



# Demand to Act and Use of Mental Contrasting

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**Abstract:** Mentally contrasting a desired future with present reality fosters selective goal pursuit: People pursue feasible desired futures and let go from unfeasible ones. We investigated whether people spontaneously use mental contrasting when the demand to act toward their desired future is high. Study 1 provided correlational evidence: The participants who planned to act most immediately were also those who used mental contrasting. Studies 2 and 3 added experimental evidence: Imagining an immediate (vs. no immediate) action and being confronted with the opportunity to perform an instrumental (vs. noninstrumental) action, respectively, led participants to mentally contrast. The findings have theoretical implications by suggesting that people initiate mental contrasting as a problem-solving strategy; they have applied implications for interventions teaching mental contrasting.

**Keywords:** self-regulation, mental contrasting, future thinking, goal pursuit, action, content analyses

An undergraduate student wishes to complete her bachelor thesis during next term. Envisioning the desired future of having mastered her thesis – feeling proud and fulfilled – and then identifying the critical inner obstacle that may interfere – feeling the urge to party – should lead her to recognize that she needs to take the necessary steps in time (e.g., writing an outline, meeting her professor), rather than party. Only when visualizing both the desired future and the critical obstacle (i.e., mental contrasting of completing her thesis with the urge to party) will the student act toward completing her thesis.

Research on mental contrasting has addressed the effects of mental contrasting on taking on and successfully completing important projects. When people spontaneously use mental contrasting however is less clear. We asked whether people would spontaneously self-regulate by mental contrasting when the demand to act toward fulfilling an important wish is high (vs. low). We operationalized demand by whether a planned action (Study 1) and a needed action (Study 2) are more rather than less immediate and whether there is an opportunity to perform instrumental action toward wish fulfillment or not (Study 3). Concerning the student above, she should tend to spontaneously mentally contrast the desired future of finishing her studies in time with present reality, when she plans or needs to act immediately and has the opportunity to perform an action that is instrumental (vs. not) for completing her thesis.

## Mental Contrasting

When people use mental contrasting, they first name an important wish (e.g., “finish my studies”). They then identify and visualize the best outcome of their desired future (e.g., “feeling accomplished”). After that, they identify and imagine their present reality standing in the way of realizing their wish (e.g., “feeling lazy”). Visualizing the desired future followed by the present reality strengthens implicit associative links between future and reality (A. Kappes & Oettingen, 2014) and between the reality and instrumental means to overcome the reality (A. Kappes, Singmann, & Oettingen, 2012). It also helps to recognize the reality as an obstacle to wish fulfillment (A. Kappes, Wendt, Reinelt, & Oettingen, 2013). These effects emerge if people consider their reality surmountable (high expectations of success). If they consider their reality as insurmountable (low expectations of success), mental contrasting weakens the future–reality and reality–means associative links and prevents people from recognizing their reality as an obstacle. As a consequence, mental contrasting leads to selective goal pursuit, that is, people will vigorously pursue their wish when expectations are high but will disengage when expectations are low.

Visualizing only the desired future (indulging) or only the present reality (dwelling) does not change the associative links between the future and the reality and between the reality and the means to overcome reality, and it fails to

induce a perception of the reality as being an obstacle to the desired future. Similarly, visualizing the reality first, before imagining the future (reverse contrasting), does not change respective associative links because the reality is not elaborated in the context of the desired future and thus is not perceived as an obstacle to the desired future (A. Kappes, Singmann, et al., 2012; A. Kappes & Oettingen, 2014). For example, a student who imagines having successfully finalized an important class assignment on Monday and then imagines attending a party on Saturday night (as in mental contrasting) will likely see the party as an obstacle to finalizing the assignment. When, however, she thinks about the party first, that is, not in the context of finalizing her assignment (as in reverse contrasting), she will likely imagine the party as disconnected from her assignment. Thus, she will perceive the party as an opportunity to have fun rather than an obstacle to her desired future of finalizing the assignment.

Empirical support for the contention that as opposed to mental contrasting, in reverse contrasting people fail to perceive the reality as an obstacle, comes from a series of studies that used explicit evaluations and implicit categorization tasks (e.g., a task-switching paradigm) to investigate whether mental contrasting versus reverse contrasting leads people to interpret their reality as an obstacle (A. Kappes et al., 2013). Indeed, mental contrasting (vs. reverse contrasting, and other relevant control groups) fostered negative explicit evaluations of the obstacle and the meaning of reality as an obstacle when expectations of successfully reaching the desired future were high (weakening obstacle interpretation when expectations of success were low). Interestingly, the changed interpretation of reality as an obstacle mediated mental contrasting effects on goal pursuit. That is, mental contrasting, but not reverse contrasting, changes the interpretation of reality, and thus, it enables people to selectively pursue feasible (vs. unfeasible) desired futures.

In sum, mental contrasting (but not reverse contrasting) is a conscious self-regulation strategy that transforms mere wishes into goals with subsequent goal pursuit by changing nonconscious associative links between a desired future and the present reality. As such, mental contrasting differs from self-regulation strategies used to attain already set goals (implementation intentions; P. M. Gollwitzer, 1999) and from self-control strategies that shield ongoing goal pursuit from temptations (counteractive self-control; Trope & Fishbach, 2000; temptation-goal activation; Fishbach, Friedman, & Kruglanski, 2003).

## Inducing Mental Contrasting

Most studies on mental contrasting experimentally induced mental contrasting to examine its effects on expectations-

based goal pursuit. In these studies, participants first wrote down their currently most important wish from a specific domain. Participants in the mental contrasting condition were then instructed to write down and elaborate the best outcome they associate with having fulfilled their wish. Following this, they wrote down their most critical inner obstacle that keeps them from fulfilling their wish. Control conditions involved an indulging condition (participants named and elaborated their best outcome followed by their second best outcome), a dwelling condition (participants named and elaborated their most crucial obstacle followed by their second most crucial obstacle), a reverse contrasting condition (participants named and elaborated their most crucial obstacle followed by their best outcome), or an irrelevant content condition (participants named and elaborated content irrelevant to their wish).

As dependent variables, these studies assessed various indicators of goal pursuit, for example, cognitive (e.g., planning), motivational (e.g., determination), physiological (e.g., energization), and behavioral indicators (e.g., performance). These indicators were self-reported or observed and assessed directly after the mental exercise or weeks later. Consistently, mental contrasting more than the control elaborations led to expectations-based goal pursuit (Oettingen, 2000; Oettingen, Pak, & Schnetter, 2001; Oettingen et al., 2009; Sevincer, Busatta, & Oettingen, 2014; summaries by Oettingen & Sevincer, 2018; Sevincer & Oettingen, 2015). Moreover, when mental contrasting was taught as a metacognitive strategy, it helped people to tackle important tasks and successfully realize their wishes. For example, it led people to become physically more active (Sheeran, Harris, Vaughan, Oettingen, & Gollwitzer, 2013), improve their time management (Oettingen, Mayer, & Brinkmann, 2010), deal with chronic disease (Adriaanse, de Ridder, & Voorneman, 2013), and excel in a school quiz (A. Gollwitzer, Oettingen, Kirby, Duckworth, & Mayer, 2011) among others.

## Measuring Mental Contrasting

In addition to inducing mental contrasting and applying it as a metacognitive strategy, researchers have measured the spontaneous use of mental contrasting (Sevincer & Oettingen, 2013). Following the procedure to induce mental contrasting, participants first named an important wish. They then freely wrote about their wish. Their written texts were content analyzed to identify participants' mode of thought. Participants who wrote about the desired future first, followed by the present reality were identified as mentally contrasting; those who wrote about the desired future only as indulging; those who wrote about the reality only as dwelling, and those who wrote about the reality first,

followed by the future as reverse contrasting. Interrater reliabilities for coding participants' mode of thought were acceptable to high (between 76% and 89%; Sevincer & Oettingen, 2013; Sevincer, Mehl, & Oettingen, 2017; Sevincer, Schlier, & Oettingen, 2015).<sup>1</sup>

Support for the predictive validity of the coding system comes from studies suggesting that spontaneous mental contrasting, measured in this way, produced expectations-based goal pursuit just as induced mental contrasting does (Sevincer & Oettingen, 2013). Other studies supported the concurrent (Sevincer et al., 2015), convergent, and discriminant validity (Sevincer et al., 2017) of the coding system. In sum, the developed procedure is a reliable and valid measure of the spontaneous use of mental contrasting.

Studies successfully used the coding system to investigate person states and traits that predict whether people spontaneously use mental contrasting. Because mental contrasting is cognitively demanding, mentally fatigued (ego-depleted; Muraven & Baumeister, 2000) participants were less inclined to use it than not fatigued participants (Sevincer et al., 2015). Further, because mental contrasting is an effective self-regulation strategy that helps people manage their life, people who are well self-regulated, as indicated by their high self-regulation skills, need for achievement, and need for cognition, used mental contrasting rather than people low on these traits (Sevincer et al., 2017). Here, rather than exploring person variables (states and traits) that predict mental contrasting, we investigated in which situations people use mental contrasting. Specifically, in a situation where the demand to act toward fulfilling an important wish is high, people would use mental contrasting rather than when the demand is low.

## Use of Mental Contrasting and Demand to Act

Support for our hypothesis that people use mental contrasting when the demand to act toward wish fulfillment is high comes from three lines of research. First, mental contrasting involves more cognitive effort than other modes of thought (Achtziger, Fehr, Oettingen, Gollwitzer, & Rockstroh, 2009). Research on effortful self-regulation suggests that people strategically manage their effort expenditure. For example, they do not expend more effort than is

required to complete a task successfully (energy-conservation principle; Richter, Gendolla, & Wright, 2016; Wright, 1996). Similarly, people limit their effortful self-regulation when anticipating they will need effortful self-regulation in the future (Muraven, Shmueli, & Burkley, 2006). People also strive to find a balance between exerting effortful self-regulation and letting themselves go (de Witt Huberts, Evers, & De Ridder, 2014; Inzlicht & Schmeichel, 2012). Indeed, when researchers measured people's spontaneous modes of thought, participants predominantly indulged or dwelled, which requires less mental effort than mental contrasting (Sevincer & Oettingen, 2013). Moreover, participants whose regulatory resources were depleted (vs. not) refrained from mental contrasting (Sevincer et al., 2015). Because mental contrasting requires cognitive effort, and people strategically manage their effort, we suspected participants would use mental contrasting when the demand to act on a wish is high (vs. low).

Second, mental contrasting involves the processing of more complex information than other modes of thought. In mental contrasting, people elaborate both the desired future and present reality rather than one or the other only as in indulging or dwelling. Mentally contrasting participants also processed negative feedback more thoroughly as indicated by better recall of the feedback (A. Kappes, Oettingen, & Pak, 2012). Research on information processing suggests that whether people engage in thorough or shallow processing depends on their motivation and the situational demands (Fiske & Neuberg, 1990; Petty & Wegener, 1999). Rather than minimizing their use of cognitive resources (cognitive miser; Fiske & Taylor, 1984), people engage in thorough processing when the demand to do so is high (motivated tactician; Fiske, 2004). Because mental contrasting involves more thorough information processing, and people engage in thorough (vs. shallow) processing when the demand to do so is high, we suspected that participants would use mental contrasting when the demand to act is high (vs. low).

Third, mental contrasting is an effective self-regulation strategy in academic contexts that helps students to manage their academic pursuits (A. Gollwitzer et al., 2011). Research on self-regulated learning suggests that students may deliberately postpone exerting self-regulation depending on how pressing the demand to self-regulate is (Chu & Choi, 2005; Pintrich & De Groot, 1990). Although the usefulness of such active procrastination for academic achievement has been debated (Cao, 2012), people frequently

<sup>1</sup> One might argue that our coding system does not explicitly capture whether participants contrasted their thoughts about a desired future with their thoughts about the present reality. For instance, participants who thought about the desired future and then about the present reality may have used indulging and then dwelling independently rather than mental contrasting. However, in line with the theory (Oettingen, 2000; Oettingen, Pak, & Schnetter, 2001), and mirroring the procedure inducing mental contrasting, mentally elaborating the desired future followed by mentally elaborating the present reality, both in relation to an important personal wish, is mental contrasting. Therefore, when a participant wrote about the desired future followed by the present reality, this pattern must be coded as mental contrasting.

engage in this approach (Harriott & Ferrari, 1996). Therefore, we suspected that participants would spontaneously self-regulate by mental contrasting when the demand to act is high (vs. low).

## The Present Research

We examined whether people spontaneously self-regulate by mentally contrasting when the demand to act on a personally important wish is high rather than low. In Studies 1 and 2, we operationalized demand by the immediacy of action toward wish fulfillment. Study 1 used a correlational design. We hypothesized that the participants who planned to act the most immediately to fulfill an interpersonal wish would also be those who mentally contrasted. Study 2 used an experimental design to establish a causal effect of high demand on mental contrasting. Specifically, undergraduate students imagined a needed action (registering their bachelor thesis) for fulfilling their wish of completing their studies. We manipulated high (vs. low) demand by having students imagine registering their thesis either immediately or not immediately (in 2 months vs. 2 years). In Study 3, we operationalized demand by confronting participants with the opportunity to perform an action that is either instrumental (training interpersonal skills) or not instrumental (training reading, spelling, and comprehension) to attaining a self-generated interpersonal wish. The spontaneous use of mental contrasting was measured following Sevincer and Oettingen (2013). We hypothesized the higher the demand to act the more of the participants would use mental contrasting.

## Study 1: Immediacy of Planned Action

Study 1 aimed to establish correlational evidence for our proposition that the higher the demand to act the more of the participants would use mental contrasting. Participants named a personally important interpersonal wish and indicated when they planned to act on it. After that, we assessed whether they mentally contrasted about their wish. We hypothesized that participants who planned to act more immediately would be those who used mental contrasting.

## Method

### Participants and Design

Participants were 276 US Americans recruited via Amazon MTurk for an online study on life tasks (163 male, 106

female, seven unidentified,  $M_{age} = 30.99$  years,  $SD = 10.46$ ). Because there were no prior studies on the relationship between demand to act and mental contrasting, we estimated our sample size to detect even a small effect. Given a critical  $\alpha$  of .05, to detect a small effect ( $d = 0.20$ ) with high power (80%), we would need about 300 participants (G\*Power Analysis; Faul, Erdfelder, Lang, & Buchner, 2007). Participants received 0.50\$ for taking part. The study used a cross-sectional, correlational design.

### Procedure

#### *Interpersonal Wish, Expectations, and Incentive Value*

Following prior research (Sevincer & Oettingen, 2013), participants first named their currently most important interpersonal wish (see the Electronic Supplementary Material, ESM 1 for verbatim instructions). Participants named, for example, “Make more friends.” They then indicated their expectations of success (“How likely do you think it is that you will realize your wish?”) and the incentive value of their wish (“How important is it to you that you will realize your wish?”). The 7-point answer scales ranged from 1 (= *not at all*) to 7 (= *very*).

#### *Immediacy of Planned Action*

Participants reported when they planned to act and fulfill their wish by answering two items: “When do you plan to take action to realize your wish?” and “By when do you plan to have realized your wish completely?” They indicated their answers as the number of days/months/years from taking part in the study.

#### *Assessment of Self-Regulatory Thought*

To measure mental contrasting, we followed the procedure by Sevincer and Oettingen (2013). We first asked participants to freely think about their interpersonal wish (see ESM 1 for verbatim instructions). They wrote down their thoughts and mental images into a designated field. To assess their mode of thought, two independent raters segmented participants’ texts into statements. A statement was defined as at least one subject-predicate sequence or more. Interrater agreement for the segmentation was 79%. If the raters disagreed, we coded the larger number of statements. Of the 276 participants, three (1%) listed only keywords (“trust,” “happiness”). For those participants, we considered each keyword as one statement.

The raters then coded each statement into one of three categories: (a) desired future, (b) present reality, or (c) other. Statements coded as about the desired future included descriptions of desired future events and consequences of realizing the desired future, such as feelings, material and nonmaterial gains, and improvements in the current situation. Statements coded as about the present

reality included descriptions of the reality and obstacles to realizing the desired future. Statements coded as “other” included ambiguous statements, statements about past events, the self in general, and the experimental situation. Examples of the segmentation and coding are given in Sevincer and Oettingen (2013). Interrater agreement for the coding was 84% ( $\kappa = .75$ ). Regarding the number of statements on which raters disagreed (16%), for 78% of these statements, agreement could be reached through discussion. For the remaining 22%, an agreement could not be reached. If an agreement could not be reached, the statement was coded as “other.”

A participant was classified as mentally contrasting if the participant generated at least one statement about the desired future and at least one statement about the present reality, mentioning the future first; if the participant mentioned the reality first, he or she was classified as reverse contrasting. A participant was classified as indulging if the participant generated at least one statement about the future but none about the reality and as dwelling if he or she generated at least one statement about the reality but none about the future. If a participant generated only statements categorized as “other,” we did not include him or her in the above categories. We recorded the number of generated statements as an indicator for how thoroughly participants elaborated on their wish. This measure allowed us to ensure that the hypothesized relationship between immediacy of planned action and mental contrasting cannot be explained by a relationship between the immediacy of planned action and participants’ more thorough elaboration of their wishes (Klinger, 1975). To conclude, participants completed a demographic questionnaire<sup>2</sup> and were fully debriefed.

## Results

### Descriptive Analyses

#### *Expectations and Incentive Value*

Participants’ mean expectations of successfully realizing their wish were at  $M = 5.11$  ( $SD = 1.46$ ), and the mean incentive value of their wish was at  $M = 5.88$  ( $SD = 1.25$ ) of the 7-point scale. Expectations and incentive value correlated positively,  $r = .45$ ,  $p < .001$ .

#### *Immediacy of Planned Action*

We first transformed participants’ answers to the two items measuring immediacy of planned action into the number of days from taking part in the study. Because some

participants gave extreme answers (e.g., they planned to act 30 years from taking part), we winsorized each item. That is, we removed the top 5% of scores that were most extreme and replaced them with the highest remaining score (Howell, 2007; Tukey, 1962). For example, for the first item, after removing the top 5% of scores, the highest score was 3,650 days (10 years). Thus, we replaced each of the 5% of scores we removed with 3,650 days.

After we removed the highest 5% of scores, participants on average planned to act 397 days ( $SD = 882$ ) after taking part. They planned to have fulfilled their wish 1,750 days ( $SD = 2,496$ ) after taking part. Both items were right-skewed (skewness: 3.03 and 1.47), indicating that most participants named more immediate (short-term) wishes (e.g., “telling my spouse I love her”) and only a few named less immediate (long-term) wishes. To reduce skewness, we transformed each item by calculating its square root. Because the two transformed items correlated positively ( $r = .44$ ,  $p < .001$ ), we averaged them into one index of immediacy of planned action.

#### *Self-Regulatory Thought*

Fifty-three participants (19%) mentally contrasted, 119 (43%) indulged, 35 (13%) dwelled, and 42 (15%) reverse contrasted. Twenty-seven participants (10%) generated only statements categorized as “other.” Following Sevincer and Oettingen (2013), the latter 27 participants were excluded from the analyses. We dummy-coded the categorical self-regulatory thought variable into mental contrasting (0) versus not (indulging, dwelling, and reverse contrasting combined) (1).

#### *Number of Statements*

On average, participants generated 8.18 ( $SD = 5.49$ ) statements. Following Sevincer et al. (2015, 2017), to verify that the hypothesized pattern is not due to variations in the number of statements, we controlled for the number of statements in our analyses. For detailed analyses, see ESM 1.

#### **Relation Between Immediacy of Planned Action and Mental Contrasting**

Immediacy of planned action correlated positively with the dummy-coded mental contrasting variable,  $r = .16$ ,  $p = .012$  (point-biserial correlation), indicating that, as predicted, the participants who planned to act more immediately used mental contrasting rather than those who planned to act less immediately. Of the one-fourth of participants who intended to act soonest, 23% used mental contrasting,

<sup>2</sup> In Studies 1–3, we also included other measures. For example, in Study 1, we measured participants’ implicit theories of intelligence (Dweck, 2000) and their positive and negative affects (Watson, Clark, & Tellegen, 1988); in Study 2, we measured their locus of control (Kovaleva, Beierlein, Kemper, & Rammstedt, 2012); and in Study 3, we measured their mood. Because these measures were assessed for exploratory reasons, we did not discuss them here.

**Table 1.** Study 1: Summary of hierarchical binary logistic regression analyses for immediacy of planned action, expectations, incentive value, and number of statements predicting the dummy-coded mental contrasting variable (mental contrasting vs. not)

Predictor variables	<i>B</i>	<i>SE B</i>	<i>p</i>	Odds ratio <sup>a</sup>	95% CI
Step 1					
Immediacy of planned action	0.03	.01	.014	1.03	[1.01, 1.05]
Step 2					
Immediacy of planned action	0.03	.01	.010	1.03	[1.01, 1.05]
Expectations	0.02	.12	.90	1.01	[0.80, 1.30]
Incentive	-0.03	.16	.85	0.97	[0.72, 1.32]
Number of statements	-0.05	.03	.11	0.96	[0.90, 1.01]

Notes.  $R^2 = .04$ ,  $p = .008$  for Step 1,  $\Delta R^2 = .02$ ,  $p = .40$ , for Step 2. <sup>a</sup>Odds ratios (ORs) represent the likelihood that participants use mental contrasting with an increase in the predictor variable. For example, the OR of 1.03 for the relation between planned action and the use of mental contrasting signifies that with a one-unit decrease in participants' planned action scores, the likelihood that participants use mental contrasting is 1.03 times as high.

compared to 7% of the one-fourth who intended to act later. To test whether the observed relationship remains robust when controlling for expectations, incentive, and the number of statements, we conducted hierarchical binary logistic regression analyses with the dummy-coded mental contrasting variable as the dependent variable, and the continuous square-root transformed immediacy of planned action index as predictor in the first step. Immediacy of planned action predicted mental contrasting. When we added expectations, incentive value, and the number of statements as predictors in the second step, immediacy of planned action continued to predict mental contrasting. Thus, the pattern was robust when controlling for the added variables. See Table 1 for a summary of the regression analyses.<sup>3,4</sup>

### Relation Between Immediacy of Planned Action and the Other Modes of Thought

To investigate whether immediacy of planned action predicted mental contrasting only, we tested whether immediacy of planned action predicted each of the other modes of thought (indulging, dwelling, and reverse contrasting). Specifically, we dummy-coded each mode of thought as a dichotomous variable (the relevant mode of thought vs. all other modes of thought combined) and conducted hierarchical binary logistic regression analyses with the dummy-coded mode of thought variable as the dependent variable, and the continuous square-root transformed immediacy of planned action index as predictor. Immediacy of planned action did not predict indulging,  $b = -.01$ ,  $p = .106$ , 95% CI [0.75, 1.00], dwelling,  $b = -.006$ ,

$p = .540$ , 95% CI [0.54, 0.99], or reverse contrasting,  $b = .002$ ,  $p = .840$ , 95% CI [0.84, 1.00].

## Discussion

The participants who planned to act more immediately used mental contrasting rather than those who planned to act less immediately. Apparently, the higher the demand to act, the more of the participants used mental contrasting. The effect size was medium (point-biserial correlation  $r = .16$ , transformed into  $d = 0.32$ ; Cohen, 1988). The relationship was robust when we controlled for expectations, incentive value, and the number of generated statements. The fact that the relationship between high demand and mental contrasting remained robust when controlling for the number of statements also speaks against the alternative explanation that the higher the demand to act, the more participants thought about their wish (indicated by the number of generated statements) and that way a higher demand to act was related to mental contrasting. Finally, immediacy of planned action did not predict any of the other modes of thought (indulging, dwelling, reverse contrasting) suggesting that immediacy of planned action was related to mental contrasting only.

In sum, Study 1 provides correlational evidence that the higher the demand to act the more of the participants used mental contrasting. Yet, overall only relatively few participants used mental contrasting (19%). To establish that a high (vs. low) demand to act causes people to use mental contrasting, we conducted Study 2.

<sup>3</sup> The observed pattern that a higher immediacy of planned action predicted the use of mental contrasting remained the same when we used the two original, not-winsorized, items of immediacy of planned action for the analyses, OR = 1.02,  $p = .021$ , 95% CI [1.01, 1.04].

<sup>4</sup> In all three studies, we computed explorative follow-up analyses to investigate whether the high demand to act predicted mental contrasting as compared to each of the other modes of thought (indulging, dwelling, reverse contrasting). In sum, in all three studies, high demand to act consistently predicted mental contrasting as compared to each of the other modes of thought, indulging, dwelling, and reverse contrasting. We describe these analyses and results in detail in ESM 1.

## Study 2: Immediacy of Needed Action

Study 2 was an experiment. We manipulated demand to act by asking participants to imagine that action needed to fulfill a crucial wish had to be either immediately performed or not. Whereas in Study 1 participants self-generated an interpersonal wish, in Study 2 all participants had the same wish: finishing college. Participants were undergraduate students at a German university whom we asked to write about completing their bachelor thesis. In Germany, before students can complete their thesis, they need to register it at their department. Students commonly register their thesis after about five semesters of study. They have considerable leeway, however, when exactly they register. From the date of registration on, they have 3 months to write and hand in their thesis. To manipulate a high (vs. low) demand to act, we asked students to imagine either that they had to register their thesis in 2 months (immediacy of needed action condition) or 2 years (no immediacy of needed action condition). Because planning and preparing a thesis involve many steps (e.g., writing an outline), registering one's thesis in 2 months implies a need to act immediately on working on the thesis. We hypothesized that of the students who imagined registering their thesis in 2 months more would use mental contrasting than of those who imagined registering in 2 years.

## Method

### Participants and Design

Participants were 237 undergraduate psychology students from a large German university (51 male, 185 female, one unidentified,  $M_{\text{age}} = 23.98$  years,  $SD = 6.48$ ). To determine sample size, we performed power calculations using the observed effect size from Study 1. Given a critical alpha of .05 (one-tailed) and an effect size of  $d = 0.32$ , to detect such an effect with high power (80%), we would need about 120 students per condition (Faul et al., 2007). Students were recruited on campus for an online study on how students think about their bachelor thesis. Only students who reported not yet having registered their thesis were eligible. They received course credit. The study was a scenario study with two between-subject conditions (immediacy vs. no immediacy of needed action).

### Procedure

#### *Academic Wish, Expectations, and Incentive Value*

In line with prior research (Oettingen et al., 2001), participants all had the same wish: We recruited undergraduate students and measured their expectations of successfully completing their bachelor thesis ("How likely is it that

you will complete your bachelor thesis?") and their incentive value ("How important is it to you that you will complete your bachelor thesis?"). We used 7-point answer scales ranging from 1 (= *not at all*) to 7 (= *very*).

#### *Preferred Date of Registration*

We informed students that before completing their bachelor thesis, they have to register their thesis, and from the date of registration on, they have 3 months to hand it in. They then indicated their preferred date of registration.

#### *Manipulation of Immediacy of Needed Action and Assessment of Self-Regulatory Thought*

We embedded the immediacy of needed action manipulation in the instructions to assess self-regulatory thought. In the immediacy of needed action condition, we asked students to imagine they have to register their bachelor thesis in 2 months from now. In the no immediacy of needed action condition, we asked them to imagine they have to register their thesis in 2 years. See ESM 1 for the verbatim instructions. Students wrote down their thoughts and mental images. As in Study 1, we assessed self-regulatory thought using the coding scheme by Sevincer and Oettingen (2013). Interrater agreement for the segmentation of students' texts into statements was 81%. Of the 237 students, 4 (2%) listed only keywords. For the coding of the statements, agreement was 87% ( $\kappa = .78$ ). Regarding the total number of statements on which raters disagreed (13%), for 73% of these statements, an agreement could be reached through discussion. For the remaining 27%, agreement could not be reached. These statements were coded into the category "other." To conclude, students completed a demographic questionnaire and were fully debriefed.

## Results

### Descriptive Analyses

#### *Expectations and Incentive Value*

Students' mean expectations of successfully completing their bachelor thesis were at  $M = 6.30$  ( $SD = 0.92$ ) of the 7-point scale. Their incentive value was at  $M = 6.88$  ( $SD = 0.45$ ). Expectations and incentive value correlated positively,  $r = .45$ ,  $p < .001$ .

#### *Preferred Date of Registration*

On average, students preferred to register their thesis in about 1 year and 5 months (16.69 months,  $SD = 10.10$ ). Thus, the students in the immediacy of needed action condition (2 months) imagined registering earlier than the average preferred registration date, whereas the students in the no immediacy of needed action condition (2 years) imagined registering later.

**Table 2.** Study 2: Number of students engaging in the different modes of thought in each condition

Condition	<i>n</i>	Self-regulatory thought				
		Mental contrasting	Indulging	Dwelling	Reverse contrasting	Other
Immediate action	118	27 (23)	3 (3)	53 (45)	27 (23)	8 (7)
No immediate action	119	5 (4)	25 (21)	49 (41)	28 (24)	12 (10)

Note. Percentages in parentheses.

**Table 3.** Study 2: Summary of hierarchical binary logistic regression analyses for condition (immediate vs. no immediate action), expectations, incentive value, and number of statements predicting the dummy-coded mental contrasting variable (mental contrasting vs. not)

Predictor variables	<i>B</i>	<i>SE B</i>	<i>p</i>	Odds ratio	95% CI
Step 1					
Condition (immediacy of needed action)	1.89	.51	.001	6.64	[2.45, 17.99]
Step 2					
Condition (immediacy of needed action)	1.89	.52	.001	6.65	[2.42, 18.29]
Expectations	−0.11	.27	.69	0.90	[0.53, 1.52]
Incentive	−0.22	.58	.71	0.81	[0.26, 2.53]
Number of statements	0.01	.03	.78	1.01	[0.95, 1.07]

Note.  $R^2 = .14$ ,  $p < .001$  for Step 1,  $\Delta R^2 = .01$ ,  $p = .89$ , for Step 2.

### Self-Regulatory Thought

Thirty-two students (14%) mentally contrasted, 28 (12%) indulged, 102 (43%) dwelled, and 55 (23%) reverse contrasted. Twenty students (8%) generated only statements categorized as “other.” As in Study 1, these latter students were excluded from the analyses. Table 2 depicts the modes of thought in the two conditions. Like in Study 1, we dummy-coded the categorical self-regulatory thought variable into mental contrasting (0) versus not (1).

### Number of Statements

On average, students generated 10.74 ( $SD = 7.11$ ) statements. Like in Study 1, we controlled for the number of statements. For the detailed analyses, see ESM 1.

### Effect of Immediacy of Needed Action on Mental Contrasting

To test our hypothesis that in the immediacy of needed action condition more students would mentally contrast than in the no immediacy of needed action condition, we conducted hierarchical binary logistic regression analysis with the dummy-coded mental contrasting variable as the

dependent variable. In the first step, we entered condition as predictor. As hypothesized, condition predicted mental contrasting. In the immediacy of needed action condition, 27 (23%) students mentally contrasted as compared to 5 (4%) students in the no immediacy of needed action condition. When we added expectations, incentive value, and the number of statements as predictors in the second step, condition continued to predict mental contrasting. Thus, the pattern was robust when controlling for the added variables. Table 3 depicts a summary of the analyses.<sup>5</sup>

### Effect of Immediacy of Needed Action on the Other Modes of Thought

Finally, to test whether immediacy of needed action condition predicted each of the other modes of thought (indulging, dwelling, and reverse contrasting), we conducted hierarchical binary logistic regression analyses with the dummy-coded mode of thought variable (relevant mode of thought vs. all other modes of thought combined) as the dependent variable, and condition as predictor. Condition did not predict dwelling,  $b = -.096$ ,  $p = .725$ , 95% CI [0.53, 1.55], and reverse contrasting,  $b = .086$ ,  $p = .784$ ,

<sup>5</sup> Because participants who preferred a later date of actually registering their thesis may have felt even more pressured to act when they imagined registering in 2 months (vs. 2 years) than those who preferred an earlier date of registration, we investigated whether the preferred date of registration interacted with condition in predicting mental contrasting. Specifically, we conducted hierarchical binary logistic regression analyses with the dummy-coded mental contrasting variable as dependent variable and condition, preferred date of registrations (in months from taking part in the experiment), and the interaction between the two as predictors. The overall model was significant,  $\chi^2(3) = 21.76$ ,  $p < .001$ ,  $R^2 = .17$  (Nagelkerke). We observed a main effect of the immediacy of needed action condition,  $OR = 15.12$ ,  $p = .008$ , 95% CI [2.01, 113.18]. There was, however, no main effect of preferred date of registration,  $p = .155$ , 95% CI [0.97, 1.23], and no interaction effect between condition and preferred date of registration,  $p = .298$ , 95% CI [0.86, 1.05]. This pattern indicates that the effect of our manipulation of immediacy of needed action on mental contrasting remained robust over and above participants' actual preferred date of registration and, moreover, that the effect did not differ depending on whether participants preferred an earlier or a later date of registration.



95% CI [0.84, 1.00]. Condition predicted indulging however,  $OR = 10.87$ ,  $p = .001$ , 95% CI [3.17, 37.26]. In the immediacy of needed action condition, 3 (3%) students indulged as compared to 25 (21%) students in the no immediacy of needed action condition. Thus, when immediate action was needed, almost no one took the liberty of still indulging in their future fantasies.

## Discussion

Of the students who imagined registering their thesis in 2 months, more students used mental contrasting than of those who imagined registering in 2 years. Apparently, imagining high demand to act (a needed action that was immediate) led students to use mental contrasting. Yet, as in Study 1, even when the demand was high, only a moderate number of participants mentally contrasted. Because we used an experimental design, Study 2 suggests a causal effect of high demand on the use of mental contrasting. The effect size was large ( $OR$  transformed into  $d = 1.04$ ; Cohen, 1988). Moreover, the pattern was robust when we controlled for expectations, incentive value, and the number of statements.

As in Study 1, this pattern speaks against the alternative explanation that a high demand to act led students to elaborate more on their wish, and therefore, more students in the immediacy of needed action condition used mental contrasting. Finally, imagining to register in 2 months (vs. 2 years) had no effect on the use of dwelling and reverse contrasting. However, of the students who imagined registering in 2 months, fewer students used indulging than of those who imagined registering in 2 years. We will return to this point in the General Discussion.

To conceptually replicate the observed effect of high demand to act on mental contrasting, in Study 3, we operationalized high (vs. low) demand by confronting participants with the opportunity to perform an action that was either instrumental or not instrumental to fulfilling their wish.

## Study 3: Instrumentality of Action

We operationalized high demand to act by providing participants with an impending opportunity to act toward wish fulfillment or no such opportunity. Participants named their currently most important interpersonal wish. Then, we presented them with the opportunity to perform an action that was instrumental to fulfilling their wish (training their social skills; instrumental action condition), or they did not receive such an opportunity: They could perform an action

that was not instrumental to fulfilling their wish (training academic skills; noninstrumental action condition). We hypothesized that of the participants in the instrumental action condition, more participants would use mental contrasting than of those in the noninstrumental action condition.

## Method

### Participants and Design

Participants were 239 students (55 male, 180 female, 4 unidentified,  $M_{age} = 26.67$  years,  $SD = 7.25$ ) from universities in Germany. Because Study 3 was a conceptual replication of Study 2 and used the same design, we determined sample size as in Study 2. Participants were recruited via social networking Websites for a study on interpersonal wishes. They could win gift cards in a lottery for their participation. The study used two between-subject conditions (instrumental action vs. noninstrumental action).

### Procedure

*Interpersonal Wish, Expectations, and Incentive Value* Participants named their currently most important interpersonal wish and indicated their expectations of success and incentive value. We used the same instructions and items as in Study 1.

### *Manipulation of Instrumental Action*

To establish the two conditions (instrumental vs. noninstrumental action), participants read on the next page that we would ask them to write about their interpersonal wish. We also told them that after writing about their wish, we would present them with a tutorial. In the instrumental action condition, we told them the tutorial trains their interpersonal skills (they perform interpersonal exercises). In the noninstrumental action condition, we told them the tutorial trains their academic skills (they perform reading, spelling, and comprehension exercises).

### *Assessment of Self-Regulatory Thought*

We assessed self-regulatory thought using the same procedure as in Studies 1 and 2. Participants wrote about their wish, and we content analyzed their texts. Interrater reliability for the segmentation into statements was 87%. Of the 239 participants, 20 (8%) listed only keywords. For coding the statements, agreement was 92% (Cohen's  $\kappa = .88$ ). Regarding the total number of statements on which raters disagreed (8%), for 63% of these statements, an agreement could be reached through discussion. For the remaining 37%, agreement could not be reached. These statements were coded as "other." To conclude, participants completed a demographic questionnaire and were fully debriefed.

**Table 4.** Study 3: Number of students engaging in the different modes of thought in each condition

Condition	<i>n</i>	Self-regulatory thought				
		Mental contrasting	Indulging	Dwelling	Reverse contrasting	Other
Instrumental action	109	23 (21)	27 (25)	33 (30)	21 (19)	5 (5)
Noninstrumental action	130	10 (8)	26 (20)	54 (42)	30 (23)	10 (8)

Note. Percentages in parentheses.

**Table 5.** Study 3: Summary of hierarchical binary logistic regression analyses for condition (instrumental vs. noninstrumental action), expectations, incentive value, and number of statements predicting the dummy-coded mental contrasting variable (mental contrasting vs. not)

Predictor variables	<i>B</i>	<i>SE B</i>	<i>p</i>	Odds ratio	95% CI
Step 1					
Condition (instrumentality of action)	1.15	.41	.005	3.17	[1.42, 7.04]
Step 2					
Condition (instrumentality of action)	1.25	.42	.003	3.52	[1.53, 8.03]
Expectations	0.02	.16	.91	1.02	[0.75, 1.38]
Incentive	-0.19	.20	.34	0.83	[0.57, 1.22]
Number of statements	0.08	.04	.028	1.08	[1.01, 1.16]

Notes.  $R^2 = .07$ ,  $p = .003$  for Step 1,  $\Delta R^2 = .03$ ,  $p = .175$ , for Step 2.

## Results

### Descriptive Analyses

#### Expectations and Incentive Value

Mean expectations of success were at  $M = 4.70$  ( $SD = 1.41$ ), and mean incentive value was at  $M = 6.10$  ( $SD = 1.10$ ) of the 7-point scale. Expectations and incentive value correlated positively ( $r = .48$ ,  $p < .001$ ).

#### Self-Regulatory Thought

Thirty-three participants (14%) mentally contrasted, 53 (22%) indulged, 87 (36%) dwelled, and 51 (21%) reverse contrasted. Fifteen participants (6%) generated only statements categorized as "other." As in Studies 1 and 2, these latter participants were excluded from the analyses. Table 4 depicts the use of the modes of thought in the two conditions. Like in Studies 1 and 2, we dummy-coded the categorical self-regulatory thought variable into mental contrasting (0) versus not (1).

#### Number of Statements

On average, participants generated 7.67 ( $SD = 5.00$ ) statements. As in Studies 1 and 2, we controlled for the number of statements. See ESM 1 for detailed analyses on the number of statements.

#### Effect of Instrumental Action on Mental Contrasting

To test our hypothesis that in the instrumental action condition more participants would mentally contrast than in the noninstrumental action condition, we conducted hierarchical binary logistic regression analysis with mental contrasting as the dependent variable. In the first step, we entered condition as predictor. As hypothesized, condition

predicted mental contrasting. In the instrumental action condition, 23 (21%) participants mentally contrasted as compared to 10 (8%) participants in the noninstrumental action condition. When we added expectations, incentive value, and the number of statements as predictors in the second step, condition continued to predict mental contrasting. Table 5 depicts a summary of the analyses.

#### Effect of Instrumental Action on the Other Modes of Thought

To test whether instrumentality of action condition predicted each of the other modes of thought, we conducted hierarchical binary logistic regression analyses with the dummy-coded mode of thought variable (relevant mode of thought vs. all other modes of thought combined) as the dependent variable, and condition as predictor. Condition did not predict indulging,  $b = .237$ ,  $p = .451$ , 95% CI [0.68, 2.35], and reverse contrasting,  $b = -.276$ ,  $p = .393$ , 95% CI [0.40, 1.43]. It predicted dwelling however, OR = 0.57,  $p = .043$ , 95% CI [0.33, 0.98]. In the instrumental action condition, 33 (30%) students dwelled as compared to 54 (42%) students in the noninstrumental action condition. Thus, when the action was instrumental (vs. not) for fulfilling participants' wishes, fewer students got stuck in dwelling on the obstacles of reality.

## Discussion

Study 3 conceptually replicated the pattern of Study 2 that high demand to act causally leads people to use mental contrasting. Of the participants who anticipated the

opportunity to perform an action (training their social skills) that would help them to fulfill their interpersonal wish, more participants used mental contrasting than of those who anticipated the opportunity to perform an action unrelated to their wish (training reading, spelling, and comprehension skills). The effect size was medium (OR transformed into  $d = 0.63$ ). Moreover, the pattern was robust when we controlled for expectations, incentive value, and the number of statements.

As in Studies 1 and 2, this pattern speaks against the alternative explanation that more participants in the instrumental (vs. noninstrumental) action condition used mental contrasting because these students thought more about their wish (i.e., generated more statements). See ESM 1 for a discussion on the number of statements as alternative explanation. Finally, anticipating the opportunity to perform instrumental (vs. noninstrumental) action did not affect the number of indulging and reverse contrasting participants. However, it led to more dwelling participants. We will return to this point in the General Discussion.

## General Discussion

We investigated whether people would use mental contrasting when the demand to act on a personally important wish was high. Study 1 provided correlational evidence – the more immediate participants planned to act and fulfill a self-generated interpersonal wish the more of the participants mentally contrasted. Studies 2 and 3 provided causal evidence that a higher demand to act leads participants to mentally contrast: In Study 2, undergraduate students who imagined registering their bachelor thesis in the immediate (vs. not immediate) future used mental contrasting; in Study 3, participants who were confronted with the opportunity to act toward fulfilling a self-generated interpersonal wish (vs. the opportunity to act unrelatedly to their wish) used mental contrasting. In sum, the results emerged for wishes from different domains (academic and interpersonal), for wishes that were self-generated or provided by the experimenter, for different samples (students and MTurk users), and for participants from different cultures (Germany and the USA).

Because participants' self-regulatory thought was measured as a categorical variable, more participants using mental contrasting when the demand to act was high rather than low necessarily entails fewer participants using the other modes of thought. Whereas a high demand was systematically linked to mental contrasting across studies, it was unsystematically linked to the other modes of thought. Thus, the pattern that fewer participants used indulging (Study 2) and dwelling (Study 3) when the demand was high

(vs. low) is likely due to more participants using mental contrasting rather than the other way round.

## Theoretical Implications

### Managing Regulatory Resources

Our finding that participants self-regulated by mental contrasting depending on how pressing the demand to act was suggests that people strategically manage their self-regulation (Muraven et al., 2006). Because mental contrasting requires cognitive effort (Achtziger et al., 2009), and people are motivated to conserve their effort (Richter et al., 2016), people more readily use mental contrasting when the demand to self-regulate is high. The observation that people tend to use other modes of thought than mental contrasting when the demand to act is low may point to a double-edged sword. People may save cognitive resources instantly by not mentally contrasting, but by not mentally contrasting they may fail to disengage from unattainable wishes early, and waste their resources in the long run.

### Mental Contrasting as a Purposeful Strategy

Our finding that participants mentally contrasted when the demand was high concurs with findings that participants used mental contrasting when in a sad (vs. happy) mood that indicates the presence of a problem (H. B. Kappes, Oettingen, Mayer, & Maglio, 2011). These findings suggest that people initiate mental contrasting as a purposeful problem-solving strategy. People also tended to mentally contrast, however, when primed with the future and reality (Sevincer & Oettingen, 2013; Sevincer et al., 2015). This latter finding suggests that people use mental contrasting also by spontaneously associating the desired future with present reality in their stream of thought. Future research may use experience sampling to explore the degree to which mental contrasting occurs in response to specific problems or spontaneously during mind-wandering.

## Applied Implications: Interventions Teaching the Use of Mental Contrasting

In line with earlier findings (Sevincer & Oettingen, 2013; Sevincer et al., 2015), only a few participants used mental contrasting (between 14% and 19%), even when the demand was high. This pattern emphasizes the need to develop interventions teaching people to use mental contrasting. Such interventions may involve information when people tend to engage in other modes of thought such as indulging and dwelling, for example, when acting toward a wish is not pressing. However, people may benefit from mentally contrasting about wishes still far in the future,

because the self-regulatory strategy may help them save resources and pursue alternative goals in case the wishes are unattainable. Therefore, tutors may encourage people to use mental contrasting for both more and less immediate wishes.

## The Other Modes of Thought

### Indulging and Dwelling

In Study 1, overall substantially more participants indulged (43%) than dwelled (13%), whereas the reverse was true in Study 2 (indulging: 12%, dwelling: 43%) and Study 3 (indulging: 22%, dwelling: 36%). These findings corroborate research showing that the frequency of indulging and dwelling differs between studies depending on the domain of the wish and context of the study (Sevincer & Oettingen, 2013; Sevincer et al., 2015, 2017).

As for the relation between demand to act and indulging and dwelling, in Study 1, demand was not related to indulging or dwelling. In Study 2, however, a high (vs. low) demand led to fewer indulging participants whereas, in Study 3, it led to fewer dwelling participants. We speculate that, because in Study 2, we operationalized high demand by immediacy of needed action, it may have prevented envisioning a rosy future when participants needed to start to act toward fulfilling their future. In Study 3, by contrast, we operationalized high demand by instrumentality of an upcoming action (train interpersonal skills to fulfill an interpersonal wish). Because the demanded action was a means of realizing their interpersonal wish, it may have prevented participants from dwelling on the obstacles of reality.

### Reverse Contrasting

Across studies, a similar proportion of participants used reverse contrasting (21%) and mental contrasting (16%). In all three studies, a high (vs. low) demand was related to mental contrasting, but not reverse contrasting. This pattern supports the idea that mental contrasting and reverse contrasting are different modes of thought eliciting different processes with mental contrasting but not reverse contrasting being a purposeful self-regulation strategy (A. Kappes & Oettingen, 2014; Sevincer et al., 2015).

## Related Approaches

### Temptation-Goal Activation

According to goal-systems theory (Kruglanski et al., 2002), goal representations are organized hierarchically. Specifically, high-priority goals (e.g., long-term goals such as successfully graduating) and low-priority goals (e.g., short-term goals such as finishing a paper or skipping work) are mentally interconnected and may activate or inhibit each other.

Applying the theory to self-control, Fishbach et al. (2003) posited that for people who are committed to a high-priority goal (graduating), being confronted with a low-priority goal (skipping work) activates the high-priority goal that then guides behavior. This process is assumed to be a functional mechanism that facilitates exerting self-control (e.g., resisting the temptation to skip work) in the service of the high-priority goal and to operate outside of awareness. Because the process is a *functional* mechanism, the opposite activation direction should not occur. That is, high-priority goals are not assumed to activate temptations.

In mental contrasting, consciously elaborating a desired future (graduating) is followed by consciously elaborating the present reality (skipping work). This procedure strengthens implicit associative links between the future and reality if expectations of overcoming the reality are high because the reality is then perceived as a (surmountable) obstacle to the desired future. By contrast, reverse contrasting, elaborating the reality followed by the future, does not change associative future–reality links, because the reality is not perceived as an obstacle to the desired future.

The theory and research on temptation-goal activation differ from those on mental contrasting and reverse contrasting. First, in temptation-goal activation, participants are committed to a high-priority goal, whereas in mental contrasting and reverse contrasting, participants' desired future is not yet a goal they are committed to. Rather, when expectations of success are high, the conscious mental imagery procedure of mental contrasting (but not reverse contrasting) creates strong commitments to attaining the desired future, which then becomes a goal (Oettingen et al., 2001).

Second, in mental contrasting with low expectations and reverse contrasting, the reality is not perceived as a (surmountable) obstacle (e.g., a temptation). Only mental contrasting with high expectations leads people to perceive the reality as an obstacle, and strong associative links between the future and reality with subsequent goal pursuit ensue. In line with the theory on temptation-goal activation, once mental contrasting has established strong future–reality links and transformed people's wishes into goals, temptations may nonconsciously activate the goal, and this process helps people to resist the temptations.

In sum, temptation-goal activation is a nonconscious mechanism that kicks in when people who are strongly committed to a high-priority goal encounter temptations that threaten goal attainment. On the contrary, mental contrasting is a conscious self-regulation strategy to create strong goal commitments: Reflecting on the desired future followed by the present reality changes implicit associative future–reality links outside of awareness. These nonconscious processes then predict goal commitment with subsequent goal pursuit.

### Counteractive Self-Control

Counteractive self-control theory (Trope & Fishbach, 2000) proposes that people use counteractive self-control strategies to deal with self-control dilemmas, for example, resisting the temptation of eating chocolate to successfully attain one's goal to lose weight. When people face temptations that threaten goal attainment, they devalue the temptation ("chocolate doesn't taste *that* good!") and doing so facilitates their goal pursuit (Myrseth, Fishbach, & Trope, 2009).

At first sight, this finding seems to be in line with research on mental contrasting. Because mental contrasting leads people to perceive the reality as an obstacle (e.g., a temptation) to attaining the desired future, mentally contrasting (vs. dwelling and reverse contrasting) participants evaluated their reality more negatively (less pleasant; A. Kappes et al., 2013). This effect, however, was not due to people devaluing the reality, but due to them recognizing the reality as an obstacle that has to be surmounted. For example, a struggling student when mentally contrasting about doing well on next week's examination will discover that tonight's party is an obstacle to doing well – rather than a fun party. Importantly, evaluating the reality more negatively occurred only when participants had high expectations of overcoming the reality. When participants had low expectations, they evaluated their reality less negatively (more pleasant). In this case, they see the reality as disconnected from the desired future (not as an obstacle).

In sum, counteractive self-control theory describes strategies that people who *have* a goal use, consciously or non-consciously, when they encounter temptations that threaten goal attainment (e.g., devaluing the temptations). On the contrary, mental contrasting is a conscious self-regulation strategy that *forms* goals (it creates strong goal commitments) by modulating nonconscious associative links and leading people to perceive the reality as an obstacle if they have high expectations of success. In other words, mental contrasting sets up the necessary conditions under which people show counteractive self-control strategies.

### Construal-Level Theory

Construal-level theory posits that people mentally represent events differently depending on the psychological (e.g., temporal) distance of the events (Trope & Liberman, 2010). For example, events in the far future tend to be represented on an abstract (high) construal level, whereas events in the near future on a more concrete (low) level. A high-level construal enhances people's focus on the primary, essential features of an event, whereas a low-level construal directs their attention to the secondary, incidental features.

One line of research on construal-level theory suggests that a high-level rather than low-level construal helps people to exert self-control when facing self-control dilemmas (Fujita & Carnevale, 2012; Fujita, Trope, Liberman, & Levin-Sagi, 2006). A self-control dilemma is a situation in which people must resist immediate impulses to attain long-term goals such as eating an apple rather than chocolate to attain the goal to live healthily (Mischel, Shoda, & Rodriguez, 1989). Construing the situation on a high level should lead people to focus on more abstract and essential features like their goal of a healthy diet, whereas construing the situation on a low level should lead them to focus on more concrete and incidental features such as the taste of chocolate. Using a construal-level manipulation, Fujita and Han (2009) induced a high-level (vs. low-level) mind-set in participants who had the goal to eat healthily and then asked participants whether they would currently rather eat an apple or a sweet. As predicted, in the high-level (vs. low-level) condition, more participants chose the apple over the sweet. This finding is in line with research on delay of gratification suggesting that focusing on more abstract ("cool") features of a marshmallow ("it looks like a cloud") rather than on its more concrete ("hot") features ("it looks tasty") helps children to resist the temptation to eat the marshmallow (Mischel et al., 1989).

At first glance, the pattern that a high-level (vs. low-level) construal enhances rather than reduces self-control may seem to conflict with our finding that anticipating immediate (low-level) rather than less immediate (high-level) action fostered self-regulation by spontaneous mental contrasting. In contrast to the research by Fujita and colleagues and Mischel and colleagues, however, the participants in our studies were not facing a self-control dilemma, where they had to resist immediate impulses. Rather, the more immediately participants planned to fulfill a desired future, the higher was the demand to self-regulate, and therefore, more participants mentally contrasted. After all, mental contrasting is a self-regulation strategy helping people to recognize and surmount their obstacles and act on fulfilling their wishes.

In fact, our finding that the nearer a planned or necessary action was (low-level rather than high-level construal), the more participants employed mental contrasting as a strategy that helps them to act concurs with another line of research on construal-level theory. Research by McCrea, Liberman, Trope, and Sherman (2008) suggests that participants who were put in a low-level (vs. high-level) construal mind-set (via a how vs. why manipulation; Freitas, Gollwitzer, & Trope, 2004) acted sooner rather than later. Future research may investigate whether representing an action on a low (vs. high) level (Vallacher & Wegner, 1989) facilitates mental contrasting and in that way fosters performing that action sooner rather than later.

## Other Influences on the Use of Mental Contrasting

Research so far showed that people tend to use mental contrasting when in a sad mood (H. B. Kappes et al., 2011), when primed with future and reality (Sevincer et al., 2015), when believing their abilities are malleable rather than fixed (Sevincer, Kluge, & Oettingen, 2014), and when the demand to act is high (the present research). By contrast, they refrain from mental contrasting when mentally fatigued (Sevincer et al., 2015). Another variable worthwhile exploring is experienced responsibility for goal attainment. When people share their responsibility (e.g., when several teammates work on one project), they may experience a reduced demand to act personally (diffusion of responsibility; Darley & Latané, 1968). As a consequence, they may refrain from mental contrasting. Future work may explore whether people are less likely to mentally contrast when working in a team than alone.

## Change of Modes of Thought Within Participants

Because we employed cross-sectional (Study 1) and between-subject designs (Studies 2 and 3), we did not measure a change of the modes of thought within participants. Future research should employ within-subject designs and longitudinal designs to investigate whether situational changes may lead to a change of the modes of thought within individuals. One may also examine whether the use of mental contrasting is an individual difference in the sense that people use the same mode of thought across situations and over time.

## Conclusion

Going back to the student at the beginning who wishes to complete her studies – our findings suggest that she is more likely to use mental contrasting if her bachelor thesis is close (vs. far) and relevant for completing her studies (vs. irrelevant). Apparently, people's readiness to self-regulate by mental contrasting depends on the demands of the current situation – when self-regulation by mental contrasting is most needed people are more inclined to use it spontaneously.

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## Open Data/Material

All data used in Studies 1–3 are available at <https://osf.io/ntysz/>

## Author Contributions

Timur Sevincer and Gabriele Oettingen designed the studies. Patrick Tessman collected the data for Study 1. Timur Sevincer collected the data for Studies 2 and 3. Timur Sevincer and Patrik Tessman analyzed the data for Study 1. Timur Sevincer analyzed the data for Studies 2 and 3. Timur Sevincer and Gabriele Oettingen drafted and revised the manuscript.

## Electronic Supplementary Material

The electronic supplementary material is available with the online version of the article at <https://doi.org/10.1027/1864-9335/a000353>

ESM 1. Text (.pdf)

Verbatim Instructions in Studies 1 and 2.

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