


From Fantasy to Action: Mental Contrasting With Implementation Intentions (MCII) Improves Academic Performance in Children

Angela Lee Duckworth¹, Teri A. Kirby², Anton Gollwitzer³,
and Gabriele Oettingen^{3,4}

Social Psychological and
Personality Science
4(6) 745-753
© The Author(s) 2013
Reprints and permission:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/1948550613476307
spps.sagepub.com


Abstract

The current intervention tested whether a metacognitive self-regulatory strategy of goal pursuit can help economically disadvantaged children convert positive thoughts and images about their future into effective action. Mental contrasting with implementation intentions (MCII) entails mental contrasting a desired future with relevant obstacles of reality and forming implementation intentions (if-then plans) specifying when and where to overcome those obstacles. Seventy-seven 5th graders from an urban middle school were randomly assigned to learn either MCII or a Positive Thinking control strategy. Compared to children in the control condition, children taught how to apply MCII to their academic wishes and concerns significantly improved their report card grades ($\eta^2 = .07$), attendance ($\eta^2 = .05$), and conduct ($\eta^2 = .07$). These findings suggest that MCII holds considerable promise for helping disadvantaged middle school children improve their academic performance.

Keywords

mental contrasting with implementation intentions, MCII, achievement, adolescence, goals, motivation, self-regulation, intervention

The achievement gap between low-income and high-income children is among the most pressing social problems of contemporary American society. Compared to their wealthier counterparts, disadvantaged children come to school less reliably, earn lower grades and standardized test scores, and enroll in and graduate from both high school and college at lower rates (Brooks-Gunn, Linver, & Fauth, 2005; Jencks & Phillips, 1998; National Center for Education Statistics, 2000a, 2000b). The walls of many schools serving disadvantaged students are decorated with inspirational quotes encouraging positive thinking (e.g., “If you can imagine it, you can achieve it; if you can dream it, you can become it,” “Dream it, believe it, achieve it!”) More generally, the idea that positive thinking about the future effectively motivates action in the present runs deep in American culture and is vigorously advocated in best-selling self-help books (e.g., Byrne, 2006; Peale, 1952).

Urging children to engage in mental simulations of positive outcomes contradicts empirical evidence, primarily from studies of adults, showing that positive fantasies fail to activate goal-directed action (Oettingen, 2012; Oettingen & Mayer, 2002; Taylor, Pham, Rivkin, & Armor, 1998). For instance, Pham and Taylor (1999), comparing process and outcome simulations, conducted an experimental study with undergraduate students studying for their first midterm examination in

introductory psychology. Participants who were instructed to visualize themselves studying for the exam began studying earlier, spent more hours studying, and performed better on the exam than participants instructed to imagine themselves attaining a high score on the exam. Process simulations reduced anxiety and facilitated planning, which in turn mediated the benefits of process simulations on test performance.

In the current study, we tested whether economically disadvantaged children could learn and apply MCII, a metacognitive strategy for converting positive thoughts and images about a desired future into self-regulated behavior change. MCII combines *mental contrasting*, a strategy for pursuing (i.e., committing to and striving for) goals, with the formation of *implementation intentions*, a strategy of planning out one’s goal

¹ University of Pennsylvania, Philadelphia, PA

² University of Washington, Seattle, WA

³ New York University, New York, NY, USA

⁴ University of Hamburg, Hamburg, Germany

Corresponding Author:

Angela Lee Duckworth, Positive Psychology Center, University of Pennsylvania, 3701 Market Street Suite 200, Philadelphia, PA 19104, USA.

Email: duckworth@psych.upenn.edu

pursuit. In a random-assignment, longitudinal intervention study at an urban middle school, we compared the effects of MCII versus solely indulging in positive thoughts about the future on objective indicators of academic achievement. Our aims in this investigation were both practical and theoretical. From a practical perspective, we saw the unfulfilled promise of metacognitive strategies that could help disadvantaged children “learn better in formal educational settings” (Flavell, 1979, p. 910). From a theoretical perspective, we hoped to extend prior research on MCII by showing that school-age children taught MCII could flexibly adapt this metacognitive strategy to diverse personal wishes or concerns, demonstrating generalization beyond a very narrowly specified wish chosen by the child in the intervention session (e.g., studying for a particular quiz) and, ultimately, improvements on consequential, objectively measured (as opposed to subjectively reported) academic outcomes.

Fantasy Realization Theory

Successful goal pursuit entails converting valued and feasible wishes into strong goal commitment with subsequent goal striving and goal attainment. The model of *fantasy realization* (Oettingen, 2000; Oettingen, Pak, & Schnetter, 2001; summary by Oettingen, 2012) distinguishes three modes of self-regulatory thought: indulging, dwelling, and mental contrasting. Indulging entails imagining a desired future and mentally elaborating its benefits without consideration of obstacles posed by present reality. Indulging in these positive thoughts and images (e.g., imagining getting an A in math, being praised by parents, feeling proud) feels good in the moment and thus might seem to motivate goal-directed action. However, as there are no reflections on the present reality pointing to the fact that the positive future has not yet been realized, indulging does not induce a necessity to act. Dwelling, on the other hand, entails reflecting on the present reality possibly standing in the way of one’s desired future (e.g., a distracting classmate) without activating mental representations of the desired future. Since no mental representation of the desired future indicates a direction for action, like indulging, dwelling does not induce a necessity to act.

The third and most effective route to goal pursuit is mental contrasting: conjoint mental elaboration of a desired future *and* the present reality standing in the way of fantasy realization. This conjoint elaboration of a desired and feasible future (e.g., an A in math, praise) and obstacles that may prevent this future (e.g., a chatty, distracting classmate) creates a strong mental association between future and reality that signals the need to overcome the obstacles in order to attain the desired future. Importantly, these associations then foster energization and goal pursuit toward attaining the desired future as measured by explicit (e.g., self-report, teacher report, body weight reduction) and implicit indicators (e.g., systolic blood pressure, implicit cognition; Kappes, Singmann, & Oettingen, 2012; Oettingen et al., 2009). Numerous experimental studies in various life domains (e.g., interpersonal relationships, health)

show that adults can use mental contrasting to turn wishful thoughts and images about a desired future into strong goal commitments with subsequent goal striving and goal attainment (Oettingen, 2000; Oettingen et al., 2001; Oettingen, Marquardt, & Gollwitzer, 2012; Oettingen, Mayer, & Thorpe, 2010; Oettingen, Mayer, Thorpe, Janetzke, & Lorenz, 2005; Oettingen, Stephens, Mayer, & Brinkmann, 2010; summary by Oettingen, 2012).

People who are pursuing a goal often benefit from planning out in advance how exactly they will implement their goal. Attainment of goals benefits from planning how to overcome obstacles and executing goal-directed actions (Gollwitzer, 1999; Gollwitzer & Sheeran, 2006; Oettingen et al., 2001, 2005). Successful goal attainment has been shown to be facilitated by the furnishing of set goals with implementation intentions, *if . . . , then . . .* plans that link a critical situational cue to a specific goal-directed behavior (Gollwitzer, 1999). Returning to our example of the student whose goal is to improve his math grade, an implementation intention might take the following form: “*If my friend begins chatting to me during math class, then I will ask him that we talk after class instead!*” In the presence of the critical situation, the intended goal-directed behavior is initiated automatically, that is, immediately (Gollwitzer & Brandstätter, 1997), effortlessly (Brandstätter, Lengfelder, & Gollwitzer, 2001), and without conscious intent (Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009). Implementation intentions have been widely shown to facilitate goal attainment in both laboratory and field studies (Gollwitzer & Sheeran, 2006).

A Self-Regulatory Strategy of Mental Contrasting With Implementation Intentions (MCII)

In MCII, mental contrasting first facilitates the conversion of thoughts about desired and feasible futures into goals to which individuals are now strongly committed. Subsequently, obstacles identified during mental contrasting can be addressed by implementation intentions linking obstacles to specific actions that overcome them (i.e., *if obstacle, then goal-directed action*). MCII constitutes a synergistic strategy for self-regulated behavior change and is more effective than either MC or II alone (e.g., Adriaanse et al., 2010; Kirk, Oettingen, & Gollwitzer, 2012).

Prior research shows that adults and adolescents can use MCII to initiate and sustain goal-directed behavior. For example, adult volunteers in a study on healthy lifestyles who completed training in MCII were twice as physically active over the next 4 months than were adults in an information-only group (Stadler, Oettingen, & Gollwitzer, 2009). Of particular relevance to the present investigation, adolescents studying for the Preliminary SAT (PSAT) college entrance exam who learned MCII completed about 60% more practice questions during a summer of self-regulated study than did students who completed a placebo control intervention (i.e., writing a practice essay for the writing section of the PSAT; Duckworth, Grant, Loew, Oettingen, & Gollwitzer, 2011).

Transition to Middle School for Disadvantaged Children

Like other psychologists, we believe that disadvantaged children making the transition to middle school are particularly worthy of intervention efforts (Becker & Luthar, 2002). Report card grades generally decline from elementary to middle school (Blyth, Simmons, & Carlton-Ford, 1983; Petersen & Crockett, 1985; Simmons & Blyth, 1987) despite an increase in the number of academic wishes children spontaneously articulate (Galotti, 2005). Failure during this transitional epoch instigates for many children a downward spiral in academic performance ending in failure and dropout (Eccles, Lord, & Midgley, 1991). Compared to their more advantaged peers, children from disadvantaged backgrounds tend to receive less support from parents and others (Anderson, Jacobs, Schramm, & Splittgerber, 2000), and their report card grades and attendance records decline more steeply as they progress from elementary school to high school (Gutman, Sameroff, & Cole, 2003).

The ability to “work by themselves and stay on-task without direct teacher intervention or supervision” has been proposed as essential to successfully transitioning from elementary to middle school (Anderson et al., 2000, p. 331). Consistent with this supposition, middle school students who are more adept at self-regulating behavior in the service of long-term goals earn higher report card grades and attend school more reliably than their more impulsive peers (Duckworth & Seligman, 2005; Poropat, 2009). Moreover, there is evidence that superior self-regulatory competence helps explain why children of higher socioeconomic backgrounds perform better in school than their more disadvantaged peers (Evans & Rosenbaum, 2008). Whereas general intelligence has proven difficult to deliberately improve, especially after early childhood, other competencies, including self-regulation, appear responsive to intervention later in development (Cunha, Heckman, & Schennach, 2010).

Metacognitive self-regulatory strategies hold particular promise for deliberate intervention (Flavell, 1979; Mischel & Mendoza-Denton, 2003), though their effectiveness among economically disadvantaged children remains largely untested. Given the importance of verbal ability to children’s metacognitive self-regulatory skill (Rodriguez, Mischel, & Shoda, 1989; Zelazo, 2004), we considered that a “Catch-22” situation might prevail. In particular, we foresaw the possibility that economically disadvantaged children, who tend to lag behind their more advantaged counterparts in verbal ability (Sirin, 2005), might find it difficult to flexibly apply MCII to diverse wishes and concerns since it entails verbalizing and imagining their self-identified wishes, outcomes, obstacles, and plans. Contrariwise, we were encouraged by the possibility of a virtuous (rather than vicious) cycle, in which disadvantaged children improved their metacognitive self-regulatory skill, which in turn improved their academic performance and, in the long-run, their verbal ability.

The Present Research

The current investigation tested whether socioeconomically disadvantaged fifth-grade students could learn a metacognitive

self-regulatory strategy (MCII) and apply it to diverse school-related wishes. Whereas previous research has primarily explored the benefits of MCII for adults to attain predefined, narrowly specified wishes, in this investigation we explored whether disadvantaged children in their first year of middle school could apply MCII very generally to diverse, self-defined, everyday academic wishes and concerns to improve their overall performance in school. In collaboration with school administrators and teachers, we scheduled our intervention for the midpoint of the academic year, just after students had received report cards summarizing their first and second marking quarter performance. Students were expected at that juncture to be highly motivated to improve their third quarter grade point average (GPA), attendance, and conduct, especially because their performance determined eligibility for a highly desired, 4-day, out-of-town class trip whose attendees were announced at the beginning of the fourth quarter.

Method

Participants

Ninety-four percent of fifth graders at an urban public middle school elected to participate in this study, providing implied parent consent and written child assent ($N = 77$, mean age = 11.05 years, $SD = 0.69$). Participants did not differ from non-participants on race, gender, or age, $ps > .18$. There was no attrition over the course of the study. About 73% of participants were Hispanic, and 27% were Black; 52% were female. Eighty-five percent of participants were from low-income families, as indicated by eligibility for free or reduced-price lunch.

Procedure

Prior to the intervention, we asked homeroom teachers to rate children regarding their classroom behavior in the previous month (see Figure 1 timeline). In addition, from official report cards of first and second quarter, we recorded baseline academic performance using three indicators: GPA, attendance, and conduct. At the beginning of the third quarter, children were randomly assigned to complete either the MCII or the Positive Thinking control exercises. As detailed below, trained interventionists met with the children in groups of 4 to 5 children each during three 1-hr sessions. At the end of the third quarter, we again recorded the three indicators of academic performance (GPA, attendance, and conduct). As our dependent variables, we used the indicators of academic performance at the end of the third quarter adjusted for the respective indicators at baseline (first and second quarters). Figure 1 provides a timeline of the study.

Measures

Classroom Behavior. Prior to the intervention, we asked homeroom teachers to rate students on 33 classroom behaviors (e.g., “This student got distracted by his/her classmates,” “This student lost his temper”) observed in the month prior

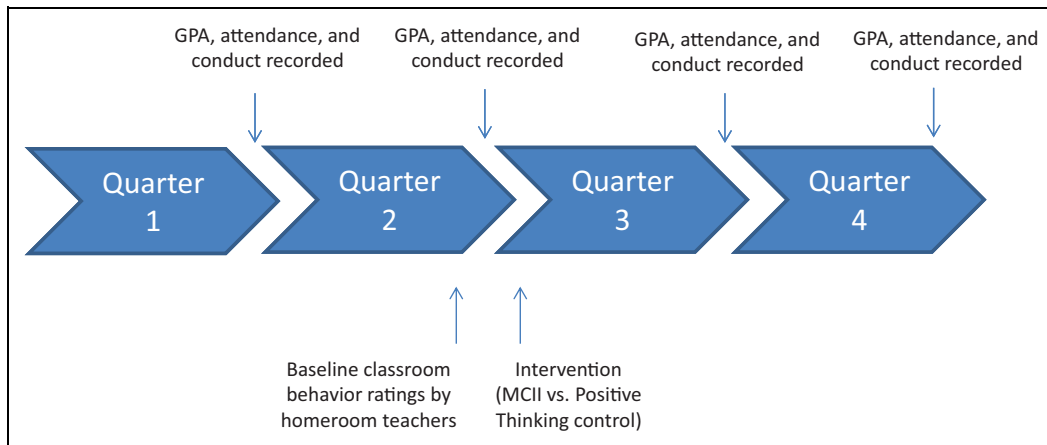


Figure 1. Timeline of study events.

to the intervention using a 5-point frequency scale ranging from 1 = *at least once a day* to 5 = *almost never*. Item ratings were averaged, with higher scores indicating better classroom behavior. The observed internal reliability coefficient for this scale was $\alpha = .98$.

Academic Performance Indicators: GPA, Attendance, and Conduct.

As a matter of usual practice, three performance outcomes are measured quarterly by the school in which the study took place: GPA, attendance, and conduct. We calculated GPA for each quarter as the average of math, writing, social studies, and reading grades, each of which was measured on a 0–100 percentage point scale. Likewise, we obtained from school records the number of days children were either late to school (i.e., tardies) or failed to arrive at all (i.e., absences). We calculated attendance (i.e., the number of days on which students arrived promptly to school) for each quarter by subtracting the number of days which children were either tardy or absent from the total number of official school days. Finally, for conduct, teachers in each academic subject gave students a quarterly rating indicating their overall comportment and preparedness for school, using a single 5-point scale, where 1 = *unsatisfactory*, 2 = *needs improvement*, 3 = *satisfactory*, 4 = *good*, and 5 = *excellent*. Conduct ratings were highly correlated across teachers, as indicated by alphas exceeding .80 for each quarter, so we averaged ratings across teachers for each student for each quarter.

MCII and Positive Thinking Control Interventions. During the first session in both conditions, interventionists introduced “an exercise to help students improve in school” and passed out a worksheet packet. Interventionists began by asking children to “think about your most important wish or goal that’s related to school work” and to write it down. To ensure the selection of feasible wishes, children were directed as follows: “This wish or goal should be something that is challenging, but that you can achieve within the next few weeks or months.” Next, interventionists asked children to write down “the one best outcome, the one best thing of fulfilling your wish or reaching

your goal.” Thereafter, children were given a few quiet minutes to think and imagine this best thing.

In the MCII condition, interventionists now asked children to write down “something that could prevent you from achieving your wish or goal, an obstacle that stands in the way of you achieving your wish.” Children were again given a few quiet minutes to think and imagine the named obstacle. Thereafter, interventionists asked children to write down when and where they would next encounter this obstacle: “Where does it occur next—in what place? When exactly—what day, what time?” Then, interventionists asked, “What can you do to overcome your obstacle? What action or behavior could you do that would help to overcome the obstacle?” and to write the behavior down. Finally, children had to fill out an “*if . . . , then . . .*” template. Specifically, they were asked to fill the obstacle in the “*if . . .*” part, and the action in the “*then . . .*” part. In other words, children were taught to make an implementation intention (i.e., *if* obstacle, *then* action) and to rehearse this plan once more to themselves.

Whereas in the MCII condition children named and wrote down an obstacle standing in the way of realizing their wish, in the Positive Thinking control condition, children were asked to write down “another good outcome of fulfilling your wish or reaching your goal.” After giving children a few quiet minutes to think and imagine this second positive outcome, interventionists asked children to write down when and where this positive outcome may occur: “Where may it occur—in what place? When exactly—what day, what time?” Then, interventionists asked, “How would this best outcome make you feel? What would you feel?” and to write the positive feeling down. Finally, interventionists asked children to fill out the same “*if . . . , then . . .*” template as in the MCII condition. However, in the Positive Thinking control condition, participants were asked to fill the best outcome in the “*if . . .*” part and the positive feeling in the “*then . . .*” part. That is, children were taught to make an if–then plan (i.e., *if* outcome, *then* feeling) and to rehearse this plan once more to themselves.

Finally, for ease of understanding, interventionists told all children that the exercise they had just learned will be referred

Table 1. Summary of Analysis of Covariance Models Predicting Third Quarter GPA, Attendance, and Conduct.

Variable	GPA		Attendance		Conduct	
	F	η^2	F	η^2	F	η^2
Baseline level of outcome	154.34***	.68	53.43***	.43	67.53***	.48
Baseline classroom behavior	5.34*	.07	2.43	.03	.12	.002
Female	1.73	.02	1.46	.02	.27	.004
MCII (vs. Control)	5.78*	.07	3.91*	.05	4.98*	.07
R ²	.82		.52		.73	

Note. Baseline level of outcome for these three analysis of covariance models was the average value of first and second quarter grade point average (GPA), attendance, and conduct, respectively.

to as the WOOP exercise. In the MCII condition, children were told that WOOP stood for “Wish-Outcome-Obstacle-Plan,” and in the Positive Thinking control condition, they were told that WOOP stood for “Wish-Outcome-Outcome-Plan.” They were also encouraged to apply the WOOP exercise regarding any of their academic wishes and goals and that they could even use the exercise for wishes and goals in other domains. Finally, children received a small reminder card for what the WOOP exercise entailed to take along with them.

During separate follow-up sessions 2 days and 3 weeks later, respectively, interventionists met with children in the same small groups and practiced the same exercises as in the first session.

Results

Preliminary Analyses

Children in the MCII and Positive Thinking control conditions did not differ in baseline classroom behavior (MCII $M = 3.54$, $SD = 1.03$; Control $M = 3.50$, $SD = 0.98$; $t(75) = -0.19$, $p = .85$, $d = .04$), baseline GPA (MCII $M = 76.30$, $SD = 8.78$; Control $M = 76.44$, $SD = 8.47$; $t(75) = 0.07$, $p = .95$, $d = .02$), or baseline conduct (MCII $M = 3.67$, $SD = 0.74$; Control $M = 3.50$, $SD = 0.72$; $t(75) = -0.98$, $p = .33$, $d = .23$). However, children in the Positive Thinking control condition came to school on time more reliably at baseline than did children in the MCII condition (MCII $M = 78.25$, $SD = 12.59$; Control $M = 83.84$, $SD = 7.74$; $t(75) = 2.32$, $p = .02$, $d = .55$).

Strategy of Analysis

As mentioned earlier, school teachers suggested that motivation to improve behavior would be greater in the third than in the fourth quarter. To test this assumption empirically, we compared mean levels of third and fourth quarter academic performance outcomes. Consistent with school teachers’ anecdotal observations, both GPA ($d = 0.82$, $p < .001$) and attendance ($d = 1.05$, $p < .001$) worsened for students between the third (GPA $M = 79.23$, $SD = 8.49$; attendance $M = 42.84$, $SD = 2.65$) and fourth quarters (GPA $M = 76.34$, $SD = 9.47$; attendance $M = 40.31$, $SD = 3.74$). However, teacher ratings of

student conduct improved slightly ($d = -0.22$, $p = .05$) between the third ($M = 3.55$, $SD = 0.91$) and fourth quarters ($M = 3.66$, $SD = 0.98$). Apparently, as the school year wound down, students’ lower motivation to still improve performance paralleled more lenient standards of teachers for good conduct. None of these effects differed by condition ($ps > .05$).

Third quarter conduct was associated with GPA ($r = .64$, $p < .001$) but not attendance ($r = .07$, $p = .52$); nor were GPA and attendance related ($r = .12$, $p = .29$). We therefore fit three separate single-factor analysis of covariance (ANCOVA; MCII vs. Positive Thinking control) models to assess the effect of the MCII intervention on outcomes. In all ANCOVA models, we controlled for first and second quarter levels (baseline) of the respective academic indicators. We also controlled for classroom behavior because it was related to outcomes of interest, and its inclusion reduced error variance. More specifically, baseline classroom behavior was related to all measured outcomes (rs from .23 to .65, $ps < .05$). Finally, we controlled for gender because 62% of children in the MCII condition were female, compared to 38% of children in the control condition ($\chi^2 = 3.71$, $p = .05$).

Effects of MCII on Academic Performance Outcomes

As shown in separate ANCOVA models summarized in Table 1, there was substantial stability in all three academic performance outcomes. Thus, the best predictor of third quarter GPA, attendance, and conduct was the first and second quarter value of respective variables, η^2 s from .43 to .68, respectively. Nevertheless, children taught MCII (adjusted $M = 80.29$, $SD = 3.78$) earned higher third quarter GPAs than did children taught positive thinking (adjusted $M = 78.13$, $SD = 3.79$; $F(1, 72) = 5.78$, $p = .02$, $\eta^2 = .07$). Likewise, children taught MCII (adjusted $M = 43.28$, $SD = 1.94$) came to school on time more reliably than did children taught positive thinking (adjusted $M = 42.38$, $SD = 1.95$; $F(1, 72) = 3.91$, $p = .05$, $\eta^2 = .05$)¹ and were graded by their teachers as superior in overall conduct (MCII adjusted $M = 3.67$, $SD = 0.50$; Positive Thinking control adjusted $M = 3.42$, $SD = 0.50$; $F(1, 72) = 4.98$, $p = .03$, $\eta^2 = .07$). By conventional standards, these effects were medium in size; see Figures 2, 3, and 4, respectively. In the fourth quarter, after the announcement of the class trip, the effect of condition favored MCII but was diminished in magnitude (η^2 s = .03, .03, and .001 for GPA, attendance, and conduct, respectively) and failed to reach statistical significance.

Discussion

In this investigation, economically disadvantaged fifth-grade students taught MCII improved their GPA, attendance, and conduct relative to students randomly assigned to merely think positively about their academic wishes. The present investigation adds to the existing literature by showing that children can learn to flexibly apply a self-regulatory metacognitive strategy to diverse, self-identified wishes and concerns—the ultimate aim, presumably, of early pioneers in metacognition who saw

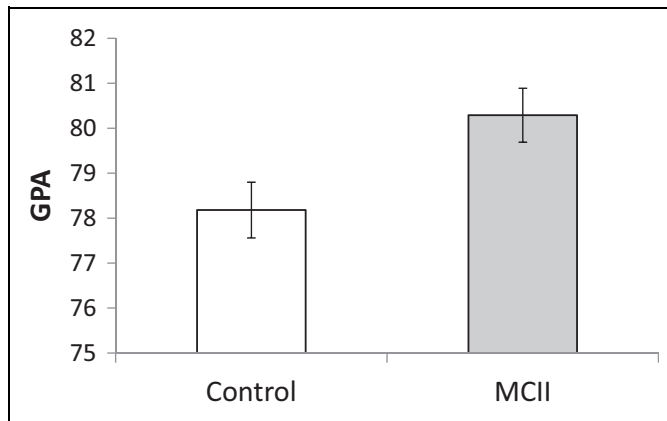


Figure 2. Adjusted means of GPA (on a 0 to 100 percentage point scale) during the third quarter by condition. Error bars represent ± 1 standard error of the mean.

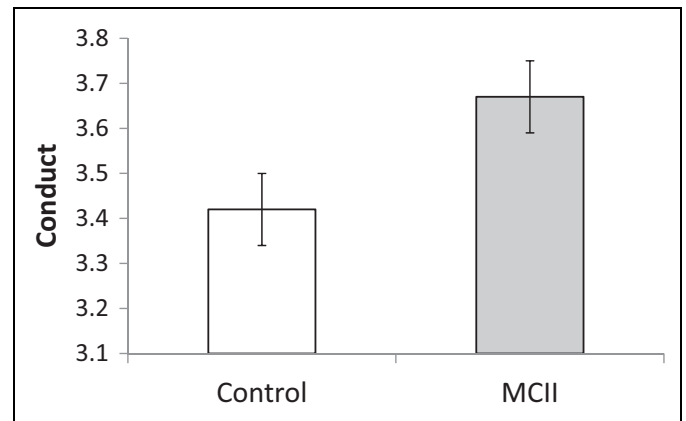


Figure 4. Adjusted means of conduct (averaged across teacher ratings on a 1- to 5-point scale) during the third quarter by condition. Error bars represent ± 1 standard error of the mean.

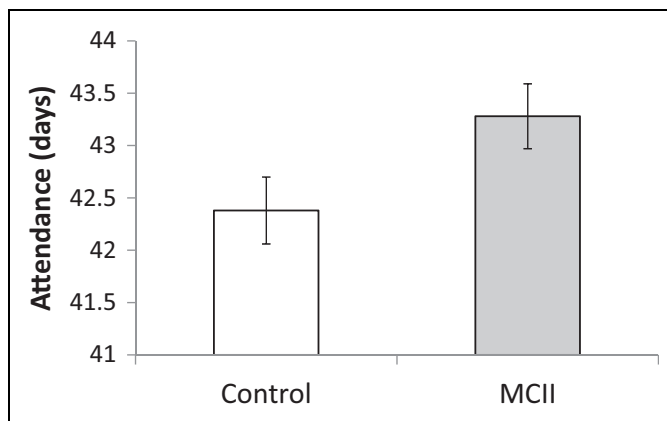


Figure 3. Adjusted means of attendance (number of days student arrived on time to school) during the third quarter by condition. Error bars represent ± 1 standard error of the mean.

the potential for “increasing the quantity and quality of children’s metacognitive knowledge and monitoring skills through systematic training” (p. 910) to improve a broad array of learning outcomes in children (Flavell, 1979).

The present results suggest that children as young as age 11 (and whose verbal abilities are typical of 9-year-olds) can, with only three cumulative hours of training with an interventionist, learn MCII as a metacognitive strategy (Achtziger, Martiny, Oettingen, & Gollwitzer, 2012; Flavell, 1979; Nelson & Narens, 1994; Oettingen, 2012) and apply MCII to diverse wishes “related to school work” they themselves identify as personally important, challenging, and feasible. The benefits of this relatively brief intervention were evidenced by improvements in objectively measured academic outcomes 2 months later, relative to classmates who spent the same amount of time learning to think positively about their wishes.

Limitations

Several limitations of the current study are worth discussing and suggest profitable directions for future research. First and

foremost, the effect of MCII on academic outcomes was attenuated in size and failed to reach statistical significance in the fourth quarter of the academic year. Prior research has shown that MCII only strengthens goal pursuit when feasibility and desirability (value) of the imagined future are high (see Oettingen, 2012 for a review). Both teachers’ observations and declining report card grades and attendance in the fourth quarter supported the inference that at the end of school year, there was minimal possibility of changing year-end outcomes (e.g., cumulative GPA). However, we do not know whether the children had a similar impression of lowered possibilities to still improve their academic performance at the end of the year; in the present study, we could not measure children’s subjective feasibility and desirability regarding their various idiosyncratic wishes and concerns. But we speculate that possibly due to perceiving relatively fewer possibilities to still improve their course grades, in the fourth quarter at the conclusion of the school year, children used MCII less often or less effectively, thus diminishing its impact on behavior in the fourth quarter. Changing behavior is far from a trivial challenge, but enduring benefits are nevertheless the ultimate goal of any psychological intervention (Yeager & Walton, 2011). Thus, additional studies are needed to determine the extent to which children need ongoing reminders and support to internalize metacognitive strategies like MCII, even when only small improvements are possible in a given context.

Second, additional investigation is needed to establish whether even younger children than the ones who participated in the present study can learn MCII. Earlier studies have shown that preschool children can follow plans to resist distraction during a laboratory work task (Mischel & Patterson, 1976, 1978; Patterson & Mischel, 1975, 1976). What is not known is how early in life children can identify goal-interfering obstacles on their own and make their own plans to obviate these obstacles, as did children in the current study. Generally, intervention efforts are more cost-effective the earlier in life they are initiated (Heckman, 2006), but it is possible that some metacognitive self-regulatory strategies are not possible to

learn at very young ages (Fernandez-Duque, Baird, & Posner, 2000). Thus, more research is needed to identify the ideal age to begin teaching children metacognitive self-regulatory strategies.

Finally, the logistical constraints of the current investigation precluded assessing presumed mechanisms. Because we relied entirely on objective rather than subjective outcomes in this study, we assumed—but could not test directly—that children improved their grades, attendance, and behavior by fulfilling the wishes they specified in their MCII exercise. Given the diversity of self-identified wishes and plans, we did not see a practical way of assessing objectively whether children had accomplished the wishes specified in their daily MCII exercises. Thus, additional research is needed to confirm mediators of the effect of MCII on generalized behavior improvements. For instance, a future study might attempt to replicate the current findings but add behavioral measures of goal completion at sufficiently frequent intervals to trace out, with much greater precision, the effect of the intervention on behavior change over time, and examine whether goal completion mediates the effect of MCII on objective measures of academic performance.

Conclusion

A widely held belief, particularly among members of the lay public, is that thinking positively about the future motivates self-regulated behavior change in the present: “If you dream it, you can achieve it.” The current study suggests that, on the contrary, it is more effective to mentally contrast positive thoughts about a desired future with obstacles standing in its way. Wishful thinking is, alas, exactly that. Anticipating enjoyment of future outcomes feels good in the moment (MacLeod & Conway, 2005), but has been shown in longitudinal studies to predict greater distress, dissatisfaction, and dysfunction (Busseri, Choma, & Sadava, 2009; Oettingen & Mayer, 2002). Less eloquent but more helpful advice for children would be: “If you dream it, you have just begun. Now consider the obstacles standing in the way of achieving your dream. Make and follow a plan to get around these obstacles. You will in this way help your dream come true.”

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The research reported here was supported by Grant K01-AG033182 from the National Institute on Aging to the first author.

Note

1. Attendance was left-skewed (i.e., a handful of students attended many fewer days of school than most), so we attempted several transformations. Because these transformations did not substantially reduce skew, we instead excluded four outliers identified in a box-and-whisker plot, which reduced the skew index to $-.93$ and

the kurtosis index to $-.12$. When running the ANCOVA model with these outliers removed, the results were virtually unchanged: The effect of MCII (vs. control) on attendance was $\eta^2 = .06$, $p = .04$. Because ANCOVA models are reasonably robust to minor violations of normality, we opted to present results that included all participants.

References

- Achtziger, A., Martiny, S. E., Oettingen, G., & Gollwitzer, P. M. (2012). Meta-cognitive processes in the self-regulation of goal pursuit. In P. B. & K. DeMarree. (Eds.), *Social Meta-cognition. frontier of social psychology series* (pp. 121–139). New York, NY: Psychology Press.
- Adriaanse, M. A., Oettingen, G., Gollwitzer, P. M., Hennes, E. P., de Ridder, D. T. D., & de Wit, J. B. F. (2010). When planning is not enough: Fighting unhealthy snacking habits by mental contrasting with implementation intentions (MCII). *European Journal of Social Psychology, 40*, 1277–1293.
- Anderson, L. W., Jacobs, J., Schramm, S., & Splittgerber, F. (2000). School transitions: Beginning of the end or a new beginning? *International Journal of Educational Research, 33*, 325–339.
- Bayer, U. C., Achtziger, A., Gollwitzer, P. M., & Moskowitz, G. B. (2009). Responding to subliminal cues: Do if-then plans facilitate action preparation and initiation without conscious intent? *Social Cognition, 27*, 183–201.
- Becker, B. E., & Luthar, S. S. (2002). Social-emotional factors affecting achievement outcomes among disadvantaged students: Closing the achievement gap. *Educational Psychologist, 37*, 197–214.
- Blyth, D. A., Simmons, R. G., & Carlton-Ford, S. (1983). The adjustment of early adolescents to school transitions. *Journal of Early Adolescence, 3*, 105–120.
- Brandstätter, V., Lengfelder, A., & Gollwitzer, P. M. (2001). Implementation intentions and efficient action initiation. *Journal of Personality and Social Psychology, 81*, 946–960.
- Brooks-Gunn, J., Linver, M. R., & Fauth, R. C. (2005). Children’s competence and socioeconomic status in the family and neighborhood. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 414–435). New York, NY: The Guilford Press.
- Busseri, M. A., Choma, B. L., & Sadava, S. W. (2009). Functional or fantasy? Examining the implications of subjective temporal perspective “trajectories” for life satisfaction. *Personality and Social Psychology Bulletin, 35*, 295–308.
- Byrne, R. (2006). *The secret* (1st ed.). New York, NY: Atria Books.
- Cunha, F., Heckman, J. J., & Schennach, S. M. (2010). Estimating the Technology of Cognitive and Non-Cognitive Skill Formation. *Econometrica, 78*, 883–931.
- Duckworth, A. L., Grant, H., Loew, B., Oettingen, G., & Gollwitzer, P. M. (2011). Self-regulation strategies improve self-discipline in adolescents: Benefits of mental contrasting and implementation intention. *Educational Psychology, 31*, 17–26.
- Duckworth, A. L., & Seligman, M. E. P. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science, 16*, 939–944.
- Eccles, J. S., Lord, S., & Midgley, C. (1991). What are we doing to early adolescents? The impact of educational contexts on early

- adolescents. *American Journal of Education. Special Issue: Development and Education across Adolescence*, 99, 521–542.
- Evans, G. W., & Rosenbaum, J. (2008). Self-regulation and the income-achievement gap. *Early Childhood Research Quarterly*, 23, 504–514.
- Fernandez-Duque, D., Baird, J. A., & Posner, M. I. (2000). Executive attention and metacognitive regulation. *Consciousness and Cognition*, 9, 288–307.
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, 34, 906–911.
- Galotti, K. M. (2005). Setting goals and making plans: How children and adolescents frame their decisions. In J. E. Jacobs & P. A. Klaczynski (Eds.), *The development of judgment and decision making in children and adolescents* (pp. 303–326). Mahwah, NJ: Lawrence Erlbaum.
- Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist*, 54, 493–503.
- Gollwitzer, P. M., & Brandstätter, V. (1997). Implementation intentions and effective goal pursuit. *Journal of Personality and Social Psychology*, 73, 186–199.
- Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in Experimental Social Psychology*, 38, 69–119.
- Gutman, L. M., Sameroff, A. J., & Cole, R. (2003). Academic growth curve trajectories from 1st grade to 12th grade: Effects of multiple social risk factors and preschool child factors. *Developmental Psychology*, 39, 777–790.
- Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, 312, 1900–1902.
- Jencks, C., & Phillips, M. (1998, September 1). America's next achievement test: Closing the Black-White test score gap. *The American Prospect*, 40, 44–53.
- Kappes, A., Singmann, H., & Oettingen, G. (2012). Mental contrasting instigates goal-pursuit by linking obstacles of reality with instrumental behavior. *Journal of Experimental Social Psychology*, 48, 811–818. doi:10.1016/j.jesp.2012.02.002
- Kirk, D., Oettingen, G., & Gollwitzer, P. M. (2012). *Promoting integrative bargaining: Mental Contrasting with Implementation Intentions*. New York: New York University, Psychology Department.
- MacLeod, A. K., & Conway, C. (2005). Well-being and the anticipation of future positive experiences: The role of income, social networks, and planning ability. *Cognition and Emotion*, 19, 357–374.
- Mischel, W., & Mendoza-Denton, R. (2003). Harnessing willpower and socioemotional intelligence to enhance human agency and potential. In L. G. Aspinwall & U. M. Staudinger (Eds.), *A psychology of human strengths: Fundamental questions and future directions for a positive psychology* (pp. 245–256). Washington, DC: American Psychological Association.
- Mischel, W., & Patterson, C. J. (1976). Substantive and structural elements of effective plans for self-control. *Journal of Personality and Social Psychology*, 34, 942–950.
- Mischel, W., & Patterson, C. J. (1978). Effective plans for self-control in children. In W. A. Collins (Ed.), *Minnesota symposium on child psychology* (Vol. 11, pp. 199–230). Hillsdale, NJ: Lawrence Erlbaum.
- National Center for Education Statistics. (2000a). *The condition of education*. Washington, DC: Office of Educational Research and Improvement, U.S. Department of Education.
- National Center for Education Statistics. (2000b). *National Assessment Educational Progress (NAEP), 1999 long term trend assessment*. Washington, DC: Office of Educational Research and Improvement, U.S. Department of Education.
- Nelson, T. O., & Narens, L. (1994). Why Investigate Metacognition? In J. Metcalfe & A. P. Shimamura (Eds.), *Metacognition: Knowing about knowing* (pp. 1–26). Cambridge, MA: The MIT Press.
- Oettingen, G. (2000). Expectancy effects on behavior depend on self-regulatory thought. *Social Cognition*, 18, 101–129.
- Oettingen, G. (2012). Future thought and behaviour change. *European Review of Social Psychology*, 23, 1–63.
- Oettingen, G., Marquardt, M. K., & Gollwitzer, P. M. (2012). Mental contrasting turns positive feedback on creative potential into successful performance. *Journal of Experimental Social Psychology*, 48, 990–996. doi:10.1016/j.jesp.2012.03.008
- Oettingen, G., & Mayer, D. (2002). The motivating function of thinking about the future: Expectations versus fantasies. *Journal of Personality and Social Psychology*, 83, 1198–1212.
- Oettingen, G., Mayer, D., Sevincer, A. T., Stephens, E. J., Pak, H. J., & Hagenah, M. (2009). Mental contrasting and goal commitment: The mediating role of energization. *Personality and Social Psychology Bulletin*, 35, 608–622.
- Oettingen, G., Mayer, D., & Thorpe, J. (2010). Self-regulation of commitment to reduce cigarette consumption: Mental contrasting of future with reality. *Psychology and Health*, 25, 961–977.
- Oettingen, G., Mayer, D., Thorpe, J. S., Janetzke, H., & Lorenz, S. (2005). Turning fantasies about positive and negative futures into self-improvement goals. *Motivation and Emotion*, 29, 237–267.
- Oettingen, G., Pak, H. J., & Schnetter, K. (2001). Self-regulation of goal-setting: Turning free fantasies about the future into binding goals. *Journal of Personality and Social Psychology*, 80, 736–753.
- Oettingen, G., Stephens, E. J., Mayer, D., & Brinkmann, B. (2010). Mental contrasting and the self regulation of helping relations. *Social Cognition*, 28, 490–508.
- Patterson, C. J., & Mischel, W. (1975). Plans to resist distraction. *Developmental Psychology*, 11, 369–378.
- Patterson, C. J., & Mischel, W. (1976). Effects of temptation-inhibiting and task-facilitating plans on self-control. *Journal of Personality and Social Psychology*, 33, 209–217.
- Peale, N. V. (1952). *The power of positive thinking*. New York, NY: Prentice Hall.
- Petersen, A. C., & Crockett, L. (1985). Pubertal timing and grade effects on adjustment. *Journal of Youth and Adolescence. Special Issue: Time of maturation and psychosocial functioning in adolescence: I*, 14, 191–206.
- Pham, L. B., & Taylor, S. E. (1999). From thought to action: Effects of process-versus outcome-based mental simulations on performance. *Personality and Social Psychology Bulletin*, 25, 250–260.
- Poropat, A. E. (2009). A meta-analysis of the five-factor model of personality and academic performance. *Psychological Bulletin*, 135, 322–338.

- Rodriguez, M. L., Mischel, W., & Shoda, Y. (1989). Cognitive person variables in the delay of gratification of older children at risk. *Journal of Personality and Social Psychology, 57*, 358–367.
- Simmons, R. G., & Blyth, D. A. (1987). *Moving into adolescence: The impact of pubertal change and school context*. New York, NY: Aldine De Gruyter.
- Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research, 75*, 417–453.
- Stadler, G., Oettingen, G., & Gollwitzer, P. M. (2009). Physical activity in women: Effects of a self-regulation intervention. *American Journal of Preventive Medicine, 36*, 29–34.
- Taylor, S. E., Pham, L. B., Rivkin, I. D., & Armor, D. A. (1998). Harnessing the imagination: Mental simulation, self-regulation, and coping. *American Psychologist, 53*, 429–439. doi:10.1037/0003-066x.53.4.429
- Yeager, D. S., & Walton, G. M. (2011). Social-psychological interventions in education: They're not magic. *Review of Educational Research, 81*, 267–301.
- Zelazo, P. D. (2004). The development of conscious control in childhood. *TRENDS in Cognitive Sciences, 8*, 12–17.

Author Biographies

Angela Lee Duckworth is an assistant professor in the Department of Psychology at the University of Pennsylvania. Her research interests include self-control, grit, and other factors that determine effort and achievement.

Teri A. Kirby is a PhD student in the Department of Psychology at the University of Washington. Her research interests include prejudice, stereotyping, and diversity.

Anton Gollwitzer is currently an undergraduate at New York University. His research interests include self-regulation, arousal, and individual versus pair evaluations.

Gabriele Oettingen is Professor of Psychology in the Psychology Department at New York University and the University of Hamburg. In her research, she is exploring how conscious and nonconscious processes interact in influencing people's control of thought, emotion, and behavior. Among others, she has created the model of mental contrasting that specifies how people can turn their wishes into binding goals and plans, and eventually goal attainment.