting and selective goal pursuit. *Personality and Social Psychology Bulletin, 39*, 1240–1254.

Sevincer, A. T., & Oettingen, G. (2015). Future thought and the self-regulation of

energization. In G. H. E. Gendolla, M. Tops, & S. Koole (Eds.), *Handbook of biobehavioral approaches to self-regulation* (pp. 315–329). New York: Springer.

Shear, M. K., Simon, N., Wall, M., Zisook, S., Neimeyer, R., Duan, N., … Keshaviah, A. (2011). Complicated grief and related bereavement issues for DSM-5. *Depression and Anxiety, 28*, 103–117.

Sherman, S. J., & McConnell, A. R. (1995). Dysfunctional implications of counterfactual thinking: When alternatives to reality fail us. In N. J. Roese & J. M. Olson (Eds.), *What might have been: The social psychology of counterfactual thinking* (pp.199–231). Mahwah, NJ: Erlbaum.

Sherman, S. J., Rose, J. S., Koch, K., Presson, C. C., & Chassin, L. (2003). Implicit and explicit attitudes toward cigarette smoking: The effects of context and motivation. *Journal of Social and Clinical Psychology, 22*, 13–39.

Silvestrini, N., & Gendolla, G. H. E. (2013). Automatic effort mobilization and the principle of resource conservation: One can only prime the possible and justified. *Journal of Personality and Social Psychology, 104*, 803–816.

Smallman, R., & Roese, N. J. (2009). Counterfactual thinking facilitates behavioral intentions. *Journal of Experimental Social Psychology, 45*, 845–852.

Strauman, T. J. (2002). Self-regulation and depression. *Self and Identity, 1*, 151-157.

Stroebe, M., & Schut, H. (1999). The dual process model of coping with bereavement: Rationale and description. *Death Studies, 23*, 197–224.

Summerville, A. & Roese, N. J. (2008). Dare to compare: Fact-based versus simulation-based comparison in daily life. *Journal of Experimental Social Psychology, 44*, 664–671.

Tait, R., & Silver, R. C. (1989). Coming to terms with major negative life events. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended Thought* (pp. 351–382). Guilford Press.

Taylor, S. E., Pham, L. B., Rivkin, I. D., & Armor, D. A. (1998). Harnessing the imagination: Mental simulation, self-regulation, and coping. *American Psychologist, 53*, 429–439.

Taylor, S. E., & Schneider, S. K. (1989). Coping and the simulation of events. *Social Cognition, 7*, 174–194.

Teige, S., Schnabel, K., Banse, R., & Asendorpf, J. B. (2004). Assessment of multiple implicit self-concept dimensions using the extrinsic affective Simon task (EAST). *European Journal of Personality, 18,* 495–520.

Thayer, R. E. (1978). Toward a psychological theory of multidimensional activation (arousal). *Motivation and Emotion, 2,* 1–34.

Van Dillen, L. F., Heslenfeld, D., & Koole, S. L. (2008). Tuning down the emotional brain: An fMRI study of the effects of cognitive load on the processing of affective images. *NeuroImage, 45,* 1212–1219.

Van Dillen, L. F., & Koole, S. L. (2007). Clearing the mind: A working memory model of distraction from negative emotion. *Emotion, 7*, 715–723

Watkins, P. C., Woodward, K., Stone, T., & Kolts, R. L. (2003). Gratitude and happiness: Development of a measure of gratitude, and relationship with subjective well-being. *Social Behavior & Personality: An International Journal, 31*, 431–452.

Wayment, H. A. (2004). It could have been me: Vicarious victims and disaster-focused distress. *Personality and Social Psychology Bulletin, 30,* 515–528.

Weber, S. J., & Cook, T. D. (1972). Subject effects in laboratory research: An examination of subject roles, demand characteristics, and valid inference. *Psychological Bulletin, 77*, 273–295.

Wegner, D. M., Schneider, D. J., Carter, S. R., & White, T. L. (1987). Paradoxical effects of thought suppression. *Journal of Personality and Social Psychology, 53*, 5–13.

Weisz, J. R., McCabe, M. A., & Dennig, M. D. (1994). Primary and secondary control among children undergoing medical procedures: Adjustment as a function of coping style. *Journal of Consulting and Clinical Psychology, 62,* 324–332.

Wells, G., L., & Gavanski, I. (1989). Mental simulations of causality. *Journal of Personality and Social Psychology, 56,* 161–169.

Wenzlaff, R. M., & Wegner, D. M. (2000). Thought suppression. In S. T. Fiske (Ed.), *Annual Review of Psychology* (Vol. 51, pp. 59–91). Palo Alto, CA: Annual Reviews.

Wicker, A. W. (1969). Attitudes versus actions: The relationship of verbal and overt behavioral responses to attitude objects. *Journal of Social Issues, 25,* 41–78.

Wicklund, R. A., & Gollwitzer, P. M. (1982). *Symbolic self-completion*. Hillsdale, NJ: Erlbaum.

Wieber, F., Odenthal, G., & Gollwitzer, P. (2010). Self-efficacy feelings moderate implementation intention effects. *Self and Identity, 9,* 177–194.

Wittleder, S., Kappes, A., Wendt, M., & Oettingen, G. (2017). *Self-regulation by mental contrasting modulates automatic affect towards obstacles of reality*. Manuscript in preparation.

Wright, R. A. (1996). Brehm's theory of motivation as a model of effort and cardiovascular response. In P. M. Gollwitzer & J. A. Bargh (Eds.), The psychology of action: Linking cognition and motivation to behavior (pp. 424–453). New York: Guilford.

Wright, R. A., & Kirby, L. D. (2001). Effort determination of cardiovascular response: An integrative analysis with applications in social psychology. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 33, pp. 255–307). San Diego: Academic.

Wright, R. A., Murray, J. B., Storey, P. L., & Williams, B. J. (1997). Ability analysis of gender relevance and sex differences in cardiovascular response to behavioral challenge. *Journal of Personality and Social Psychology, 73*, 405–417.

Wrosch, C., Miller, G. E., Scheier, M. F., & Brun de Pontet, S. (2007). Giving up on unattainable goals: Benefits for health? *Personality and Social Psychology Bulletin, 33*, 251–265.

Wrosch, C., Scheier, M. F., Carver, C. S., & Schulz, R. (2003). The importance of goal disengagement in adaptive self-regulation: When giving up is beneficial. *Self and Identity, 2*, 1–20.

Wrosch, C., Scheier, M. F., & Miller, G. E. (2013). Goal adjustment capacities, subjective well-being, and physical health. *Social and Personality Psychology Compass, 1*, 847–860.

Wrosch, C., Scheier, M. F., Miller, G. E., Schulz, R., & Carver, C. S. (2003). Adaptive self-regulation of unattainable goals: Goal disengagement, goal reengagement, and subjective well-being. *Personality and Social Psychology Bulletin, 29*, 1494–1508.

Zeelenberg, M., & Pieters, R. (2007). A theory of regret regulation 1.0. *Journal of Consumer Psychology, 17*, 3–18.

Zeelenberg, M., van Dijk, W. W., & Manstead, A. S. R. (1998). The experience of regret and disappointment. *Cognition and Emotion, 12*, 221–230.

Zeelenberg, M., van Dijk, W. W., van der Pligt, J., Manstead, A. S. R., van Empelen, P., & Reinderman, D. (1998). Emotional reactions to the outcomes of decisions: The role of counterfactual thought in the experience of regret and disappointment. *Organizational Behavior and Human Decision Processes, 75*, 117–141.

Appendix

Table 1

Disappointment and Global Negative Affect in the Mental Contrasting, Indulging, Dwelling, and Control Conditions: Study 1.1 and Study 1.2.

	MC		Indulging		Dwelling		Control					
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*df*	*F*	*p*	ω^2
Study 1.1 (*N* = 97)	(*n* = 50)		(*n* = 47)									
Disappointment	3.94	1.62	4.85	1.47					95	8.35	.005	.07
Global Negative Affect	3.76	1.39	4.38	1.36					95	4.93	.029	.04
Study 1.2 (*N* = 218)	(*n* = 62)		(*n* = 49)		(*n* = 50)		(*n* = 57)					
Disappointment	3.40	1.69	4.45	1.87	4.24	1.67	4.28	2.02	214	3.89	.010	.04
Global Negative Affect	3.28	1.44	4.11	1.68	4.06	1.42	4.07	1.64	214	3.96	.009	.04

Note. High scores indicate high levels of disappointment and negative affect, with scores ranging from 1-7. Reliabilities of the global negative affect scales were α = .95 (Study 1.1), and α = .96 (Study 1.2). MC = Mental Contrasting.

Table 2

Disappointment and Global Negative Affect in the Mental Contrasting, Reverse Contrasting, and Control Conditions: Study 1.3 and Study 1.4.

	MC		RC		Control					
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*df*	*F*	*p*	ω^2
Study 1.3 (*N* = 287)	(*n* = 103)		(*n* = 101)		(*n* = 83)					
Disappointment	3.22	1.87	3.95	1.77	3.75	1.61	284	4.57	.011	.02
Global Negative Affect	3.10	1.55	3.71	1.61	3.52	1.46	284	4.19	.016	.02
Study 1.4 (*N* = 267)	(*n* = 85)		(*n* = 70)		(*n* = 112)					
Disappointment	3.41	1.75	4.00	1.75	4.16	1.85	264	4.42	.013	.02
Global Negative Affect	3.30	1.61	3.87	1.61	3.78	1.51	264	3.25	.040	.02

Note. High scores indicate high levels of disappointment and negative affect, with scores ranging from 1-7. Reliabilities of the global negative affect scales were α = .96 (Study 1.3), and α = .95 (Study 1.4). MC = Mental Contrasting. RC = Reverse Contrasting.

Table 3

Post-Decisional Regret, Interpersonal Resentment, and Regret in the Mental Contrasting, Indulging, and Dwelling Conditions: Study 1.5 and Study 1.6.

	MC		Indulging		Dwelling					
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*df*	*F*	*p*	ω^2
Study 1.5 (*N* = 130)	(*n* = 50)		(*n* = 39)		(*n* = 41)					
Post-Decisional Regret [a]	2.64	0.96	3.45	0.98	3.16	0.94	127	8.10	<.001	.10
Study 1.6 (*N* = 116)	(*n* = 41)		(*n* = 34)		(*n* = 41)					
Interpersonal Resentment [b]	4.41	1.23	5.14	1.26	5.18	1.07	113	5.32	.006	.07
Regret [c]	2.92	1.18	3.60	1.02	3.32	1.21	110	3.29	.041	.04

Note. High scores indicate high levels of post-decisional regret, with scores ranging from 1-5 [a], high levels of interpersonal resentment, with scores ranging from 1-9 [b], and high levels of regret, with scores ranging from 1-5 [c]. Reliabilities were α = .90 for the Post-Decisional Regret Scale (Study 1.5), α = .40 for the interpersonal resentment scale (Study 1.6), and α = .86 for the regret scale (Study 1.6). MC = Mental Contrasting.

Table 4

Mean Untransformed Reaction Times in ms and Percentage of Errors on Target Trials as a Function of Condition, Stimulus, and Extrinsic Response Valence: Study 2.

	MC (*n* = 51)		Indulging (*n* = 48)		Control (*n* = 55)	
Extrinsic Response Valence	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*
Scenario						
Reaction Time	703 (203)	750 (229)	738 (208)	763 (263)	740 (237)	735 (190)
Percentage of Errors	3.59 (6.29)	5.56 (8.11)	5.90 (13.85)	8.85 (12.68)	3.94 (6.58)	5.61 (11.12)
Reality						
Reaction Time	711 (166)	732 (225)	781 (235)	727 (223)	744 (187)	725 (173)
Percentage of Errors	6.37 (10.08)	4.58 (9.47)	6.94 (10.92)	4.17 (6.43)	6.06 (9.28)	3.64 (8.60)
War						
Reaction Time	737 (226)	705 (193)	769 (207)	699 (220)	736 (167)	710 (163)
Percentage of Errors	8.50 (10.07)	3.43 (6.49)	9.55 (14.59)	2.43 (7.08)	8.64 (10.14)	2.73 (5.09)
Friend						
Reaction Time	691 (208)	698 (181)	707 (195)	743 (224)	699 (172)	741 (146)
Percentage of Errors	3.76 (5.85)	6.05 (9.14)	3.65 (9.71)	5.56 (8.65)	3.03 (4.91)	6.52 (8.74)
Phase						
Reaction Time	684 (170)	711 (199)	734 (222)	739 (249)	704 (197)	710 (148)
Percentage of Errors	5.72 (8.58)	4.41 (6.31)	5.03 (9.68)	5.56 (9.92)	4.55 (7.66)	4.09 (7.15)

Note. SD are given in parentheses. MC = Mental Contrasting.

Table 5

Other-Rated Performance and Authenticity in the Mental Contrasting and Indulging Conditions: Study 4.1 and Study 4.2.

Variable	MC		Indulging					
	M	*SD*	*M*	*SD*	*df*	*F*	*p*	ω^2
Study 4.1: Get-Well Letter (*N* = 140)	(*n* = 74)		(*n* = 66)					
Other-Rated Performance	4.61	1.28	3.72	1.44	134	14.34	< .001	.09
Authenticity	54.96	29.11	46.99	25.93	134	2.82	.096	.01
Study 4.2: Application Letter (*N* = 120)	(*n* = 61)		(*n* = 59)					
Other-Rated Performance	4.58	1.40	3.94	1.56	109	5.25	.024	.04
Authenticity	60.64	26.81	50.33	29.34	109	3.74	.056	.02

Note. High scores indicate strong other-rated performance, with scores ranging from 1-7, and high levels of authenticity, with a grand mean of 49.17 (*SD* = 20.92) across different genres within a corpus of 230 million words (*LIWC 2015*; Pennebaker et al., 2015). Inter-rater reliabilities of other-rated performance were α = .96 in Study 4.1, and α = .88 in Study 4.2. MC = Mental Contrasting.

Table 6

Task Performance and Task Persistence in the Mental Contrasting, Indulging, and Control Conditions: Study 4.3.

	MC (n = 45)		Indulging (n = 47)		Control (n = 51)					
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*df*	*F*	*p*	ω^2
Task Performance	6.51	1.77	5.51	2.11	5.14	2.45	140	5.16	.007	.06
Task Persistence	238.60	127.45	193.61	89.63	190.40	110.83	140	2.78	.066	.02

Note. High scores indicate successful task performance, measured as the number of matrices solved correctly. Scores range from 0-10. High scores indicate high levels of task persistence, measured as total time spent on the task (in seconds). MC = Mental Contrasting.

Stimuli presented in Study 2

Positive Adjectives: GESUND (*healthy*), EHRLICH (*honest*), KLUG (*smart*), LUSTIG (*funny*), HERVORRAGEND (*outstanding*)

Negative Adjectives: BÖSE (*evil*), SCHRECKLICH (*horrible*), GEMEIN (*mean*), VULGÄR (*vulgar*), WIDERLICH (*repulsive*)

Colored Words: idiosyncratic scenario word, idiosyncratic reality word, KRIEG (*war*), FREUND (*friend*), PHASE (*phase*)

Acknowledgements

This research was supported by German Research Foundation Grant Oe-237/13-1 awarded to Gabriele Oettingen. The author wants to thank Prof. Dr. rer. nat. Gabriele Oettingen for her support, supervision, and inspiration, Prof. Dr. rer. soc. Rosemarie Mielke, PD Dr. phil. Stefanie Brassen, Prof. Dr. rer. nat. Lars Schwabe, and Prof. Dr. phil. Alexander R. Redlich for being part of the dissertation committee. The support of Klaus Michael Reininger, Vivica Riess, Eberhard Krott, Marlis Krott-Luetzeler, Nikolas Leon Krott, Jan David Krott, and Steffen Görtz was inestimable. The author especially thanks the team of the Motivation Lab and associated students for their support and valuable feedback. I am deeply grateful to Ruth Marheinecke, Katharina Schulte, Rosa Groth, Sarah Schneider, Maria Kessel, and to all contributors not mentioned here.

Erklärung gemäß § 5 (4d) der Promotionsordnung des Instituts für Psychologie der Universität Hamburg vom 20.08.2003

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

_____ _____

Ort, Datum Unterschrift

Eidesstattliche Erklärung nach § 9 (1c) der Promotionsordnung des Fachbereichs Psychologie der Universität Hamburg vom 20.08.2003

Hiermit erkläre ich an Eides statt, dass die von mir vorgelegte Dissertation nicht Gegenstand eines anderen Prüfungsverfahrens gewesen oder in einem solchen Verfahren als ungenügend beurteilt worden ist.

_____ _____

Ort, Datum Unterschrift

Eidesstattliche Erklärung nach § 9 (1d) der Promotionsordnung des Fachbereichs Psychologie der Universität Hamburg vom 20.08.2003

Hiermit erkläre ich an Eides statt, dass ich die von mir vorgelegte Dissertation selbst verfasst, keine anderen als die angegebenen Quellen und Hilfsmittel benutzt und keine kommerzielle Promotionsberatung in Anspruch genommen habe. Die wörtlich oder inhaltlich übernommenen Stellen habe ich als solche kenntlich gemacht.

_____ _____

Ort, Datum Unterschrift