

## Research article

# Self-regulation of time management: Mental contrasting with implementation intentions

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### Abstract

*Mental contrasting with implementation intentions (MCII) has been found to improve self-regulation across many life domains. The present research investigates whether MCII can benefit time management. In Study 1, we asked students to apply MCII to a pressing academic problem and assessed how they scheduled their time for the upcoming week. MCII participants scheduled more time than control participants who in their thoughts either reflected on similar contents using different cognitive procedures (content-control group) or applied the same cognitive procedures on different contents (format-control group). In Study 2, students were taught MCII as a metacognitive strategy to be used on any upcoming concerns of the subsequent week. As compared with the week prior to the training, students in the MCII (vs. format control) condition improved in self-reported time management. In Study 3, MCII (vs. format control) helped working mothers who enrolled in a vocational business program to attend classes more regularly. The findings suggest that performing MCII on one's everyday concerns improves time management. Copyright © 2015 John Wiley & Sons, Ltd.*

Time seems to be particularly perishable today because people have difficulty allocating their resources among a myriad of potential pursuits. Successful time management—in the sense of maximizing one's use of time to facilitate productivity, balance, and satisfaction—is a challenge for many reasons. For example, people tend to underestimate the amount of time required to complete projects (Buehler, Griffin, & Ross, 1994). They also discount future consequences, leading them to prioritize tasks with smaller but sooner outcomes (König & Kleinmann, 2007). Assuming that people construe activities to be performed in the more distant future at a more abstract level, they may procrastinate actions that are conceptualized in abstract terms (McCrea, Liberman, Trope, & Sherman, 2008).

Existing interventions aiming to improve time management suggest very concrete tactics such as scheduling daily activities (Green & Skinner, 2005; Hall & Hursch, 1982; Macan, 1994). In the present research, we wondered what type of self-regulatory thought could facilitate the use of such simple tactics. Zimbardo and Boyd (2008) give the following advice:

Before you manage your time by assigning activities and goals to calendar boxes ... you need to assess the direction that you want to take and the steps you must take on the path to your goals (p. 296).

In other words, committing to goals and making respective plans seem to be a prerequisite for scheduling one's daily

activities. Accordingly, we hypothesized that teaching a self-regulation strategy of selective goal pursuit should facilitate successful time management. In the present studies, we taught participants to use mental contrasting with implementation intentions (MCII), a self-regulation technique that has been shown to foster effective goal pursuit and behavior change across the academic, interpersonal, and health domains.

## MENTAL CONTRASTING WITH IMPLEMENTATION INTENTIONS

Mental contrasting with implementation intentions entails two complementary self-regulation procedures: mental contrasting and implementation intentions. Mental contrasting (Oettingen, 2000, 2012) is a tool to solve problems in that it fosters selective behavior change. In mental contrasting, individuals first positively fantasize about a wished-for future (e.g., excel in the upcoming exam) and then imagine the present reality that holds them back from realizing the envisioned future (e.g., my messy desk). By imagining the future and subsequently mentally elaborating the reality, the future becomes closely associated with the reality, revealing that attaining the future demands acting on the current reality (e.g., organize my desk). Now, expectations of overcoming the obstacle guide one's

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behavior: High expectations strengthen effort (clean the desk), and low expectations weaken effort, allowing people to let go of unfeasible wishes (go to class and clean up later).

Many experimental studies find that mental contrasting leads to behavior change that is based on expectations of success. For instance, university students specified their most important wish or concern in the interpersonal domain and reported about their expectations that their concern will have a happy ending. Students who held high expectations of success became more energized and initiated immediate actions, whereas those with low expectations became more relaxed and delayed their actions (Oettingen, Pak, & Schnetter, 2001). These results have been replicated across domains (e.g., health and academic), for short-term as well as for long-term goals, across the life span and in different cultures, and for different indicators of goal attainment (e.g., cognitive, emotional, and behavioral; see Oettingen, 2012).

Effects of mental contrasting on behavior change are mediated by cognitive and motivational processes. As for cognitive processes, mental contrasting with high expectations strengthens the implicit associations between the desired future and the present reality as well as between the reality and the instrumental means to deal with the reality. It also changes the implicit meaning of reality, in that the reality now becomes interpreted as an obstacle that needs to be overcome (Kappes & Oettingen, 2014; Kappes, Singmann, & Oettingen, 2012; Kappes, Wendt, Reinelt, & Oettingen, 2013). As for processes of motivation, mental contrasting energizes people, thus providing the resources for behavior change. Such energization is best captured by physiological measures (e.g., systolic blood pressure; Gendolla & Silvestrini, 2015). Indeed, when chances of success are high, mental contrasting increases systolic blood pressure, and when they are low, it decreases it; the saved energy can be applied to other endeavors. Changes in energization then mediate the relation between expectations and goal pursuit (Oettingen et al., 2009; Sevincer, Busatta, & Oettingen, 2014). Finally, mental contrasting helps students deal with setbacks (e.g., negative feedback). When the desired future seems reachable, negative feedback is processed as valuable information without impairing students' subjective competence, and it bolsters beneficial attributions (Kappes et al., 2012). Taken together, mental contrasting is a conscious procedure that supports people in attaining their desired futures by activating cognitive and motivational mechanisms outside of awareness.

However, sometimes people encounter particularly hard obstacles. Planning in advance how one wants to deal with these challenges is an effective remedy. This has been highlighted by Gollwitzer (1993, 1999), but also more recently in health psychology by Sniehotta, Schwarzer, Scholz, and Schüz (2005). Gollwitzer stressed the importance of forming implementation intentions that specify plans in the format of "If I face situation X, then I will perform goal-directed response Y!" For instance, a person who wants to excel in his exam and has the obstacle to studying of his messy desk might form the following if-then plan: "And if my desk is messy, then I'll clean it up and immediately start studying." A meta-analysis based on close to a hundred studies on implementation intentions shows a medium to large effect on

increased rate of goal attainment ( $d=0.61$ ; Gollwitzer & Sheeran, 2006).

Implementation intentions facilitate the attainment of goals based on psychological mechanisms that pertain to the anticipated situation (specified in the if-part) and to the mental association formed between the if-part and the then-part of the plan (Gollwitzer, 2014). As forming implementation intentions requires the selection of a specific situation, the mental representation of this situation becomes highly activated and more accessible (e.g., Achtziger, Bayer, & Gollwitzer, 2012; Parks-Stamm, Gollwitzer, & Oettingen, 2007). Forming implementation intentions also produces strong associations between the critical situation and the respective goal-directed response (Webb & Sheeran, 2007, 2008). As a consequence, initiating the goal-directed response when facing the critical situation exhibits features of automaticity in terms of immediacy, efficiency, and no need for conscious intent (e.g., Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009; Brandstätter, Lengfelder, & Gollwitzer, 2001; Gollwitzer & Brandstätter, 1997).

The beneficial effects of implementation intentions are shown across life domains and regarding a variety of challenges to the successful attainment of goals: getting started, staying on track, disengaging from inappropriate means, and coping with the depletion of resources (reviews by Gollwitzer, 2014; Gollwitzer & Oettingen, 2011).

### Mental Contrasting with Implementation Intentions

Mental contrasting with implementation intentions has been found to be more effective in changing behavior than each of the two components alone. For example, MCII helped college students in breaking snacking habits more than mental contrasting only and forming implementation intentions only. Importantly, mental contrasting increased clarity about personal obstacles towards reducing unhealthy snacking (Adriaanse et al., 2010). When negotiating with others, MCII led to finding more integrative solutions than mental contrasting or implementation intentions alone (Kirk, Oettingen, & Gollwitzer, 2013). These findings suggest that MCII may be a useful strategy for finding creative and integrative solutions in managing one's time and resources.

Mental contrasting of promising wishes strengthens the non-conscious association between reality and instrumental means (Kappes et al., 2012; Oettingen, 2012); explicitly forming implementation intentions should strengthen this association even more and thus heighten the effects of mental contrasting on behavior change. Mental contrasting on the other hand paves the way for effectively using implementation intentions; it fosters goal commitment, which in turn is needed for implementation intentions to be effective (Sheeran, Webb, & Gollwitzer, 2005). Further, when engaging in mental contrasting, people specify their own idiosyncratic obstacles and means of how to pursue their wished-for future; these obstacles can then be taken as the if-component of a respective implementation intention, and the instrumental means as the then-component. That is, *if-then* plans in MCII may use the following format: "If... (obstacle), then I will... (respond to overcome or circumvent the obstacle)."

## Present Research: MCII and Time Management

Interventions aimed at improving time management typically teach the relevant skills, such as prioritizing things and scheduling each day, allocating time to important rather than urgent tasks, setting clear objectives, organizing work materials, and reducing procrastination (Green & Skinner, 2005; Hall & Hirsch, 1982; Macan, 1994). The present research takes a different approach: People are taught MCII—which is known to facilitate discrimination between various endeavors and make their implementation more effective—and we then test whether it yields benefits in time management.

In Study 1, college students completed a brief MCII exercise on a currently important academic concern. We then assessed participants' scheduling of the upcoming week, a key element of successful time management (Forsyth & Burt, 2008; Slaven & Totterdell, 1993). In Study 2, we analyzed whether applying MCII as a metacognitive strategy to a range of everyday concerns for a week's time would also yield benefits, and this not only for time management *per se* but also for its consequences, such as more effective completion of projects and staying on top of things. In Study 3, we taught MCII to women of low income who were enrolled in a vocational program geared at acquiring business skills and objectively assessed an indicator of successful time management: the women's attendance in the program.

The present studies extend previous research on MCII not only by introducing time management as a dependent variable but also by adding critical control groups. So far, participants in the control groups either received information about why behavior change is attractive and well possible (e.g., Stadler, Oettingen, & Gollwitzer, 2009, 2010), a standard treatment aiming at behavior change (e.g., based on cognitive-behavioral therapy; Christiansen, Oettingen, Dahme, & Klinger, 2010), or received part of the MCII intervention (i.e., either only MC or only II; Adriaanse et al., 2010). In contrast, we used control groups that allowed testing whether thought processes of a similar format or of a similar content already suffice for producing the effects of MCII. Further, previous studies did not check whether the effects of MCII may have been due to heightened experimenter demand. We checked for this alternative explanation in Study 1. Finally, in most past research, MCII pertained to the behavior change in question. In the present research, MCII focused on participants' pressing concerns; however, we assessed time management as the dependent variable. Specifically, MCII was applied to a specific academic concern (Study 1) or taught as a metacognitive strategy regarding pressing everyday concerns (Studies 2 and 3).

### STUDY 1: MCII REGARDING AN ACADEMIC CONCERN FUELS THE SCHEDULING OF TIME

In Study 1, scheduling of the upcoming week was assessed right after university students performed either MCII or one of two control exercises with regard to an important academic concern. We included two control groups. Participants in the first control group (i.e., content control) were asked to

elaborate on the same issues as MCII participants but in a different order. That is, rather than contrasting the desired future with negative reality, these participants engaged in reverse contrasting about their academic concern (i.e., elaborating first the negative reality, then the positive future). Following reverse contrasting, they were also asked to form if-then statements, this time linking a goal-directed behavior with its consequences (i.e., "If I go to my room and read the assigned papers, then I will improve my class grades"), rather than specifying a situational cue and linking it to a goal-directed behavior as is performed in implementation intentions. Participants in the second control group (i.e., format control) were asked to go through the motion of the MCII procedure. Instead of focusing on a desired future and on the respective negative reality, participants had to pick a given object in the experimental room (e.g., the door) as well as another object present in the room (e.g., the black board). They were then instructed to find an essential difference between the two objects. Finally, they had to specify (as an if-component) the place and time in which (as a then-component) one of the objects shows the named distinctive feature.

All participants were subsequently presented with a calendar depicting the 24 hours of each of the seven upcoming days. Those in the MCII condition were hypothesized to schedule more hours than participants in either of these two control groups. As MCII facilitates the smart pursuit of goals and the forming of respective plans—that is, strengthens pursuit when expectations are high and disengagement when expectations are low, freeing up resources for alternative projects—it should help participants to achieve clarity on their goals and plans and thus lead them to schedule more hours of their upcoming week.

## Method

### Participants

Participants were 84 German undergraduate students who received class credit for their participation. Age and gender were not recorded. Twenty-eight participants were randomly assigned to each of three experimental conditions (i.e., MCII, content control, and format control). An additional 22 individuals who had completed some portion of the study materials but neglected to name an academic concern were excluded from analyses.

### Procedure and Materials

Participants had to choose an important academic concern that they would like to solve in the upcoming week. Participants named, for instance, to be well prepared for their classes, to finish a writing project, or to prepare a class presentation. They then indicated their expectation of successfully solving it by answering the question: "How likely is it that you will solve your concern in the next week?" using a 1 (*not at all*) to 7 (*extremely*) response scale. Before participants were randomly assigned to the three conditions, they were told that they would now engage in a mental exercise that allowed them to think more clearly about their named concern.

*MCII condition.* Participants named and wrote down the most positive aspect associated with solving their concern in the next week. They had to hold this aspect in their mind, really thinking about it, and to write down all the thoughts and images associated with it in vivid detail. Next, they named the most important obstacle that stands in the way of solving the concern in the next week, vividly elaborated on it, and wrote their thoughts and images down. Following this, they were asked to name a behavior which they could do to overcome the obstacle and to create a plan in the format of “If (fill in the named obstacle), then (fill in the named behavior).” Finally, they were prompted to make their plan more specific by adding the time and location where the obstacle usually appeared and asked to repeat the plan once more in their mind’s eye.

*Control condition 1: Content control.* Participants mentally elaborated the same content with the same instructions as those in the MCII condition, but in the reverse order. That is, they first named and elaborated the most important obstacle, followed by the most positive future aspect, using the instructions described earlier. Then they created a plan that had the behavior that could overcome the obstacle in the if-part (rather than in the then-part, as in the MCII condition). Specifically, the plan was in the format of the following: “If (fill in the behavior that can overcome the obstacle), then (fill in a potential consequence).”

*Control condition 2: Format control.* Participants mentally elaborated a descriptive content that was unrelated to their concern, following the same format as the MCII condition. That is, rather than naming and elaborating on their concern’s most positive aspect and most important obstacle, they named and mentally elaborated two objects in their near environment (i.e., the experimental room) using the same instructions as in the other conditions. When they had found an essential difference between the two objects, they were asked to form a sentence that linked a place and time to one of the object’s distinctive features.

*Dependent variable.* Amount of scheduling was measured by presenting participants with a blank 7-day calendar. The calendar listed for each day all 24 hours as boxes in which an activity could be inserted. Participants were instructed: “Please use this calendar to schedule anything that you would like to do during the next week; please take a few minutes and do so now.” As dependent variable, we counted the number of hours (boxes) for which participants scheduled an activity. If they did not schedule any hours, they were given a score of 0.<sup>1</sup>

## Results

### *Time Management*

We counted how many hours participants scheduled on the 7-day calendar they were given. Because this variable was highly positively skewed, we used negative binomial regressions, a generalized linear model that has been recommended

for analyzing non-normal count variables (Gardner, Mulvey, & Shaw, 1995; Hilbe, 2007). We conducted the analysis with robust standard errors and included expectations as covariate.

The effect of condition approached significance,  $\chi^2(2, N=84) = 5.72, p = .057$ ; estimated marginal means,  $M_{MCII} = 45.93$  hours,  $M_{CCControl} = 23.04$  hours,  $M_{FCControl} = 18.15$  hours. A planned contrast showed that scheduling in the MCII condition was higher than in the two control conditions, Wald  $\chi^2(1) = 4.69, p = .03$ , which did not differ from each other, Wald  $\chi^2(1) = 0.35, p = .55$ .

### *Effects of Expectations of Success*

Expectations of successfully solving the academic concern ranged over the entire response scale ( $M = 4.92, SD = 1.42$ ). There was no main effect of expectations predicting scheduling,  $\chi^2(1, N=84) = 1.23, p = .27$ , nor was there an interaction between condition and expectations,  $\chi^2(2, N=84) = 1.72, p = .42$ . As expected, MCII facilitated scheduling irrespective of whether participants had applied MCII to a named likely or unlikely concern.

## Discussion

Applying MCII to an important academic concern did facilitate time management assessed by scheduling activities for the upcoming week. Specifically, participants in the MCII condition scheduled more of their time than control participants; that is, they filled more hours on a 7-day calendar depicting the upcoming week. Actually, MCII participants scheduled about twice as many hours as participants in either control condition. The difference between participants in the MCII and the two types of control conditions (content control and format control) suggests the following: First, the beneficial effect of MCII on scheduling cannot be explained in terms of thinking about certain contents, as the content-control participants showed a lower level of scheduling than MCII participants did. Second, the beneficial effects of MCII can neither be explained in terms of thinking about things using a certain format, as the format-control participants also showed a lower level of scheduling time than MCII participants.

As predicted, the effects of MCII on time management were independent of whether participants applied MCII to concerns where expectations of successfully solving the concern were high or low. As the mental contrasting portion of MCII engenders selective goal pursuit, people engaging in MCII should know what to do regarding a pressing concern: go forward when expectations are high and disengage when expectations are low. As a consequence, they should be able to schedule activities for the upcoming week in either case.

In Study 1, participants of all three conditions were told that the mental exercise that they had to engage in might help them think more clearly about their named concern. Still, the various mental exercises might have created different experimenter demand with respect to scheduling activities for the upcoming week. We conducted a follow-up study to explicitly address the question of experimenter demand by adopting a procedure used in research on implementation intentions (Schweiger Gallo, Keil, McCulloch, Rockstroh, & Gollwitzer, 2009). A new sample of 78 students was recruited, and

<sup>1</sup>In this and the subsequent studies, additional measures were collected that are not discussed here. A complete list of measures is available in the Supporting Information.

participants were randomly assigned to the three conditions of Study 1, receiving the identical materials. After participants engaged in the respective exercises, they reported on felt experimenter demand for time management in terms of scheduling activities: “Do you think the experimenter wants you to demonstrate good time management?” and “Do you think the experimenter wants you to schedule your time?” on a 1 (*not at all*) to 7 (*extremely*) scale. These questions were averaged into a single index ( $\alpha = .94$ ). A one-way analysis of variance showed that there was no effect of condition on demand,  $F(2, 75) = 0.02$ ,  $p = .98$  ( $M_{MCII} = 3.66$  vs.  $M_{CControl} = 3.75$  vs.  $M_{FControl} = 3.66$ ). The findings suggest that the differences in time scheduling between conditions in Study 1 cannot be explained away by pointing to differential experimenter demand. Participants who applied MCII to a specific academic concern scheduled more of their time for the upcoming week. We wondered whether MCII would yield even broader benefits if individuals are explicitly taught MCII as a self-regulation strategy that they can apply by themselves to any of their everyday concerns. Can we teach MCII as a metacognitive strategy (Flavell, 1979; Nelson & Narens, 1994) that enables people to effectively manage their time?

Other research on self-regulation suggests that learning about certain self-regulation strategies benefits goal pursuit. For example, teaching people that intelligence is malleable fosters learning goals (vs. performance goals) that support coping with setbacks (Dweck & Leggett, 1988). Or, instructing children to think of desired rewards in non-consummatory terms (i.e., a marshmallow as a puffy cloud) helps them to delay gratification (Mischel, 1974). Accordingly, teaching MCII as a metacognitive strategy should facilitate time management.

## STUDY 2: TEACHING MCII AS A METACOGNITIVE STRATEGY

Participants acquired MCII (or a control mental exercise) as a metacognitive strategy by practicing it with a number of different concerns. All participants were then asked to apply the acquired self-regulation strategy on a daily basis during the upcoming week. Before the training and 1 week after, we asked participants to report on their time management. First, participants had to indicate their success in time management. Second, we asked about common features of successful time management such as participants' project completion and their feelings of being in control and on top of things. In responding to these measures, participants were asked to consider their experiences during the previous week. Participants in the control group performed a parallel-format mental exercise similar to that engaged in by those in the format-control group in Study 1. Care was taken that the control participants' time spent with the experimenter was equal to that of MCII participants.

As participants in the MCII group were trained to use MCII as a metacognitive strategy by practicing it with a variety of concerns, we expected them to take a decisive stand regarding their concerns in everyday life during the upcoming week. As a consequence, when successful time management is assessed

a second time with respect to the previous week (this time after the MCII training), we should observe improvements in time management. No such effects should evince with participants in the control group as they were only trained to perform an inconsequential mental exercise.

We also tested whether the effects of MCII would be evident above and beyond other variables that have been shown to affect time management. For example, depression (Desha & Ziviani, 2007) and stress, which promote disorganization, both predict impaired time management. To address these variables, baseline (pre-intervention) levels of depression, perceived stress, and the occurrence of troublesome life events were measured. Other variables related to self-discipline, such as perceived control (Bandura, 1997), being female (Duckworth & Seligman, 2006), increasing age (Olds et al., 2009), and grade level in school are also linked to effective time management. Therefore, we assessed baseline subjective well-being, gender, age, and school year.

## Method

### Participants

Participants were 51 American undergraduate students (29 women), who received class credit for their participation. Participants' ages ranged from 18 to 21 years ( $M = 19.04$  years,  $SD = 0.85$ ). Before the initial session, we randomly assigned participants to the MCII ( $n = 26$ ) and the control condition ( $n = 25$ ); six participants (three MCII and three control) failed to return for the second session, and five additional participants (two MCII and three control) failed to complete at least four daily exercises. The drop-out rates were very similar in the MCII and control conditions, and they were in the range observed in other studies using MCII to achieve behavior change (e.g., Stadler et al., 2009, 2010). The analyses reported later include 40 participants (those who completed both lab sessions and four or more daily exercises).

### Procedure and Materials

At the first session, participants provided their informed consent and completed the control variable measures. Then they were guided through a series of mental and written tasks.

**Control variables.** Participants started with filling out a time management questionnaire containing six items (see later discussions) to obtain a baseline measure. They then completed the Center for Epidemiologic Studies Depression Scale (Radloff, 1977), the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983), and the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985). Reliability for these scales was high ( $.83 < \alpha < .89$ ). Participants also reported whether they encountered any of 14 negative life events in the last week (e.g., extra work at school or home, and relatives/friends making many demands; adapted from Gleason, Iida, Bolger, & Shrout, 2003), and indicated their gender, age, and school year.

**MCII condition.** To teach the metacognitive strategy of mental contrasting, a trained interventionist led participants through a series of steps. She first asked them to make

themselves comfortable and then to think of their most pressing academic concern:

Your concern should be challenging for you, but you should be able to resolve it within the upcoming week. If you have several such concerns, select the one that is most important to you.

The interventionist guided participants through mental elaborations on the most positive outcome associated with resolving that concern, as well as one relevant obstacle that could get in the way. To teach the formation of implementation intentions, the experimenter prompted participants to identify the behavior necessary to overcome or circumvent their obstacle. Finally, participants were told to repeat to themselves, "If the obstacle X occurs, then I will perform the specified behavior Y!" They were then told that they had completed an exercise called MCII, and that they would now be provided with several more opportunities to practice it.

Participants next completed a written exercise of MCII. They worked through a booklet by themselves, in which they named another important concern, this time an interpersonal one, followed by the most positive outcome and most critical obstacle. They described the outcome and obstacle in vivid detail, before creating three "if-then" statements, using the following formats (adapted from Stadler et al., 2009, 2010):

**If** a certain Situation (the obstacle) arises, **then** I will act in a certain way to overcome the obstacle.

**If** a certain Situation (to prevent the obstacle) arises, **then** I will act in a certain way to prevent the occurrence of the obstacle.

**If** a certain Situation (an opportunity to effectively realize my concern) arises, **then** I will act in a certain way to resolve my concern.

For example, a participant who named as most important interpersonal concern "smoothing things out with my boyfriend" identified as most positive outcome "going back to the way things were" and elaborated on this outcome by writing:

Lying in bed, talking about whatever. He is talking, saying something—not quiet not passive but assertive and confident. He makes me laugh and we go out—the spontaneity of it all.

She identified as most important obstacle "I lose my temper" and elaborated on this obstacle by writing "If I get mad and try to aggressively confront the situation then that only pushes him away. But I get upset when he withdraws himself. It is an ugly cycle." As implementation intentions, the participant wrote:

If this week I get frustrated with his actions, then I will calmly talk to him about them.

If he acts passive and lazy, then I will not get mad but address it right away.

If he invites me to go out to talk about things, then I will readily accept.

When they had finished writing, the interventionist guided participants through a further practice showing them how to apply the MCII procedure in their everyday lives, with the aim of showing them how this exercise could be used to effectively deal with all sorts of concerns throughout their daily life. For this purpose, participants were directed to identify a third concern, this time a daily concern weighing on their mind (which could be as minor as an overdue phone call), mentally contrast the relevant positive outcome and obstacle, and then make respective "if-then" plans. The interventionist prompted students to discuss any questions about each step of the MCII procedure. Finally, participants were asked to complete a last mental exercise about another daily concern; this time, they were not provided with step-by-step instructions.

At the conclusion of the first session that took no longer than an hour, the interventionist asked participants to perform at least one MCII exercise each day of the upcoming seven days on whatever concerns they felt appropriate; they were reminded to return after this period for the final session. Each morning of the upcoming week, we reminded participants of our request by sending a message to a personal email account that we had created for each participant.

*Format-control condition.* Control participants, rather than identifying four current concerns and being guided through mental elaborations about aspects of these concerns, were asked to choose four pictures from a provided selection displaying landscapes and decorative objects. For each of the chosen pictures, they were to go through mental elaborations on the matters depicted in a manner that mimicked the guidance received by participants in the MCII group. First, participants had to name two objects or aspects shown in the picture and then elaborate on these matters in the order they were named, thus creating a mental contrast between the two. Thereafter, participants were prompted to create two-part statements that linked the second matter elaborated with further aspects shown in the picture, thus mimicking the if-then links created by implementation intentions.

For example, a picture showing a camel and a man standing next to it was identified as, "Mighty camel." As first object in the picture, "camel" was named and elaborated on by writing, "Tan and orange colors, rough texture on its fur or hair, smoother texture on its body and legs, covered with a multi-colored blanket and wearing a harness." As second object in the picture, the "standing man" was named and elaborated on by writing, "He has a rough beard, small hands and face (both tan), and grey hair, and is standing in the sand staring off into the distance." A sentence linking further aspects of the picture to the second object was "The standing man with the camel is dressed in black."

Just as participants in the MCII group, those in the control group started out with the interventionist guiding them through their mental exercise when working on the first picture, then went on to performing the exercise in writing when working on the second picture, and finally performed the exercise using private inner speech for the remaining two pictures. Thereafter, just like the participants in the MCII group, we reminded those in the control group of our request to perform their exercise each day of the upcoming 7 days. We also sent a message

to the personal email account that we had created for each participant to remind them to do their mental exercise.

**Dependent variable: Time management.** One week after the first session, participants arrived at the laboratory for a second time. They were again asked to answer the six items of the time management questionnaire with respect to the previous week (i.e., the week following the intervention). Two of the items referred to overall time management (“I managed time easily” and “I kept my appointments easily”), two asked about project completion (“How many projects did you complete?” and “How many projects did you fail to complete?”, the latter was reverse-coded), and two asked about feeling on top of things (“How often did you feel in control?” and “How often did you feel relaxed?”). All items were measured on a continuous 10-cm response scale, which ranged from *never* to *very often* for the overall time management and feeling on top of things items, and *none* to *very many* for the project completion items. The reliability of the time management measure was satisfactory at Time 1 ( $\alpha = .65$ ) and Time 2 ( $\alpha = .70$ ).

Once participants had filled out the time management questionnaire at Time 2, they were thanked and debriefed; participants in the control condition were offered the opportunity to learn to perform the MCII strategy if they wished.

## Results

### Time Management

To assess our hypothesis that MCII participants would show a stronger increase in time management from Time 1 to Time 2 than control participants, we performed an analysis of covariance, controlling for time management at Time 1. Over and above the effect of the covariate, we observed a significant effect of condition,  $F(1, 37) = 9.55, p = .004, \eta^2 = 0.21$ ; estimated marginal means,  $M_{MCII} = 7.10$  vs.  $M_{Control} = 6.09$ .

### Effects of Time

To further support our hypothesis that the two groups would develop differently over time, we isolated participants by condition and performed two independent paired-samples *t*-tests with the dependent variable of time management. As depicted in Figure 1, we found a significant effect of time

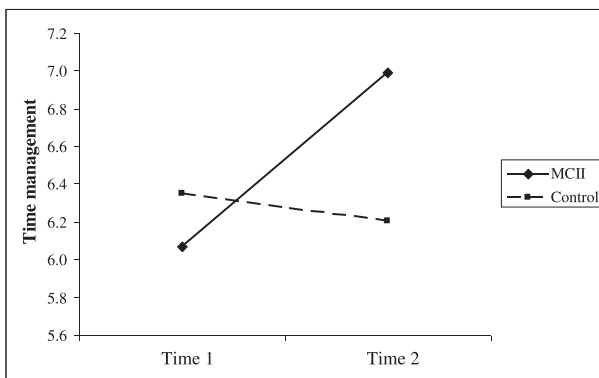


Figure 1. Time management (unadjusted means) by time and condition (Study 2)

on time management within the MCII condition,  $t(20) = 3.74, p = .001$ , indicating that the time management of MCII participants improved from Time 1 to Time 2, whereas in the control condition, the main effect of time was not significant,  $t(18) = 0.66, p = .52$ .

### Effects of Control Variables

The combination of baseline depression, stress, troublesome life events, subjective well-being, gender, age, and school year explained significant variance in Time 1 time management,  $F(7, 32) = 3.06, p = .01$ , adjusted  $R^2 = 27\%$ , and also tended to explain Time 2 time management,  $F(7, 32) = 2.27, p = .054$ , adjusted  $R^2 = 18.6\%$ . However, when Time 2 time management was controlled for Time 1 time management, these control variables did not predict the change in time management over the week,  $F_{change}(7, 31) = 1.02, p = .44$ . When these control variables were added as covariates to the analysis of covariance testing MCII versus control condition as a predictor of change in time management, the effect of condition not only remained significant, but it also became slightly larger  $F(1, 30) = 11.41, p = .002, \eta^2 = 0.28$ .

## Discussion

Study 2 examined the effects of a metacognitive MCII intervention on time management over a 1-week period. Students reported on their time management prior to receiving the MCII or a control training and 1 week thereafter. Whereas no improvement in time management was observed for control participants, MCII participants did improve significantly; the latter participants now indicated more effective time management than control participants. This pattern of findings endured after controlling for demographic and psychological variables known to affect time management (e.g., gender and depression). These variables turned out to be significant predictors of successful time management in the present study as well, indicating that time management was assessed in an effective way.

When teaching the use of MCII, the experimenter had emphasized the understanding of the logic underlying MCII to facilitate its application to any upcoming concerns in the subsequent week. This approach is in contrast to most existing interventions aimed at behavior change, which typically tell people how to strive for an *a priori* defined desired outcome (e.g., weight control, Stice, Shaw, & Marti, 2006; alcohol control, Lock, 2004; forgiveness, Harris et al., 2006). Such focus on specific outcomes has also been true of most interventions geared at improving time management. However, in everyday life, people commonly want to attain a multitude of outcomes varying in domains (e.g., academic, interpersonal, and health), specificity (Locke & Latham, 1990), and framing (Dweck & Leggett, 1988; Higgins, 1997), many of which cannot be anticipated ahead of time. Being in command of MCII as a metacognitive strategy that can be applied on the spot to any upcoming concern should thus qualify as a helpful tool to organize one's everyday life.

One might argue, however, that our measures of time management have not fully captured its objective enactment. We had focused on how the students had scheduled their time in

the upcoming week (Study 1) and how they subjectively estimated their overall time management and its consequences (Study 2). We had not measured time management in objective terms. In Study 3, we therefore asked whether MCII would affect an everyday behavior that we could objectively measure, and that was contingent on successful time management. Specifically, regularly attending school for people with binding competing commitments would demand effective time management. Thus, women who have to integrate raising children and holding a job would only succeed to also regularly attend a vocational training program if they succeeded in time management.

### STUDY 3: MCII AND ENACTMENT OF TIME MANAGEMENT

We recruited women of low income who had enrolled in a vocational training program geared at business education. We reasoned that among these women, those who had to integrate raising children with going to work should face a particular challenge in turning up for class. MCII and its components have been shown to be especially effective when behavior change is difficult rather than easy (Gollwitzer & Sheeran, 2006; Oettingen, 2012; Webb, Christian, & Armitage, 2007). Thus, when it comes to regularly attending class, mothers who also work during the week should especially benefit from being taught MCII.

#### Method

##### *Participants*

Participants were 58 women who completed a 21-week vocational program geared at business education for low-income women in New York City and who had agreed to release their attendance records. Participants' ages ranged from 18 to 58 years ( $M=32.91$  years,  $SD=10.55$ ; two did not report age). They were randomly assigned to an MCII ( $n=30$ ) or control condition ( $n=28$ ).

##### *Procedure and Materials*

The intervention was embedded in a "Study Skills" class that participants attended 12 times (from the 2nd to 14th week) during the 21-week program. Within the class, they met in small groups led by a trained interventionist. Prior to the first meeting, students were randomly assigned to the MCII or control condition and then randomly assigned to small groups. In Week 7, participants provided their informed consent (to release their attendance records and demographic information; participation in the Study Skills class was a mandatory component of the school program). The MCII or control training was delivered in Weeks 9, 10, 12, 13, and 14. During other class meetings, participants learned about study skills, using materials from Tuckman, Abry, and Smith (2002) and similar sources.

*MCII condition.* To teach the metacognitive strategy of MCII, participants were led through the series of steps

described in Study 2. However, all materials were presented orally; there was no written component. Participants were told that they had completed an exercise called WOOP and were asked to use this acronym to remember the steps of the exercise: identify a *wish*, think about the best *outcome*, think about an *obstacle* to reaching it, and make an if-then *plan* to deal with the obstacle. During the first 1-hour session, participants were guided through the exercise and then encouraged to discuss the steps they had identified so that the interventionist could ensure that they understood how to do the exercise. During subsequent sessions, participants discussed their experiences using the exercise and the interventionist reminded them of the steps, when necessary. At the conclusion of the first meeting, participants were asked to perform the exercise at least once daily and were provided with a small diary booklet in which to record doing so. The diary included the acronym WOOP with a line next to each letter where participants could jot down a keyword representing that step of the strategy. They completed a 1-week diary after the first training session, a 2-week diary after the second training session, and a 1-week diary after the third training session.

*Format-control condition.* Control participants also learned about an exercise called WOOP. However, the steps of this exercise were to think about being *wise*, *optimistic*, *open-minded*, and *powerful*. Participants were instructed to identify and elaborate on aspects of their lives that fit each of these steps. Just as in the MCII condition, they were asked to perform the exercise at least once daily and were provided with a small diary booklet (identical to the one given to MCII participants) in which to record doing so.

*Moderators: Difficulty of time management.* We recorded two variables as indicators that students faced a difficult task regarding time management: the number of children they had and the number of hours per week that they worked.

*Dependent variable: Time management.* As an indicator of unsuccessful time management, we recorded the number of days that students were absent over the course of the program, using school records.

#### Results

The number of children that participants had ranged from 0 to 4 ( $M=0.97$ ,  $SD=1.11$ ) and their hours of work per week ranged from 0 to 65 ( $M=7.26$ ,  $SD=13.81$ ). Days absent from school ranged from 0 to 24 ( $M=4.81$ ,  $SD=5.65$ ). To assess the hypothesis that MCII would show the strongest effects on attendance for those students who faced the hardest task in managing their time (i.e., had children and worked during the week), we used a regression analysis predicting days absent, with condition (MCII vs. control), number of children, and hours working during the week as predictors entered in the first step, the 3 two-way interactions in the second step, and the three-way interaction in the third step. To adjust for the non-normal distribution of number of children, hours working, and days absent, we used maximum likelihood estimation with robust standard errors.



This analysis showed a three-way interaction effect, Wald  $\chi^2(1)=4.70$ ,  $p=.03$ . Examining the 3 two-way interactions, two of them—condition by number of children,  $\chi^2(1)=0.18$ ,  $p=.67$ , and condition by hours worked per week,  $\chi^2(1)=0.83$ ,  $p=.36$ —were not significant, indicating that regardless of condition, each additional child and each additional hour of work per week predicted more days absent. What differed depending on condition was how the combination of more children and more hours working related to attendance. Specifically, in the MCII condition, there was a significant two-way interaction effect of children by hours working per week,  $b=-0.08$  (0.04),  $\chi^2(1)=5.54$ ,  $p=.02$ . That is, participants showed a relatively high attendance even when they had more than one child and worked many hours per week (Figure 2). In the control condition, there was no significant two-way interaction of number of children by hours working per week,  $b=0.13$  (0.10),  $\chi^2(1)=2.04$ ,  $p=.15$ ; the combination of more children and more hours working predicted increasingly poor attendance. That is, condition (MCII vs. control) moderated the combined effect of more children and more hours working on school attendance.

## Discussion

Rather than focusing on subjective measures of successful time management as in Studies 1 and 2, we now showed effects of MCII on objective performance in a task that demanded effective time management: attendance in a vocational program for low-income women who had to integrate raising children and working during the week. Because MCII and its components have been shown to be particularly effective in solving difficult rather than easy tasks, we expected and found that MCII unfolded its beneficial effects in those women who, among their classmates, faced the hardest task in managing their time.

## GENERAL DISCUSSION

Mental contrasting with implementation intentions helped students to improve their time management. In Study 1, we used scheduling as a behavioral indicator of effective time

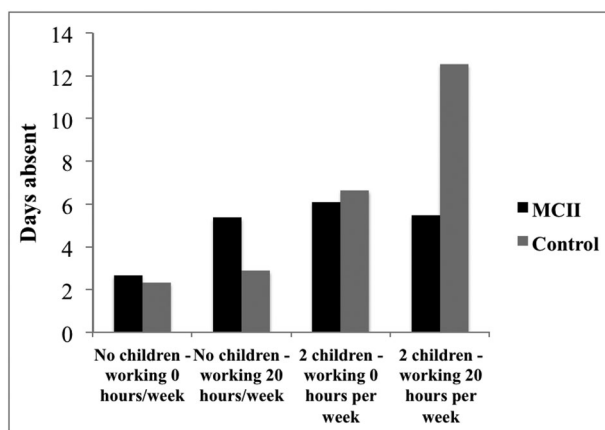


Figure 2. Days absent over the course of the program by number of children, hours working per week, and condition (Study 3)

management and observed that participants who completed a brief MCII exercise about an important academic concern scheduled about twice as many hours of their time for the upcoming week as participants who completed control exercises (i.e., content control and format control). Participants in the MCII condition scheduled more hours than those in the control condition who mentally elaborated identical content using a different format (i.e., content control), and they also scheduled more hours than control participants who applied cognitive procedures mimicking mental contrasting and the formation of implementation intentions using irrelevant content (i.e., format control). Thus, the findings imply that only when the specific steps of the MCII exercise are applied in their particular order to the respective goal-related contents that beneficial effects on time management accrue.

The results of Study 1 also indicate that engaging in MCII on the named pressing academic concern helped time management regardless of the participants' expectations of successfully resolving this concern. This finding is in line with our ideas on how MCII promotes better time management. MCII facilitates the discrimination between concerns that are feasible and unfeasible (Oettingen, 2000, 2012), thus enabling people to effectively allocate their resources (i.e., they know where to invest and where to better let go).

We further examined whether the beneficial effects of MCII can be explained by increased experimenter demand for showing improved time management. For this purpose, we had a different sample of participants complete either the MCII exercise, the content control, or the format-control exercise and then report on felt demand. No matter whether we asked about demand for improved time management in general or the scheduling of time in particular, participants of all groups (i.e., MCII, content control, and format control) reported a medium degree of felt demand that did not differ between conditions. Thus, an alternative explanation in terms of demand is implausible.

In Study 2, participants being taught to use MCII as a metacognitive strategy to regulate the pursuit of their everyday concerns reported improvements in their general time management. At the end of the week following the intervention, we observed that on average, participants in the MCII condition reported about a 15% improvement in their use of time as compared with baseline (i.e., the week prior to the intervention). This was in contrast to participants in the control group who engaged in an extensive intervention using the same format but different content. Although participants in both groups spent the same time with the interventionist, the participants of the control group reported no improvement in their time management after a week. Finally, the training of MCII versus control accounted for variance in the change of time management that could not be explained by otherwise potentially important predictors such as depression, perceived stress, or well-being, even though these background variables did predict baseline as well as post-intervention time management. The latter finding also suggests that our self-report questionnaire of six items assessed time management quite reliably.

Study 3 focused on everyday behavior that was objectively measured and that reflected effective time management: school attendance. It focused on participants other than college

students, and it tested the effects of MCII over a longer period: Low-income women enrolled in a 5-month vocational program for business education. This sample is noteworthy as some of the women faced a particularly hard task regarding time management. They had children, had to work during the week, and on top of it, they had to integrate the burden of regularly attending class. We reasoned and observed that in these working mothers, rather than in their classmates who were not working mothers, MCII would unfold its beneficial effects on class attendance. Thus, Study 3 shows that beyond effective scheduling (Study 1) and beyond self-reported time management (Study 2), MCII also benefited actual behavior for which effective time management was indispensable.

### Implications for Research on MCII

The present studies extend previous research on MCII as they used control groups that investigated whether simply thinking about irrelevant content in the format of MCII (format control) or thinking about relevant content in a different format (content control) would be enough to produce the typical effects of MCII on behavior change. Using both format-control and content-control groups in Study 1, and a format-control group in Studies 2 and 3, we can conclude that the format of MCII needs to be filled with the appropriate content for its beneficial effects to unfold.

In contrast to most research on MCII (Oettingen, 2012), the present participants were not applying MCII to changing the targeted behavior (i.e., improving time management). Rather, MCII was applied to a pressing academic concern (Study 1) or acquired as a metacognitive strategy (i.e., the skill to use a certain set of cognitive procedures on appropriate thought contents; Studies 2 and 3); still, it was found to have the ancillary benefit of aiding time management. Apparently, not only behavior change interventions focusing on desired outcomes that are *a priori* defined (e.g., weight control, Stice et al., 2006; alcohol control, Lock, 2004; forgiveness, Harris et al., 2006) achieve benefits. Interventions that teach metacognitive strategies to be applied to a host of everyday concerns are also beneficial (Achtziger, Martiny, Oettingen, & Gollwitzer, 2012; Oettingen, 2012).

The targeted concerns may have varied in framing (e.g., promotion vs. prevention), specificity (low vs. high), domain (e.g., achievement, interpersonal, fitness), and time perspective (short term vs. long term). Accordingly, future research might investigate whether using MCII is especially effective for concerns of particular framings, specificity, domains, or time perspectives. Future studies might also investigate mediators of the effects of MCII when used as a metacognitive strategy. We assume that participants are enabled to separate the wheat from the chaff in terms of bringing order into their various concerns, by yielding strong commitment and effective planning for concerns with high expectations of success and promoting disengagement from concerns with low expectations of success. Future work might shed more light on this process by examining exactly which projects participants strongly pursue and which they abandon when MCII has been acquired as a metacognitive strategy.

### Implications for Research on Time Management

Although time management has been theoretically connected to strategic self-regulation (Zimmerman, Greenberg, & Weinstein, 1994), interventions generally try to directly implement scheduling, prioritization, and organization. Such interventions may be complemented with a MCII exercise focusing on solving pressing everyday concerns. Thereby, new avenues for research on time management may open up. Might MCII ameliorate the planning fallacy (Buehler et al., 1994), perhaps by forcing people to unpack a large concern into smaller goals (Kruger & Evans, 2004) and by automating action initiation with respect to these behavioral goals (Koole & van't Spijker, 2000)? By leading people to anchor their thoughts about a concern in visions of a desired future, does MCII reduce people's tendency to discount future consequences (König & Kleinmann, 2007)? By clarifying broad concerns, specifying the relevant obstacles, and forming concrete plans of how to deal with them, does MCII counteract the inclination to delay pursuing overarching goals (McCreary et al., 2008)? And finally, do the benefits of MCII on time management persist over time, and do they last more than a week or a few months? We suspect they would, as we have found benefits of MCII on eating fruits and vegetables persist over a period of 2 years (Stadler et al., 2010).

### CONCLUSION

Effective time management has been found to lead to a host of positive consequences reaching from high academic achievement (GPA; Britton & Tesser, 1991) to creativity (Zampetakis, Bouranta, & Moustakis, 2010), and task performance in organizations (Rapp, Bachrach, & Rapp, 2013). However, it is also well known that people often fail to achieve effective time management (Zimbardo & Boyd, 2008). The present research suggests that MCII is a time- and cost-effective self-regulation strategy that people can use by themselves in order to remedy their time management and thus improve their everyday life and long-term development.

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### SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article at the publisher's web-site.

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