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Examining the Efficacy of a Time Management Intervention for High School Students

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November 2013

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Abstract

The current paper reports the results of 2 quasiexperimental studies conducted to examine the efficacy of a new time management intervention designed for high school students. In both studies, there was no difference between the treatment and control groups in improvement in self-reported time management skills as a result of the intervention. However, the treatment group reported significantly greater improvement than the control group for secondary outcomes such as stress (Studies 1 and 2), anxiety (Studies 1 and 2), depression (Study 1), and knowledge of time management strategies (Study 1). Additionally, advisor ratings of student time management skills were higher for the treatment than for the control group in Study 2. Implications and suggestions for improving the intervention are discussed.

Key words: time management, noncognitive, intervention, high school, psychosocial, study skills

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If you want to make good use of your time, you've got to know what's most important and then give it all you've got.

– Lee Iacocca, Iacocca

Until we can manage time, we can manage nothing else.

– Peter F. Drucker, The Effective Executive

Background

The above quotations make the point that time management skills (e.g., setting and prioritizing goals, planning ahead, and organization) are necessary for success in life. It is not surprising that time management is a topic of importance to educators, researchers, and psychologists, as it relates to both academic and job performance (Liu, Rijmen, MacCann, & Roberts, 2009; Macan, 1994). Despite its growing popularity, a recent meta-analysis of 35 studies focusing on time management, time use, and time structure concluded that no agreed-upon definition of time management exists (Claessens, van Eerde, & Rutte, 2007). One popular definition states that time management involves determining one's needs, setting goals to meet needs, and prioritizing and planning to meet goals (Lakein, 1973). Years later, a similar definition of time management surfaced with goal setting, the mechanics of time management, and organization again noted as key components (see Macan, Shahani, Dipboye, & Phillips, 1990).

Time Management and Academic Performance

Although the connection is intuitively clear, surprisingly little research has been conducted linking time management to academic performance. There is, however, a growing body of research that suggests time management is positively related to academic performance (see Adamson, Covic, & Lincoln, 2004; Britton & Tesser, 1991; Lahmers & Zulauf, 2000; Liu et al., 2009; Macan et al., 1990; Trueman & Hartley, 1996). For example, in a recent study of middle school students, Liu et al. (2009) found that the time management skills of planning and organization were positively related to course grades. These relations held over time and, in fact, were stronger after 6 months. Further, researchers have theorized that time management strategies are important cognitive aspects of self-regulated learning that can lead to higher

academic achievement (see Dembo & Eaton, 1997; Eilam & Aharon, 2003; Zimmerman & Risemberg, 1997). High achievers are more able than average or low achievers to invest their efforts and abilities in time management related self-regulatory processes, such as planning (Eilam & Aharon, 2003). Furthermore, Britton and Tesser (1991) found that both the time management skill of short-term planning and time attitudes were related to academic achievement. If the ability to effectively manage one's time were indeed positively related to academic performance, then, presumably, interventions that improve time management would be of value to students.

Time Management Interventions

Existing time management interventions include training in skills such as goal-setting, scheduling, prioritizing tasks, self-monitoring, problem-solving techniques, delegating, and negotiating, as well as conflict resolution (Bruning & Frew, 1987; Higgins, 1986; Morisano, Hirsh, Peterson, Pihl, & Shore, 2010; Richardson & Rothestein, 2008). Those focused specifically on time management are often centered on setting goals and priorities, the mechanics of time management (e.g., making to-do lists), and/or one's preference for organization (e.g., preference for a well-organized rather than disorganized work day; Claessens et al., 2007). Macan et al. (1990) suggested that time management training should lead to increases in those areas and, in turn, this should lead to increased perceived control of time (Claessens et al., 2007).

However, research findings on the effectiveness of time management interventions in adults has been mixed as some research has found that time management training does not lead to differences in time management behaviors (see Briddell, 1987; Kirby, 1978; Macan, 1994, 1996; Robinson, 1974), while other research has reported that exposure to such training can lead to improved use of time and completion of tasks (see Hall & Hursch, 1982; King, Winett, & Lovett, 1986; Maher, 1986; Orpen, 1994; Woolfolk & Woolfolk, 1986). Studies (see Green & Skinner, 2005; King et al., 1986; Macan, 1994; Slaven & Totterdell, 1993; Van Eerde, 2003) have concluded also that, after training, participants were likely to engage in time management behaviors more frequently (Claessens et al., 2007). Additionally, variables such as accurately estimating time, time on important tasks, anxiety, and procrastination seem to be positively affected by time management training (Burt & Kemp, 1994; Eilam & Aharon, 2003; Francis-Smythe & Robertson, 1999; Hall & Hursch, 1982; Van Eerde, 2003).

Research attempting to improve the time management of college students has also received mixed support. Adamson et al. (2004) assessed the time management of first-year college students who were exposed to a time management demonstration, a lecture on stress and coping, and given a time management manual and exercises (e.g., calendar, to-do list) after completing a survey. Students who read the manual scored significantly higher in meeting deadlines and effective organization than students who did not. Although many of these students felt that their time management skills did not improve, they still reported that time management was important to their success (Adamson et al., 2004).

Additionally, Terry and Doolittle (2008) assessed college and graduate student self-efficacy and time management skills before and after the use of a time management tool (e.g., students set goals, monitored time use, received feedback, recorded time spent working [a] toward goals, [b] in social matters, [c] on entertainment, and [d] sleeping, etc.). Although the students reported an increase in time management behaviors, there was no actual effect on self-efficacy and learning, regardless of the type of feedback they received or when they received it.

Few studies, however, have investigated the impact of time management interventions on adolescents, despite the fact that researchers (see Hattie, Biggs, & Purdie, 1996) have reported that younger students gain the greatest benefits when such habits are developed early. In response, we have developed an intervention designed to improve the time management skills of high school students. Below, we first describe the intervention. Next, we report the results of two quasiexperimental studies designed to investigate the efficacy of the intervention.

Current Time Management Intervention

The current time management intervention consists of several steps and is described in greater detail in the Method sections. First, students' skill level on six facets of time management was assessed by having students complete the Abbreviated Time Management Index (ATMI; Roberts, Krause, & Suk-Lee, 2001). These six facets are meeting deadlines, staying focused, having a workspace, setting goals, planning ahead, and organizing time and tasks. Next, they were provided with feedback on three of these facets (setting goals, planning ahead, and organizing time and tasks) that was tailored to their skill level. That is, for example, students with a low level of skill received different feedback than students with a high level of skill. In this feedback, students were told their skill level (e.g., *high*, *medium*, or *low* in Study 1; *medium* or *low* in Study 2) on each of the three facets and were given suggestions for improving (*low* and

medium skill buckets) or maintaining (*high* skill bucket) their skills. Suggestions were generated in consultation with experts in student time management (e.g., highly experienced high school teachers and guidance counselors).

Next, students discussed their assessment results and feedback in class with the school counselor, and were then provided with one homework assignment per week for the next 3 (Study 1) or 5 (Study 2) weeks. These assignments were designed to improve the three facets of time management that students received feedback on and were created using theory and research from the fields of social psychology and education. It should be noted that, although the feedback students were provided differed slightly as a function of self-reported skill level, all students completed identical homework assignments. Thus, the crux of the intervention was the same for all students. After they completed each assignment, they had an in-class discussion about the assignment with the school counselor.

Current Studies

The efficacy of the intervention was assessed with two quasiexperimental studies. Each study consisted of a treatment group, which received the intervention, and a control group, which either did nothing but complete the pre- and posttests (Study 1) or participated in an unrelated intervention in addition to completing the pre- and posttests (Study 2). Students were assigned to groups by the researchers, who formed groups to ensure that each group consisted of an approximately equal number of students. Control groups were *focal-local* control groups (Shadish & Cook, 2009). That is, in each study, the control group was in the same locale (students in the same grade level and at the same school) as the treatment group, and possessed similar characteristics on variables that were important to the study. Previous research has found that effects from randomized experiments were identical when a focal-local control group was substituted for a randomized control group (Aiken, West, Schwalm, Carroll, & Hsiung, 1998).

Outcomes measured are divided into primary and secondary outcomes. The primary outcome is student improvement on self-reported time management skills. Secondary outcomes include variables that one would expect to be influenced by an improvement in one's time management skills (e.g., stress, anxiety, and self-efficacy). For example, an improvement in one's ability to manage time might lead to a decrease in the amount of stress and anxiety one feels. We hypothesized that the treatment group would demonstrate more improvement than the

control group on secondary outcomes. For primary outcomes, we predict that the intervention will moderate student overconfidence in their time management. We generated this hypothesis for primary outcomes because previous research has found that students tend to be inaccurate in assessing their skill level (e.g., Dunning, Heath, & Suls, 2004; Hansford & Hattie, 1982). Furthermore, there is some evidence that the best way to calibrate estimates is to improve skills in the domain (e.g., Kruger & Dunning, 1999). Thus, we predict that some students will overestimate their time management skill (low-skilled students) and, as a result of the intervention, will actually *lower* their estimates after the intervention. In Study 1 we tested the hypotheses using the original intervention. In Study 2, we tested a slightly expanded intervention and attempted to address some of the limitations of Study 1. In addition, advisor ratings of students' time management behaviors are included in Study 2.

One potentially important difference between Studies 1 and 2 is that, whereas students received class grades during the semester in which Study 1 took place, they did not during the semester in which Study 2 took place. Thus, as the intervention would appear more relevant to everyday school life for students in Study 1, these students may have been more motivated to follow the intervention.

Study 1

The purpose of Study 1 was to examine the efficacy of the time management intervention. For this study, a treatment group participated in the intervention and completed pre- and posttest assessments, and a focal-local control group also completed the pre- and posttest assessments. The efficacy of the intervention is demonstrated if the treatment group demonstrates greater improvement in primary and secondary outcomes than the control group.

Method

Participants

Participants were 143 students from a highly selective private high school in the northeastern United States who were in the ninth grade during the spring of 2009. These students took part in the intervention as part of their English and cultural studies courses. Demographics are displayed in Table 1.

Table 1

Comparison of Treatment and Control Conditions for All Subjects, Including Those Who Attrited, for Demographic Variables, Cognitive Ability, Conscientiousness, and Time Management (Study 1)

Characteristic	Treatment	Control	Attrition	
			Treatment	Control
Sample size	65	78	4	13
Percent male	49.20	51.30	100.00	84.60
Percent White	36.90	62.80	50.00	84.60
Percent Asian/Asian American	27.70	19.20	50.00	0.00
Percent African American/Black	15.40	5.10	0.00	7.70
Percent Hispanic/Latino	7.70	2.60	0.00	0.00
Percent other	12.30	10.30	0.00	7.70
Age				
M	14.65	14.58	14.25	14.85
SD	0.53	0.53	0.50	0.38
Conscientiousness				
M	74.40	73.08	75.75	66.62
SD	7.87	10.19	9.29	4.49
SSAT Total				
M	2161.06	2149.29	2221.00	2083.33
SD	96.91	108.50	195.84	246.65
N	62	70	3	3
TM: Meeting deadlines				
M	18.23	17.52	17.00	16.85
SD	2.70	3.21	2.83	4.04
TM: Staying focused				
M	17.66	18.21	21.25	19.62
SD	2.97	3.06	2.36	3.97
TM: Having a workspace				
M	15.58	15.36	14.75	15.31
SD	3.62	4.33	4.11	5.20
TM: Setting goals				
M	19.12	18.72	20.50	17.85
SD	2.73	2.92	2.65	3.65
TM: Planning ahead				
M	18.08	17.10	20.00	15.69
SD	3.19	3.19	3.16	3.59
TM: Organizing time & tasks				
M	11.42	10.51	7.75	9.77
SD	4.59	3.85	1.71	4.19

Note. TM = time management; SSAT = Secondary School Admission Test.

Assignment to Condition

Students were assigned to condition by class. That is, half of the English courses and half of the cultural studies courses were assigned to the treatment condition. By assigning students to condition in this way, we could ensure that the treatment and control conditions were composed of approximately equal numbers of students. This assignment method also made the most sense logistically, as it made it possible for the school counselor to discuss assessment and homework results with entire classes of students rather than requiring her to discuss results with each student individually.

Instruments

A description of the instrument used to assess the primary and secondary outcomes is below. In addition to outcome measures, students also provided their gender, race/ethnicity, age, characteristics, and Secondary School Admission Test (SSAT) scores (SSAT, 2011). The SSAT is used as a proxy for cognitive ability and is a standardized multiple-choice test for students in Grades 5–11. It tests verbal ability, quantitative ability, and reading comprehension. For students in Grades 8–11, scores can range from 1500–2400. Furthermore, conscientiousness was assessed with 19 industriousness items from the International Personality Item Pool (IPIP; Goldberg et al., 2006). An example item is, *I accomplish a lot of work.* Items were answered on a 5-point scale ranging from 1 (very inaccurate) to 5 (very accurate). This information was used to verify that the control group qualified as a focal-local control group. All assessments were delivered via the web.

Primary outcome: time management. Time management was assessed with the Abbreviated Time Management Index (ATMI; Roberts et al., 2001). Based on theoretical, applied, and empirical approaches to time management, the ATMI assesses six facets of time management behaviors and attitudes. Each item was answered on a scale from 1 (*Never or Rarely*) to 4 (*Usually or Always*).

1. Having a workspace (6 items): This subscale measures a person's preference for being organized and keeping his or her workspace neat and tidy; several items pertain to the degree to which a person views messiness or disorganization as counterproductive. Example: *I keep my desk uncluttered.*

2. Meeting deadlines (6 items): This subscale measures the extent to which people perceive themselves to be in control of time and to use their time wisely and efficiently. Example: *I leave things to the last minute* (reverse-keyed).
3. Organizing time and tasks (6 items): The items in this subscale assess actions, strategies, and preferred ways of behaving that are associated with successful time management (TM) practices. Example: *I write a daily to-do-list.*
4. Planning ahead (6 items): This subscale reflects an individual's preference for structure and routine over flexibility, unpredictability, and lack of constraint. Example: *I like to leave things to chance (reverse-keyed).*
5. Setting goals (6 items): This subscale measures an individual's sense of purpose, level of focus, and goal-setting capacity. Example: *I am driven to achieve my goals*.
6. Staying focused (6 items): This subscale reflects an individual's potential to cope with change and ability to adapt when change occurs. Example: *I can't cope with change* (reverse-keyed).

Secondary outcomes. These include:

1. Depression Anxiety Stress Scales (Lovibond & Lovibond, 1995; 21 items): Measures student depression, anxiety, and stress over the past week. Examples: *I couldn't seem to experience any positive feeling at all* (depression), *I felt that I was using a lot of nervous energy* (anxiety), *I felt that I was rather touchy* (stress). Items were answered on a scale ranging from 1 (*Did Not Apply to Me At All*) to 4 (*Applied to Me Very Much*, or *Most of the Time*).
2. Time Management Self-Efficacy (Bandura, 2006; 10 items): This scale is taken from Bandura's measure of Self-Efficacy for Self Regulated Learning. The measure assesses how confident the student is in his/her ability to perform tasks that are relevant to good time management. Example: *Plan my schoolwork for the day*. Items were answered on an 11-point scale ranging from 0 (*Cannot Do At All)* to 100 (*Highly Certain I Can Do*) in intervals of 10.

Intervention and Study Procedure

Pretest assessment. Students in both the treatment and control conditions completed the assessments of primary and secondary outcomes described above during class time in a computer lab in the school library.

Categorization of skill level. After time management skills were assessed their responses were compared to the responses of a national sample of 814 students of the same age. These students came from Atlanta, GA; Chicago, IL; Denver, CO; Fort Lee, NJ; and Los Angeles, CA. Students were then classified as *low*, *medium*, or *high*, on each of the six facets of time management. That is, students who fell more than one standard below the mean of the national sample on a facet were classified as falling in the *low* skill bucket for that facet, those within one standard deviation were classified as falling in the *medium* skill bucket, and those more than one standard deviation above the mean were classified as falling in the *high* skill bucket.

Delivery of feedback. After students were classified, the treatment group was provided with feedback (paper-based) on three of the facets during a class period 1 week after the pretest assessment was completed. Example feedback can be seen in the Appendix. This feedback provided them with their relative standing on each of the facets and suggestions for improving as created by an expert panel of high school teachers and guidance counselors. Feedback was personalized by skill level, such that students in the *low*, *medium*, and *high* skill categories received feedback and suggestions tailored to their individual skill level. In these studies, treatment students received feedback only on the setting goals, planning ahead, and organizing time and task facets. This was done for time concerns and also because the school we partnered with expressed special interest in these three facets. Feedback was given to the students by the school counselor, who also discussed the results with them.

Homework. For each of the 3 weeks that followed, students also completed a homework assignment. They are described below. All students, regardless of skill bucket, completed the same homework.

1. Week 1: The first assignment was the *goal-setting worksheet*. For this assignment, students were asked to think of three goals: a school goal, an extracurricular activities goal, and a friends-and-family goal. For each goal, they wrote down the goal plus three things (tasks) they needed to do to achieve this goal. They then wrote down three things (subtasks) they needed to do to achieve the three tasks they wrote down

to achieve their goal. Finally, they wrote down three things (sub-sub-tasks) they needed to do to achieve the subtasks. So, in total, they wrote down three goals and nine steps to achieving each goal. This exercise was done to help counter one of the most prevalent time management related problems: the planning fallacy, or the fact that people underestimate the amount of time it takes to finish complex tasks (Buehler, Griffin, & Ross, 1994). One way to counter the planning fallacy and get people to more accurately estimate task completion times is to have them unpack tasks into smaller units (Kruger & Evans, 2004). After listing three things they needed to do to achieve a goal, they further broke each of these tasks into additional activities. Finally, they wrote down the day that they would complete the first task.

2. Week 2: For the second assignment, students completed a modified version of the day reconstruction exercise (e.g., Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004). This five-part assignment required students to provide an hourly view of what they did yesterday, who they did it with, and how they felt while participating in a particular activity. Additionally, information about their overall mood yesterday and how they believed others perceive them was also collected. Finally, the last part of the assessment required them to reflect on the number of hours they spent doing each activity, who they spent time with, and how they felt. Students were prompted to note anything that surprised them as they looked for trends in their information.
3. Week 3: The third assignment involved teaching students how to use a planner and having them complete a sample planner. Included in the planner was a weekly schedule, a monthly schedule, and a to-do list. In addition to their pragmatic value, the Week 2 and 3 homework tools can help to correct any false beliefs students might have about their ability to control the way they manage their time. Plant, Ericsson, Hill, and Asberg (2005) have noted that, in their sample of college students, an organized and systematic approach to planning was associated with higher GPAs (grade point averages).

Posttest assessment. One week after treatment, students completed the planner assignment. All students then took a posttest assessment in a manner identical to the pretest assessment. Included in these assessments were all primary and secondary outcomes. The order

of the assessments, and items within the assessments, were randomized such that each student completed assessments and items in a different order than they did for the pretest assessment.

Control condition. The control condition was passive in this study. That is, they did nothing as part of the control condition except take the pre- and posttest assessments during the same time as did treatment condition students. The control group received the time management feedback after the posttest was complete.

Analysis Plan

The analysis plan for both studies consisted of three steps. The first step was to confirm that the control group was indeed a focal-local control group by establishing that the treatment and control groups were equivalent on characteristics that may be important to the study (Shadish & Cook, 2009). We did this by comparing the gender, age, ethnicity, cognitive ability (SSAT), work ethic (conscientiousness), and pretest time management scores. The second step was to compare the treatment and control group changes on both primary and secondary outcomes for the total sample, excluding manipulation check failures. The third step was to analyze changes in primary outcomes by skill bucket. That is, to gain a more accurate assessment of the time management intervention's efficacy, in this step we compared, for example, changes in low-skill treatment group students' setting-goals ratings with low-skill control group students' setting-goals ratings, medium-skill treatment students' ratings with medium-skill control students' ratings, and so on. For each analysis, we use the terms *approach significance* and *marginally significant* to refer to effects that range in significance level from $p \leq .15$ to $p = .06$. Although this practice is sometimes discouraged, we feel it may be appropriate in studies such as the current one where researchers have little to no power to increase sample size. Schneider, Carnoy, Kilpatrick, Schmidt, and Shavelson (2007, p. 27) quoted Hedges (2006) in making this argument:

> Hedges (2006) observes that increasing the significance level (denoted by α) used in statistical testing is one way to increase power without increasing sample size…when resources are limited, as in the case of many intervention studies, "selection of a significance level other than .05 (such as .10 or even .20) may be reasonable choices to balance considerations of power and protection against Type I errors."

Each of these analyses was conducted by employing 2 (Group: treatment vs. control) X 2 (Outcome Ratings: pretest vs. posttest) mixed-model ANOVAs with outcome ratings as the repeated measure and planned contrasts where appropriate.

Results

Preliminary Analyses

Scale reliabilities. Scale reliabilities were conscientiousness (α = .87), stress (α = .90), anxiety (α = .71), depression (α = .83), setting goals (α = .70), planning ahead (α = .73), organizing time and tasks (α = .85), meeting deadlines (α = .81), staying focused (α = .62), having a workspace (α = .78), and self-efficacy (α = .89).

Comparison of groups. *S*tudent pretest conscientiousness, cognitive ability (as indexed by SSAT scores), and time management as a function of study condition is displayed in Table 1. The table demonstrates that the control group may qualify as a focal-local control group (Shadish & Cook, 2009). That is, in addition to coming from the same locale as the treatment group, the control group is equivalent to the treatment group on important characteristics such as age, gender, cognitive ability, work ethic, and the facets of time management. There were no significant differences between groups for these factors, all *t*s < 1.41, all *p*s > .16, with the exception of the difference in the time management facet Planning Ahead, which did approach significance, $t(141) = 1.82$, $p = .07$. Furthermore, the treatment group was composed of a greater percentage of minority students than was the control group. These two points of data suggest that there may have been slight differences between the two groups that should be considered when interpreting results.

Attrition analysis. Table 1 also reveals that four students from the treatment condition and 13 from the control condition failed to complete the posttest assessment. The two conditions were equivalent in age, conscientiousness, cognitive ability, and most facets of time management, all *t*s < 1.34, all *p*s > .20, although the difference in the time management facet Planning Ahead was significant, $t(15) = 2.15$, $p = .05$. This analysis suggests that the treatment and control groups remained, for the most part, equivalent even after students dropped out of the study.

Correlations. Correlations between all assessments administered in the study, SSAT scores, and GPA are provided in Table 2. Statistically significant relationships are noted.

Manipulation check. As a manipulation check, during the posttest students responded to an item that stated, Did you receive time management feedback and related homework assignments (e.g., Day Reconstruction, How to Choose a Planner, and Goal-Setting)? Fifteen students answered this item incorrectly (11 control students and four treatment students), and are thus excluded from further analyses.

Table 2

Correlations Between Assessments (Study 1)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. SSAT total score	1												
2. Conscientiousness	.10	1											
3. Setting goals	.18	**.53***	1										
4. Planning ahead	.12	**.46***	**.23***	1									
5. Organizing time & tasks	-.05	**.48***	**.22***	**.35***	1								
6. Meeting deadlines	.05	**.60***	**.40***	**.19***	**.32***	1							
7. Staying focused	-.11	-.03	-.15	.00	**-.20***	.11	1						
8. Having a workspace	.08	**.37***	**.27***	**.35***	**.44***	**.30***	**-.10**	1					
9. Stress	.01	**-.24***	**-.18***	**-.20***	-.07	**-.32***	**-.35***	-.05	1				
10. Anxiety	.06	-.16	-.04	-.08	.01	**-.20***	**-.34***	.08	**.72***	1			
11. Depression	.12	**-.23***	-.09	-.11	-.07	**-.27***	**-.34***	.11	**.68***	**.65***	1		
12. TM: Self-efficacy	.03	**.58***	**.48***	**.23***	**.39***	**.54***	.06	**.29***	**-.31***	**-.18***	**-.29***	1	
13. GPA	.16	**.26***	**.31***	**.19***	**.19***	**.24***	-.10	.09	.05	.06	.05	**.34***	1

Note. SSAT = Secondary School Admission Test; TM = time management; GPA = grade point average.

*Correlations significant at $p < .05$ are in boldface.

Efficacy of Time Management Intervention

Primary outcomes. The primary outcome was change in self-assessed time management skills. Table 3 presents time management ratings at pre- and posttest for both the treatment and control groups. The hypothesis was that the intervention will moderate student overconfidence in their time management.

As Table 3 demonstrates, there was little support for the hypothesis. The sole significant interaction was for meeting deadlines, $F(1, 109) = 4.09$, $p = .05$. That is, whereas the treatment group's self-assessed ability to meet deadlines went down from pretest to posttest ($M_{pre} = 18.35$; $M_{post} = 17.81$) $t(56) = -1.52$, $p = .13$, $d = -0.18$, the control group's self-assessed ability went up

(M_{pre} = 17.85; M_{post} = 18.39) $t(53) = 1.35$, $p = .18$, $d = 0.17$. In fact, there is a general trend for the treatment group's self-assessments to decrease pretest to posttest, with ratings decreasing for every facet (nonsignificantly) besides organizing time and tasks, which showed a significant increase. This is consistent with the idea that the least skilled tend to inaccurately assess their skill, and training may be one way to better calibrate their estimates (Dunning et al., 2004; Hansford & Hattie, 1982; Kruger & Dunning, 1999). By contrast, the control group's self-ratings went up for three facets and down for three facets.

Table 3

Time Management Facet Ratings at Pretest and Posttest (Study 1)

	Treatment			Control			
Facet	Pretest	Posttest	Test of change	Pretest	Posttest	Test of change	Interaction
TM: Meeting deadlines							
M	18.32	17.81	$t(56) = -1.52$	17.85	18.39	$t(53) = 1.35$	$F(1, 109) = 4.09$
SD	2.69	3.05	$p = .13$	3.00	3.35	$p = .18$	$p = .05$
N	57	57	$d = -0.18$	54	54	$d = 0.17$	
TM: Staying focused							
M	17.35	16.95	$t(56) = -1.02$	18.06	16.85	$t(53) = -2.61$	$F(1, 109) = 1.74$
SD	2.89	3.05	$p = .31$	2.48	3.14	$p = .01$	$p = .51$
N	57	57	$d = -0.14$	54	54	$d = -0.43$	
TM: Having a workspace							
M	15.81	15.72	$t(56) = -0.19$	15.48	16.13	$t(53) = 1.16$	$F(1, 109) = .004$
SD	3.59	4.40	$p = .85$	3.99	4.22	$p = .25$	$p = .95$
N	57	57	$d = -0.02$	54	54	$d = 0.16$	
TM: Setting goals[a]							
M	19.04	17.46	$t(56) = -3.90$	18.89	17.85	$t(53) = -2.50$	$F(1, 109) = .88$
SD	2.82	3.20	$p = .13$	2.74	3.27	$p = .02$	$p = .35$
N	57	57	$d = -0.53$	54	54	$d = -0.35$	
TM: Planning ahead[a]							
M	18.04	17.26	$t(56) = -1.84$	17.37	17.11	$t(53) = -.69$	$F(1, 109) = .01$
SD	3.11	3.97	$p = .07$	3.15	3.47	$p = .49$	$p = .28$
N	57	57	$d = -0.22$	54	54	$d = -0.08$	
TM: Organizing time & tasks[a]							
M	11.58	13.23	$t(56) = 3.48$	10.76	12.33	$t(53) = 2.84$	$F(1, 109) = .83$
SD	4.75	5.08	$p < .01$	3.73	4.72	$p = .01$	$p = .37$
N	57	57	$d = 0.34$	54	54	$d = 0.37$	

Note. TM = time management.

[a]The facets that were the focus of the intervention.

Because the intervention was designed such that students received different feedback based on whether they fell in the high, medium, or low skill bucket of each of the three facets focused on in the intervention, we also conducted separate analyses comparing the treatment and control groups for each skill bucket for each facet. Once again, for this analysis there were no significant interactions, all *p*s >.17. This may not be surprising because, outside of the feedback, the intervention (i.e., homework assignments) was identical for all skill categories. Because there were no significant interactions, to save space, we do not report individual analyses here.

Secondary outcomes. Results for the secondary outcomes for the total sample are displayed in Table 4. Although there were no significant interactions, interaction terms for stress and anxiety approached significance. Specifically, for stress, whereas the treatment group reported a significant decrease in self-reported stress (M_{pre} = 12.35; M_{post} = 11.25) $t(56) = -2.30$, $p = .03$, $d = -0.28$, the control group reported no change (M_{pre} = 12.30; M_{post} = 12.48) $t(53) = 0.27$, $p = .79$, $d = 0.04$, interaction $F(1, 109) = 2.36$, $p = .13$. For anxiety, whereas the treatment group reported no change in self-reported anxiety (M_{pre} = 9.82; M_{post} = 9.65) $t(56) = -.42$, $p = .68$, $d = -0.06$, the control group reported a marginally significant increase (M_{pre} = 9.54; M_{post} = 10.74) $t(53) = 1.73$, $p = .09$, $d = 0.31$, interaction $F(1, 109) = 2.96$, $p = .09$.

Table 4

Secondary Outcome Ratings at Pretest and Posttest (Study 1)

Outcome	Treatment			Control			
	Pretest	Posttest	Test of change	Pretest	Posttest	Test of change	Interaction
Stress							
M	12.35	11.25	$t(56) = -2.30$	12.30	12.48	$t(53) = .27$	$F(1, 109) = 2.36$
SD	3.93	4.34	$p = .03$	3.98	4.70	$p = .79$	$p = .13$
N	57	57	$d = -0.28$	54	54	$d = 0.04$	
Anxiety							
M	9.82	9.65	$t(56) = -.42$	9.54	10.74	$t(53) = 1.73$	$F(1, 109) = 2.96$
SD	2.71	3.57	$p = .68$	2.71	4.81	$p = .09$	$p = .09$
N	57	57	$d = -0.06$	54	54	$d = 0.31$	
Depression							
M	9.95	9.89	$t(56) = -.10$	10.50	11.33	$t(53) = 1.49$	$F(1, 109) = 1.37$
SD	3.22	4.03	$p = .92$	3.32	4.60	$p = .14$	$p = .24$
N	57	57	$d = -0.01$	54	54	$d = 0.21$	
TM: Self-efficacy							
M	792.46	777.37	$t(56) = -.90$	784.81	767.96	$t(53) = -.61$	$F(1, 109) = .003$
SD	143.58	158.92	$p = .37$	140.80	216.18	$p = .54$	$p = .96$
N	57	57	$d = -0.10$	54	54	$d = -0.09$	

Note. TM = time management.

Discussion

There was a slight tendency for the treatment group to report a decrease in their time management skills from pretest to posttest although, in general, this effect was not significant. It is possible that one consequence of the time management intervention was to more accurately calibrate students' perceptions of their skill levels. If this is the case, the intervention may have led to greater accuracy for students in the treatment condition. One exception to this was found for the skill of organizing time and tasks, where both the treatment and control conditions reported skill improvement. The fact that the control group also improved suggests that factors external to the treatment, such as becoming familiarized with the routine of high school, were responsible for the improvement.

Some of the hypotheses concerning secondary outcomes were supported. Specifically, there was evidence to suggest that stress and anxiety were positively influenced by the intervention.

There are several limitations of Study 1. The first limitation is that the control group was a passive group. That is, in this study, the control group simply took the pretest and posttest without experiencing any intervention. This undermines the amount of confidence we have that the significant results for the secondary outcomes are a result of the intervention rather than some other variable, such as an increased amount of face time with the school counselor. Another limitation concerns the feedback that students were given. Specifically, many students were given feedback that stated that they already possessed a high level of skill on several of the facets of time management. It could be the case that students who were given this information were subsequently less motivated to put forth effort on the homework assignments because they had little to gain. A third potential limitation is that the intervention is relatively brief (consisting of only two assessments and three homework assignments), and thus did not influence behavior as much as it could have if it were longer (although see Yeager & Walton, 2011, for a counterpoint).

A fourth limitation may be that our assessments were not sensitive enough to detect the influence of the intervention. The ATMI was assessed on 4-point scales, and perhaps longer scales (e.g., 6-point) would do a better job of differentiating between students. A final limitation is that each outcome was self-reported, and thus responses to these outcome measures may have

been distorted due to several factors, including a lack of accurate self-knowledge, or due to the motivation to fake good. Each of these limitations is addressed in Study 2.

Finally, the treatment and control groups differed on planning ahead and in ethnic composition before the intervention, calling the status of the control group as a focal-local group into question. Given the groups' equivalence on other important variables, however, we consider it unlikely that the difference in ethnic makeup had a large influence on the outcome of the study.

Study 2

Study 2 was conducted in attempt to extend the findings from Study 1 and address several of its limitations. One difference between Studies 1 and 2 is that the intervention was expanded for Study 2. Specifically, in an attempt to strengthen the treatment, two additional homework assignments were added to the intervention. Additionally, to account for the possibility that the significant results from Study 1 were due to the treatment group receiving more face time with the school counselor than the control group, in Study 2 the control group took part in a strategic reading intervention also taught by the school counselor. A third important change was to the feedback given to students. To combat potential motivation problems associated with receiving *high* skill feedback, in Study 2 students received only feedback stating they were either in the *low* or *medium* skill bucket for each of the three facets.

In an attempt to create a more sensitive measure, the scales of the ATMI were increased from 4 to 6 points. Finally, Study 2 included an outcome that was not self-reported. Specifically, at posttest, academic advisors (blind to condition) rated students on 27 time management behaviors. Academic advisors did not rate students at pretest because at that time they did not know the students, who were new to the school. Although this fact, in addition to the fact that true random assignment to condition was not present, might invite criticism of the advisor ratings, we feel that establishing the fact that the control group is a focal-local control group provides some evidence that any observed differences in advisor ratings are due to the intervention rather than some other confounding factor.

Method

Participants

Participants were 149 students from a highly selective private high school in the northeastern United States who were in the ninth grade during the fall of 2009. Demographics for the sample are displayed in Table 5.

Table 5

Comparison of Treatment and Control Conditions for All Subjects, Including Those Who Attrited, for Demographic Variables, Cognitive Ability, Conscientiousness, and Time Management (Study 2)

			Attrition	
Characteristic	Treatment	Control	Treatment	Control
Sample size	75	74	13	10
Percent male	48.00	53.40	53.80	80.00
Percent White	52.00	55.00	61.50	50.00
Percent Asian/Asian American	26.70	23.30	23.10	20.00
Percent African American/Black	14.70	9.60	15.40	20.00
Percent Hispanic/Latino	1.30	1.40	0.00	0.00
Percent other	5.30	10.70	0.00	10.00
Age				
M	14.00	14.04	14.00	14.00
SD	0.44	0.42	0.41	0.47
Conscientiousness				
M	75.15	74.16	72.77	71.60
SD	8.42	8.95	10.45	12.32
SSAT Total				
M	2135.55	2175.77	2141.36	2109.60
SD	272.93	93.82	89.27	101.58
N	73	74	13	10
TM: Meeting deadlines				
M	25.71	24.82	25.23	22.20
SD	4.66	4.71	4.42	6.27
TM: Staying focused				
M	24.89	23.89	24.92	23.80
SD	3.36	4.56	4.03	5.53
TM: Having a workspace				
M	23.19	22.62	22.31	21.00
SD	5.75	6.50	5.89	6.46
TM: Setting goals				
M	28.16	27.33	28.23	25.70
SD	4.08	4.70	4.76	5.62
TM: Planning ahead				
M	23.24	23.00	21.00	22.60
SD	4.85	4.66	4.95	5.89
TM: Organizing time & tasks				
M	17.55	17.04	17.23	14.00
SD	6.27	6.32	6.70	4.78

Note. SSAT = Secondary School Admission Test; TM = time management.

Assignment to Condition

Assignment to condition was made in an identical manner as in Study 1.

Instruments

Instruments assessing primary and secondary outcomes were identical to Study 1 with the exception of the changes detailed below. As in Study 1, in addition to outcome measures, students also provided information on their demographic characteristics, standardized test scores (SSAT), and conscientiousness. This information was used to verify that the control group qualified as a focal-local control group. All assessments were delivered via the web.

Change to ATMI. The ATMI scale was expanded from 4 to 6 points, with the new scale ranging from 1 (*Never*) to 6 (*Always*).

Addition to secondary outcome assessments. Academic advisors who were blind to condition rated students' time management behaviors compared to other students of the same age at the school on 27 items. Each item was answered on scales ranging from 1 (*Below Average*) to 5 (*Truly Exceptional*). A sixth point was included (*Do Not Know*) and was treated as missing if selected. Example items include: *Sets clear goals for the future, Is good at planning ahead*, *Finishes schoolwork in a timely manner*, and *Is on time for class*. Most academic advisors were full-time faculty members, although some were housemasters, coaches, or administrators. Student advisors are informed of most student classroom issues (positive and negative). They monitor academic progress, or lack thereof, and meet with their advisee once a week.

Intervention and Study Procedure

The intervention and study procedure was identical to Study 1 with the following changes.

Categorization of student skill level. After time management skills were assessed, their responses were compared to the responses of a national sample of students of the same age. Students were then classified as *low* or *medium* on each of the six facets of time management. That is, students who fell below the mean of the national sample on a facet were classified as falling in the *low* skill bucket for that facet, and those above the mean were classified as falling in the *medium* skill bucket.

Homework. Two additional homework assignments were provided that were not included in Study 1 and thus the intervention lasted 5 weeks in total, rather than 3 weeks:

1. Week 2**:** The new Week 2 assignment was the goal construal exercise. It was intended to build upon the Week 1 (goal setting) exercise and also to help students construe their goals in a high level (e.g., abstract, decontextualized) manner. Previous experimental research has demonstrated that students primed to construe a task in a high-level manner found it easier to resist temptation when beginning goal pursuit than students not primed to construe a task in a high-level manner (e.g., Fujita, Trope, Liberman, & Levin-Sagi, 2006). In this exercise, students write down the three goals they generated for the goal-setting worksheet. They then list three reasons for why they would like to meet this particular goal. Additional questions, such as, What good will come of you achieving this goal? and, What will achieving this goal mean for your life? were asked to encourage students to think about how meeting this goal would impact them and their life. Previous research has demonstrated that answering questions of this type about an event has the effect of leading an individual to construe the event in a high-level manner (Burrus & Roese, 2006).
2. Week 4: For the new Week 4 assignment, students completed a true–false time management quiz. An example item is, As you begin to think about your goals, it is a good idea to discuss your future goals in detail with your family (answer is true). We included this exercise because recent research has demonstrated that the practice of retrieving information has just as large, or larger, of an effect on learning as does studying (e.g., Karpicke & Roediger, 2008). As such, we hypothesized that an additional quiz would create an additional opportunity to retrieve information, and thus, greater learning of information related to time management.

Control condition. The control condition was active in this study. Specifically, during the time the treatment group was participating in the time management intervention, the control group was participating in a strategic reading intervention. The intervention consisted of four tutorials: *self-evaluation of current reading practices*, *prereading*, *during reading*, and *postreading practice*. The students incorporated each learned skill into their homework, and they wrote brief reflective responses about their experience after each tutorial.

Analysis plan. The analysis plan for Study 2 was identical to Study 1 with three differences. First, because students were only given feedback stating that they fell either in the

medium or *low* skill bucket in facets of time management, additional analyses of primary outcomes were conducted comparing only *low* skill treatment students to *low* skill control students, and *medium* skill treatment students to *medium* skill control students. Second, advisor ratings for the two groups were compared employing an independent samples *t*-test.

Results

Preliminary Analyses

Scale reliabilities. Scales reliabilities were conscientiousness (α = .87), stress (α = .71), anxiety (α = .67), depression (α = .83), setting goals (α = .79), planning ahead (α = .78), organizing time and tasks (α = .84), meeting deadlines (α = .73), staying focused (α = .68), having a workspace (α = .77), and self-efficacy (α = .89).

Comparison of groups. Student pretest conscientiousness, cognitive ability (as indexed by SSAT scores), and time management as a function of study condition is displayed in Table 5. There were no significant differences in between groups for these factors, all *t*s < 1.20, all *p*s > .13, although the difference in the time management facet Staying Focused on the Present did approach significance, with the treatment group scoring higher than the control group, $t(146) = -1.53$, $p = .13$. The ethnic composition of the groups was roughly equivalent.

Attrition analysis. Table 6 also reveals that 13 students from the treatment condition and 10 from the control condition failed to complete the posttest assessment. The two conditions were equivalent in age, conscientiousness, cognitive ability, and all facets of time management, all *t*s < 1.37, all *p*s > .18. This analysis suggests that the treatment and control groups remained equivalent even after students dropped out of the study.

Correlations. Correlations between all assessments administered in the study, SSAT scores, and GPA are provided in Table 6. Statistically significant relationships are bolded.

Manipulation check. As a manipulation check, during the posttest students responded to an item that stated, Did you receive time management feedback and related homework assignments (e.g., Day Reconstruction, How to Choose a Planner, and Goal-Setting)? Several students incorrectly answered this question. Specifically, 51 control-condition students incorrectly stated that they were part of the intervention and five treatment-condition students incorrectly stated that they were not part of the intervention. We believe a large percentage of control-condition students incorrectly answered this question because they mistakenly believed the question was referring to the strategic reading intervention. Because excluding every student

who incorrectly answered this question would have had a detrimental effect on the power of the current study to find significant effects, data from all students are included in the analysis.

Table 6

Correlations Between Assessments (Study 2)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. SSAT	1												
2. Conscientiousness	-.07	1											
3. Setting goals	-.15	**.70***	1										
4. Planning ahead	.12	**.28***	.15	1									
5. Organizing time & tasks	-.02	**.49***	**.33***	**.22***	1								
6. Meeting deadlines	.04	**.58***	**.57***	**.21***	.14	1							
7. Staying focused	-.03	-.11	-.12	.03	**-.26***	**.18***	1						
8. Having a workspace	-.11	**.47***	**.44***	**.34***	**.46***	**.30***	-.12	1					
9. Stress	.09	-.06	-.08	-.11	.01	**-.25***	**-.54***	-.05	1				
10. Anxiety	-.07	-.13	**-.18***	-.08	.03	-.29	**-.36***	-.10	**.65***	1			
11. Depression	.14	**-.24***	**-.29***	-.06	.01	**-.44***	**-.41***	-.07	**.60***	**.61***	1		
12. TM: Self-efficacy	-.01	**.69***	**.55***	**.35***	**.53***	**.59***	.07	**.46***	**-.28***	**-.30***	**-.37***	1	
13. GPA	**.34***	**.29***	**.23***	.15	**.16***	.07	**-.26***	.09	**.17***	.13	.12	**.15***	1

Note. SSAT = Secondary School Admission Test; TM = time management; GPA = grade point average.

*Correlations significant at $p < .05$ are in boldface.

Efficacy of Time Management Intervention

Primary outcomes. The primary outcome is change in self-assessed time management skills. Table 7 presents time management ratings at pre- and posttest for both the treatment and control groups. Interactions for Meeting Deadlines and Setting Goals were marginally significant, *p*s = .10. Demonstrating a pattern somewhat consistent with Study 1, whereas the control group's ratings of their ability to meet deadlines went up (M_{pre} = 25.24; M_{post} = 26.65) $t(61) = 2.99$, $p < .01$, $d = 0.34$, the treatment group's ratings were unchanged (M_{pre} = 25.81; M_{post} = 26.06) $t(61) = .52$, $p = .61$, $d = 0.06$, interaction $F(1, 122) = 2.81$, $p = .10$. Furthermore, whereas the control group's ratings of their ability to set goals were unchanged (M_{pre} = 27.63; M_{post} = 27.63) $t(61) = 0.00$, $p = 1.00$, $d = 0.00$, the treatment group's ratings went down (M_{pre} = 28.15; M_{post} = 27.05) $t(61) = -2.60$, $p = .01$, $d = -0.27$, interaction $F(1, 122) = 2.81$, $p = .10$. Interaction effects for the remaining facets failed to approach significance.

Table 7

Time Management Facet Ratings at Pretest and Posttest (Study 2)

	Treatment			Control			
Facet	Pretest	Posttest	Test of change	Pretest	Posttest	Test of change	Interaction
TM: Meeting deadlines							
M	25.81	26.06	$t(61) = 0.52$	25.24	26.65	$t(61) = 2.99$	$F(1, 122) = 2.81$
SD	4.50	4.44	$p = .61$	4.37	3.84	$p < .01$	$p = .10$
N	62	62	$d = 0.06$	62	62	$d = 0.34$	
TM: Staying focused							
M	24.89	23.97	$t(61) = -1.83$	23.89	22.82	$t(61) = -2.15$	$F(1, 122) = .04$
SD	3.23	3.27	$p = .07$	4.47	4.62	$p = .04$	$p = .84$
N	62	62	$d = -0.28$	62	62	$d = -0.24$	
TM: Having a workspace							
M	23.37	24.71	$t(61) = 2.36$	22.94	23.71	$t(61) = 1.55$	$F(1, 122) = .56$
SD	5.75	5.49	$p = .02$	6.55	6.33	$p = .13$	$p = .48$
N	62	62	$d = 0.24$	62	62	$d = 0.12$	
TM: Setting goals [a]							
M	28.15	27.05	$t(61) = -2.60$	27.63	27.63	$t(61) = 0.00$	$F(1, 122) = 2.81$
SD	3.97	4.16	$p = .01$	4.56	4.00	$p = 1.00$	$p = .10$
N	62	62	$d = -0.27$	62	62	$d = 0.00$	
TM: Planning ahead[a]							
M	23.71	23.32	$t(61) = -0.71$	23.06	22.02	$t(61) = -2.25$	$F(1, 122) = .85$
SD	4.73	4.69	$p = .48$	4.52	5.00	$p = .03$	$p = .21$
N	62	62	$d = -0.08$	62	62	$d = -0.22$	
TM: Organizing time & tasks[a]							
M	17.61	18.73	$t(61) = 1.57$	17.53	18.11	$t(61) = 0.93$	$F(1, 122) = .32$
SD	6.23	6.12	$p = .12$	6.48	7.15	$p = .36$	$p = .56$
N	62	62	$d = 0.18$	62	62	$d = 0.09$	

Note. TM = time management.

[a]The facets that were the focus of the intervention.

Similar to the analyses for Study 1, because the intervention was designed such that students received different feedback based on whether they fell in the *medium* or *low* skill bucket of each of the three facets focused on in the intervention, we also conducted separate analyses comparing the treatment and control groups for each skill bucket for each facet.

As in Study 1, there were no significant interactions, all *p*s < .20, with the exception of low skill bucket for setting goals, which revealed a marginally significant interaction, $F(1, 41) = 2.15$, $p = .15$. Specifically, in this case, treatment students showed no change in setting goals ($M_{pre} = 23.44$; $M_{post} = 23.50$), $t(17) = 0.09$, $p = .93$, $d = 0.02$, whereas control students showed an increase in setting goals ($M_{pre} = 23.24$; $M_{post} = 25.00$), $t(22) = 2.15$, $p = .05$, $d = 0.56$.

Secondary outcomes. Results for the secondary outcomes for the total sample are displayed in Table 8. Although there were no significant interactions, interaction terms for

stress and anxiety approached significance. Specifically, for stress, both the treatment (M_{pre} = 10.87; M_{post} = 9.45) $t(61) = -3.41$, $p < .01$, $d = -0.53$, and control (M_{pre} = 11.37; M_{post} = 10.40) $t(62) = -2.57$, $p = .01$, $d = -0.28$, groups reported a significant decrease in self-reported stress, with the treatment group reporting a larger decrease, interaction $F(1, 123) = 2.22$, $p = .14$. For anxiety, whereas the treatment group reported a marginally significant decrease in self-reported anxiety (M_{pre} = 9.06; M_{post} = 8.56) $t(61) = -1.96$, $p = .06$, $d = -0.21$, the control group reported no change (M_{pre} = 9.70; M_{post} = 9.30) $t(61) = -1.11$, $p = .27$, $d = -0.15$, interaction $F(1, 123) = 2.98$, $p = .09$.

Table 8

Secondary Outcome Ratings at Pretest and Posttest (Study 2)

	Treatment			Control			
Outcome	Pretest	Posttest	Test of change	Pretest	Posttest	Test of change	Interaction
Stress							
M	10.87	9.45	$t(61) = -3.42$	11.37	10.40	$t(62) = -2.57$	$F(1, 123) = 2.22$
SD	2.56	2.80	$p < .01$	3.53	3.47	$p = .01$	$p = .14$
N	62	62	$d = -0.53$	63	63	$d = -0.28$	
Anxiety							
M	9.06	8.56	$t(61) = -1.96$	9.70	9.30	$t(62) = -1.11$	$F(1, 123) = 2.98$
SD	2.31	2.45	$p = .06$	2.77	2.61	$p = .27$	$p = .09$
N	62	62	$d = -0.21$	63	63	$d = -0.15$	
Depression							
M	8.52	8.66	$t(61) = 0.43$	9.40	9.13	$t(62) = -0.80$	$F(1, 123) = .77$
SD	2.16	2.75	$p = .67$	3.37	2.90	$p = .43$	$p = .38$
N	62	62	$d = 0.06$	63	63	$d = -0.09$	
TM: Self-efficacy							
M	780.97	815.48	$t(61) = 2.42$	734.92	794.13	$t(62) = 3.74$	$F(1, 123) = 1.92$
SD	144.58	131.29	$p = 02$	176.33	136.71	$p < .01$	$p = .17$
N	62	62	$d = 0.25$	63	63	$d = 0.38$	

Note. TM = time management.

Advisor ratings. The 27 items of the advisor ratings of students' time management behaviors were highly intercorrelated ($\alpha = .99$) and were thus combined to create one advisor rating per student. There was a marginally significant difference for the total sample, such that advisor ratings were higher for the treatment group (M = 2.99, SD = 1.01) than for the control group (M = 2.76, SD = .86), $t(149) = 1.49$, $p = .14$, $d = 0.23$.

Discussion

As in Study 1, there was a tendency for the treatment group students to report diminished time management skills, although this tendency was less consistent in Study 2 than in Study 1. We return to this issue in the General Discussion section.

Results for stress and anxiety were replicated for the overall sample, such that the treatment group demonstrated a greater decrease in stress and anxiety than the control group. Advisor ratings confirmed the hypothesis. Treatment group ratings were, marginally, significantly higher than the control group. These results are important because they are the only data from the two studies that are likely not susceptible to distortion due to lack of self-knowledge or the motivation to fake good. Furthermore, they are not susceptible to the potential calibration effect that may have been present in the self-reported time management ratings.

General Discussion

The current studies provide initial support for the efficacy of the time management intervention. Specifically, effects were found for self-reported stress and anxiety (Studies 1 and 2) and advisor ratings of time-management-related behaviors (Study 2). It is our belief that the results for advisor ratings are especially important because this is the only outcome from both studies that is not self-reported.

The results for ratings of time management skills are equivocal. Due to the self-report nature of the data, we cannot determine whether the null effects are due to the ineffectiveness of the time management intervention, or to a lack of accurate self-insight on the part of the students (e.g., Dunning et al., 2004; Hansford & Hattie, 1982; Kruger & Dunning, 1999). That is, it could be the case that although some students reported an increase in their time management skills due to the intervention, other students overestimated their time management skill at the pretest and the intervention had the effect of more accurately calibrating them at posttest—leading to lower ratings.

Significant results for some of the secondary outcomes and the advisor ratings lead us to believe, however, that the time management intervention was indeed at least somewhat effective. These results are particularly impressive when one takes into account the characteristics of the samples employed in these studies. That is, students in both studies were students at one of the most highly selective high schools in the United States. The fact that they were already elite students coming into the study makes it likely that they started out with higher time management

skills than the average student of their age. As such, many or most of these students were not in dire need of training in time management and thus the current studies represent a conservative test of the intervention. Indeed, this intervention may be much more powerful if studied on populations of students with fewer economic and educational resources.

Limitations and Future Research

Given that these studies represent the first test of this intervention, one would expect several limitations. Some of these limitations are enumerated below. While discussing limitations we introduce some possibilities for future research.

One limitation of the current research concerns uncertainty regarding treatment dosage effects. That is, it is difficult for us to ascertain how seriously each of the students took the intervention and how much effort they put into each of the homework assignments. We attempted to at least partially address this by eliminating students who failed the manipulation check in Study 1; however, we were unable to take this step in Study 2. Nonetheless, even in Study 1, it could certainly be the case that many of the treatment students did not take the intervention seriously (even if they did answer the manipulation check item correctly), thus obscuring the true effect of the intervention as intended. Future research can avoid this problem by having students complete homework assignments in a supervised setting, such as during class time.

There were also a few problems with Study 2 specifically that may have made finding significant effects more difficult than it otherwise would have been. One problem was that several students incorrectly answered the manipulation check question and thus we were unable to use that item as a check as to which students were taking the intervention seriously. The fact that most of the people who answered this item incorrectly were control group students suggests that in the future the item should be worded more clearly so that students are more aware that the question is asking about the time management intervention rather than the control intervention.

Another unanticipated problem with Study 2 was that every student, including the control group, went through a 45-minute time management training session upon entering the school. It is possible that due to this training, students in both groups entered the study with better time management skills than they would have otherwise had, thus making it more difficult to find significant effects. Furthermore, anecdotally, the counselor working with us on these studies stated that she believed that the students in Study 2 might not have fully appreciated the

importance of the intervention because the fall ninth grade semester is graded on a pass/fail basis. She also stated that later, in the spring semester (when Study 1 took place), students receive letter grades, and then begin to see the importance of managing their time. Consistent with this thinking, results for stress and anxiety were strongest for Study 1. There might be a benefit for future research to focus on testing the intervention with older students who might be more motivated to take the intervention seriously.

There are several additional avenues for future research that should be explored. The first would be to conduct a longitudinal study of the effects of the intervention. It is quite possible that the effects of the time management intervention will not be evident until they have had a chance to compound over time. Thus, a study employing a delayed posttest design would be informative. Yeager and Walton (2011) theorized that small interventions such as the one described in this paper are often surprisingly highly effective because they work through a recursive process. For example, time management skills learned during the intervention may allow students to study more efficiently, leading to better grades. Receiving better grades may then reinforce the value of practicing good time management, which again leads to better grades, and so forth. However, the difference in GPA between the treatment and control group may not be evident until 3 or 4 years after the actual time management intervention. This prediction is consistent with the findings of Liu et al. (2009), described in the introduction, who found that the strength of the time management–grades relationship increased over time.

Another possibility for future research would be to focus on improving just one facet of time management. An intervention focused solely on setting goals, for example, might look very different than an intervention focused on organizing time and tasks. The former would teach students how to think about what they want for the future and how to get there, whereas the latter would teach students how to organize their time in the present. Although these interventions might go hand-in-hand in practice, a more effective treatment might be had by creating an intervention more narrowly focused on a single facet.

Finally, one interesting direction for future research will be to further investigate the accuracy of students' self-assessments of their time management skill. In the current research, there was some evidence that students may have been overestimating their time management skill, and that the training may have led them to more accurately calibrate their assessments. Previous research has found that the students who are most unskilled are the ones who most

overestimate their skills (e.g., Kruger & Dunning, 1999; Mattern, Burrus, & Shaw, 2010). In order to accurately categorize students on actual skill level, future research should include preintervention measures of time management that are not reliant on self-reports. For example, future research can get teacher ratings of student time management both before and after the intervention. This added information may help researchers to more accurately assess whether all students are overestimating their time management skill, or whether this effect is primarily driven by the lowest skilled students.

Conclusion

Returning to the quotes that opened the paper, if Lee Iacocca and Peter Drucker are correct about the importance of time management, then an intervention that has the ability to improve time management skills would be invaluable. Although the current intervention has several limitations, we feel that it represents a starting point for such an intervention. The current intervention, especially once improved, has the potential to become a useful tool in improving the quality of students' academic—and nonacademic—lives.

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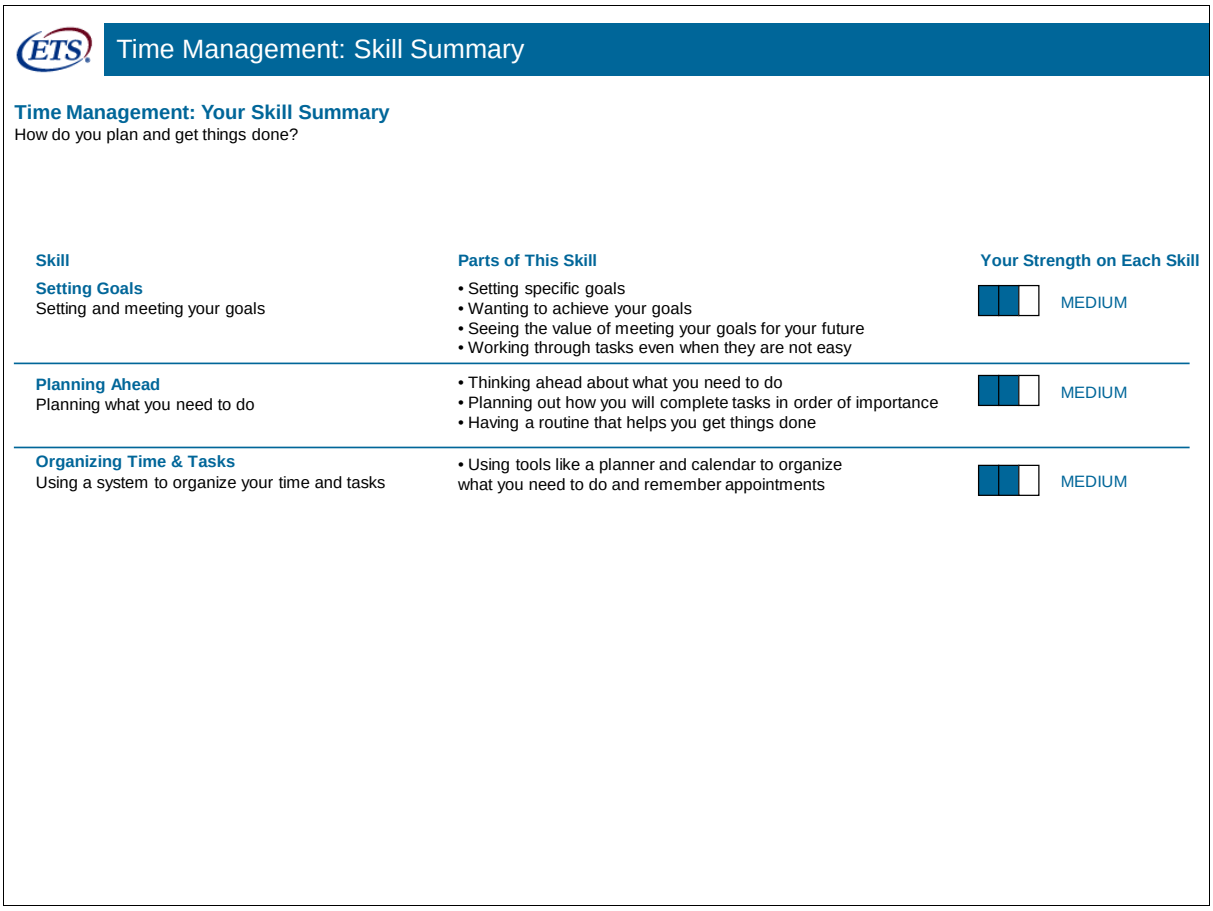
Appendix



Time Management: Skill Summary

Time Management: Your Skill Summary

How do you plan and get things done?

Skill	Parts of This Skill	Your Strength on Each Skill
Setting Goals Setting and meeting your goals	• Setting specific goals • Wanting to achieve your goals • Seeing the value of meeting your goals for your future • Working through tasks even when they are not easy	MEDIUM
Planning Ahead Planning what you need to do	• Thinking ahead about what you need to do • Planning out how you will complete tasks in order of importance • Having a routine that helps you get things done	MEDIUM
Organizing Time & Tasks Using a system to organize your time and tasks	• Using tools like a planner and calendar to organize what you need to do and remember appointments	MEDIUM

Figure A1. **Screen shot of a skill summary feedback page.**

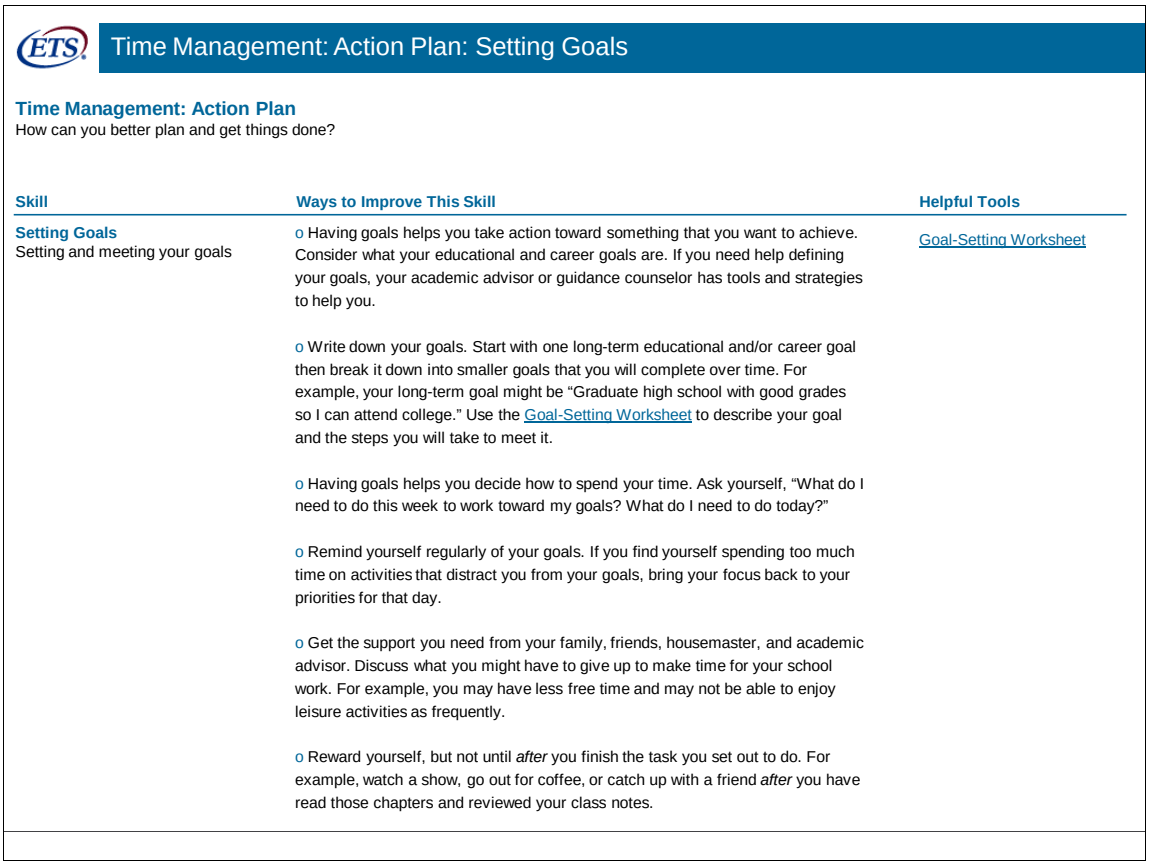


Figure A2. **Screen shot of a time management action plan.**