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The Relationships Among Students' Future-Oriented Goals and Subgoals, Perceived Task Instrumentality, and Task-Oriented Self-Regulation Strategies in an Academic Environment

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The authors performed path analysis, followed by a bootstrap procedure, to test the predictions of a model explaining the relationships among students' distal future goals (both extrinsic and intrinsic), their adoption of a middle-range subgoal, their perceptions of task instrumentality, and their proximal task-oriented self-regulation strategies. The model was based on R. B. Miller and S. J. Brickman's (2004) conceptualization of future-oriented motivation and self-regulation, which draws primarily from social-cognitive and self-determination theories. Participants were 421 college students who completed a questionnaire that included scales measuring the 5 variables of interest. Data supported the model, suggesting that students' distal future goals (intrinsic future goals in particular) may be related to their middle-range college graduation subgoal, to their perceptions of task instrumentality, and to their adoption of proximal task-oriented self-regulation strategies.

Keywords: future and proximal goals, perceived task instrumentality, social-cognitive theory, self-determination theory, intrinsic and extrinsic goals

Miller and Brickman (2004) proposed a model of future-oriented motivation and self-regulation that had the expressed purpose of integrating future and proximal motivation and self-regulation variables. This model drew heavily from social-cognitive theory (Bandura, 1997), self-determination theory (Deci & Ryan, 2000; Ryan & Deci, 2000), personal investment theory (Maehr, 1984), future-time perspective theory (Nuttin, 1985), and the future-oriented extension of achievement motivation theory (Raynor, 1974; Raynor & Entin, 1982). Miller and Brickman's (2004) model, depicted in Figure 1, consists of two major interconnected parts, *future-oriented regulation* and *proximal self-regulation processes*. The full model has been described in detail elsewhere (Miller & Brickman, 2004; Tabachnick, 2005). The backbone of the model is delineated by four major variables (see circled variables in Figure 1) that clearly connect future goals with proximal subgoals, with perceived task instrumentality, and finally, with proximal task-oriented self-regulation. The purpose of the present study was to test a specific portion of Miller and Brickman's (2004) model to examine the relationships among the four major variables explaining the connection between the hypothesized future and proximal motivation and self-regulation processes. The four variables of interest in the present study were future goals, proximal subgoals, perceived task instrumentality, and task-oriented self-regulation strategies (see Figure 1).

Miller and Brickman (2004) contended that students' distal future goals (e.g., personal growth, contribution to community, personal relationships, etc.) influence the adoption of proximal subgoals in the service of the future goals; that the proximal subgoals lead to perceptions of task instrumentality on the part of students exposed to learning tasks; and that perceived task instrumentality, in turn, leads to proximal task-oriented self-regulation. Although Miller and Brickman (2004) defined personally valued future goals in terms of Deci and Ryan's (2000; also Ryan & Deci, 2000) self-determined future aspirations, they stopped short of differentially modeling future goals in an extrinsic versus intrinsic manner, as Kasser and Ryan (1993, 1996) did.

However, the picture that is beginning to emerge from recent research is that aspiring to attain intrinsic and extrinsic future goals has an important impact on well-being, the quality of task engagement, and achievement. For example, Kasser and Ryan (1993, 1996) have found that aspirations for money and wealth (considered "extrinsic" by self-determination theory) are associated with decreased well-being and mental health in comparison with aspirations for benefitting community and personal growth (considered

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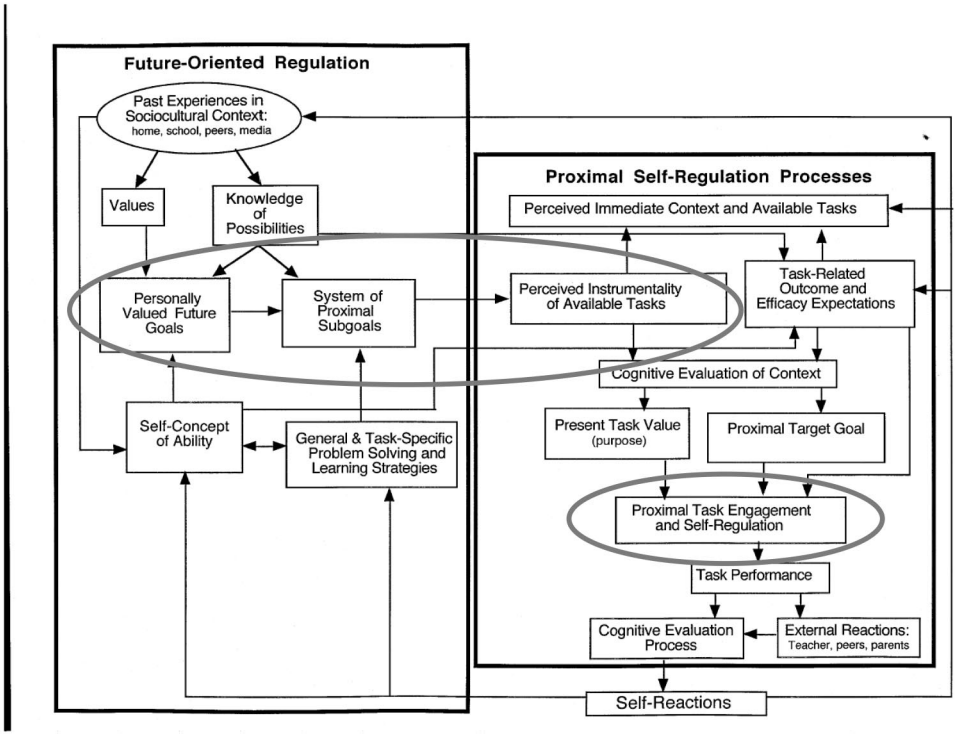

Figure 1. Model of future-oriented motivation and self-regulation, with the variables of interest to the present study circled. From "A model of future-oriented motivation and self-regulation," by R. B. Miller and S. J. Brickman, 2004, *Educational Psychology Review, 16*, p. 13, Figure 1. Copyright 2004 by Springer/Kluwer Academic Publishers. Reproduced and adapted with kind permission of Springer Science and Business Media.

"intrinsic" by self-determination theory).[1] Simons, Dewitte, and Lens (2000, 2004) found, among other things, that students performing tasks because of intrinsic future consequences (e.g., personal growth) were significantly more likely to adopt task or mastery goals and, in addition, had more interest and confidence in their studies, persisted longer, used more deep learning strategies, and received better exam scores than students who performed tasks because of extrinsic future consequences (e.g., high earnings). In a series of studies about experimentally induced goals, Vansteenkiste, Simons, Lens, Sheldon, and Deci (2004) and Vansteenkiste, Simons, Soenens, and Lens (2004) similarly found that framing tasks in terms of intrinsic future goals (e.g., the task is important for personal growth or health in the future) resulted in better test performance, a significantly larger amount of deep processing and a smaller amount of shallow processing, and higher persistence than did framing tasks in terms of extrinsic future goals (e.g., the task is important for money or an attractive image in the future).

Finally, in a comprehensive review of the intrinsic–extrinsic future goal content literature relating specifically to academic outcomes, Vansteenkiste, Lens, and Deci (2006) commented that despite the fact that "only very recently have these differential [intrinsic–extrinsic future] goal contents been linked to academically relevant outcomes" (p. 23), evidence increasingly points in the direction indicating that intrinsic future goal content may be related to adaptive academic outcomes, whereas extrinsic future goal content may be related to maladaptive academic outcomes. Based on the research in this area, we decided to include a distinction between intrinsic and extrinsic future goals in our test of predictions from the Miller and Brickman (2004) model.

Miller and Brickman (2004) viewed proximal subgoals as possibly including both "target subgoals," or middle-range intermediate subgoals of the kind described by Harackiewicz and Elliot (1998), as well as related, more-close-range sub-subgoals. The present study focused on one likely middle-range target subgoal for college students, namely, college graduation. The reasons for the choice of college graduation as the middle-range target subgoal of interest in the present study were its relatively high importance in a college environment and the fact that the college graduation subgoal was central to the measures of instrumentality and the self-regulation strategies that were tested.

Another important variable in the Miller and Brickman (2004) model is perceived task instrumentality. Perceived task instrumentality was defined as the perception that work on academic tasks

[1] The theoretical basis for Kasser & Ryan's (1993, 1996) classification of aspirations into "intrinsic" and "extrinsic" was the a priori premise in self-determination theory that the pursuit of goals that satisfies the theorized basic needs of competence, autonomy, and relatedness embodies "authentic," or self-determined, motivation, whereas the pursuit of goals emanating from external pressure (e.g., wealth, fame, and image) exemplifies externally controlled motivation (Ryan & Deci, 2000).

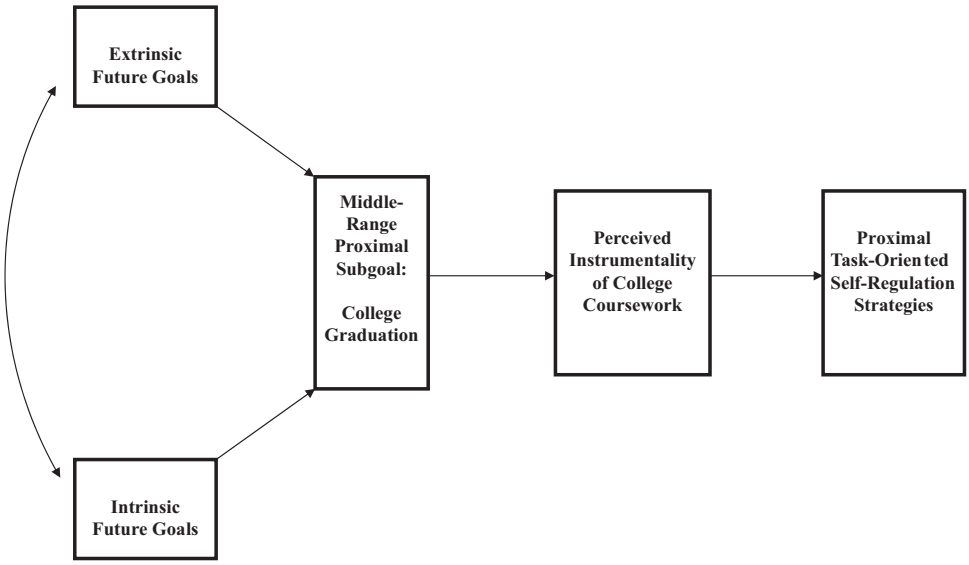

Figure 2. The theoretical model. Extrinsic and intrinsic future goals predict a middle-range subgoal, namely, the college graduation subgoal. The college graduation subgoal, in turn, predicts perceived task instrumentality. Finally, perceived task instrumentality predicts proximal task-oriented self-regulation strategies. The extrinsic and intrinsic future goals correlate.

(i.e., academic course work) is instrumental to one's future.[2] Miller and Brickman (2004) argued that it is the students' perceptions of task instrumentality that transmit the value of their future goals and subgoals to the proximal tasks they are faced with (Miller, DeBacker, & Greene, 1999). They further argued that students are more likely to perceive proximal tasks as instrumental when they have an adaptive system of proximal subgoals leading to personally valued future goals.

Finally, when proximal tasks are perceived to be instrumental, students are more likely to engage in proximal task-oriented self-regulation strategies to accomplish those tasks (e.g., Brickman & Miller, 2001; Greene, Miller, Crowson, Duke, & Akey, 2004; Miller, Greene, Montalvo, Ravindran, & Nichols, 1996). This perspective is in line with Bandura's (1986) observation that personal development is enhanced considerably when individuals connect "distal aspirations with proximal self-guidance" (p. 476). The variables of interest to the present study, along with the theorized relationships among them (Miller & Brickman, 2004), are summarized in the theoretical model (see Figure 2).

Although many of the relationships among the variables depicted in Miller and Brickman's (2004) work are based on research results, some relationships are based mainly on theoretical grounds, as research that specifically connects distal future goals and proximal subgoals is scarce (Husman & Lens, 1999; Locke & Latham, 1990), especially in educational environments. However, the few studies about the relationships between relatively distal goals and relatively proximal subgoals carried out in educational institutions make Miller and Brickman's (2004) hypothesis plausible. For example, in two studies conducted in a college and a high school environment, respectively, Schutz and Lanehart (1994) and Schutz (1997) found, among other things, that the students' distal educational goals (e.g., earn a Master's degree, earn a Doctorate) predicted their proximal educational subgoals (e.g., "I read textbooks assigned for my class"), and that the distal educational goals indirectly predicted (through the educational subgoals and other variables) the students' grade point averages. Although the distal educational goals tapped by these two studies differed considerably from the personally valued future goals that were of interest in the present study, the findings were in line with Miller and Brickman's (2004) model. Finally, in a study based on an earlier formulation of their motivational model, Brickman and Miller (2001) conducted a qualitative study at an alternative high school and found significant relationships among sociocultural factors and future goals, subgoals, and perceptions of ability among the student participants. These factors were, in turn, related to perceptions of instrumentality of school tasks and to the proximal achievement goals reported. In addition, perceptions of instrumentality were related to self-reports of self-regulation and cognitive engagement and to specific observed patterns of task engagement. Taken together, the results of these studies lend support to Miller and Brickman's (2004) model.

The Present Study

The purpose of the present study was to test the directional predictions of the portion of the Miller and Brickman (2004) model depicted in the theoretical model (see Figure 2). This portion of the model indicates that students' future goals predict

[2] The construct of perceived task instrumentality is clearly related to Eccles's (1983; Wigfield & Eccles, 2001) "utility value"; however, the constructs differ in their points of emphasis. Utility value refers to an individual's belief about the value of a task or goal object for accomplishing some other end. Miller and Brickman (2004) argued that it is the perception of the instrumentality of a task to future goal attainment that gives the task its value.

their adoption of a college graduation subgoal; that the college graduation subgoal predicts the students' perceptions of task instrumentality; and that the latter, in turn, predicts proximal task-oriented self-regulation strategies (also referred to as "self-regulation strategies").[3]

The present research was important to undertake for a number of reasons. First, it adds to the scarce research on the relationships among future and proximal motivation variables in academic environments, and thus deepens our comprehensive understanding of various facets of motivation. Second, it provides a test of a relatively new, integrated, and directional model of future and proximal motivation and self-regulation (Miller & Brickman, 2004). This study will either provide evidence for the model's hypotheses or suggest ways in which the model could be improved. Third, the current research examines Miller and Brickman's (2004) personally valued future goals differentially, in terms of their extrinsic and intrinsic hypothesized dimensions (Kasser & Ryan, 1993, 1996), an examination not carried out before.

Fourth, the present research examines factors thought to predict perceived task instrumentality. In educational environments, task instrumentality, or the perception among students that the tasks available in school are instrumental to their future, has been found to predict many positive and adaptive learning outcomes (De Volder & Lens, 1982; Greene et al., 2004; Malka & Covington, 2005; Miller et al., 1996; Raynor, 1970, 1974; Simons et al., 2004). Yet very few studies have attempted to answer the question of what predicts task instrumentality. Miller and Brickman (2004) hypothesized that when students have strong, self-determined distal future goals and related proximal subgoals, there is an increased likelihood that students will perceive relevant school tasks as instrumental to goal accomplishment. This study is among the very few to use future goals and a middle-range college graduation subgoal as predictors of task instrumentality. Finally, although (as noted above) task instrumentality has been shown to predict many adaptive educational outcomes, including self-regulation strategies, this study will examine the relationship between task instrumentality and task-oriented self-regulation strategies in a new context of a directional model consisting of interconnected future and proximal motivational variables.

The present study is based on a number of premises. For example, it is important to note that there is no accepted standard in the motivation literature by which a goal can be definitively considered a "future" or a "proximal" goal or subgoal. All goals are, to some extent, future-oriented, and researchers have investigated the relationships between people's *relatively* distal and *relatively* proximal goals and subgoals. In the present study, the most distal goals were the goals assessed by Kasser and Ryan's (2004) Aspirations Index, which tapped intrinsic and extrinsic life goals (e.g., contribution to community, personal wealth). These were referred to in the study as "future goals." A somewhat more middle-range proximal subgoal for these aspirations was that of graduating from college. Graduating from college could be considered for some a step to attaining one or more of the life future goals/aspirations previously mentioned. In the study, this subgoal was referred to as the "college graduation subgoal." The scales used to measure the distal goals and the college graduation subgoal will be described more fully in the Method section, along with all the other scales used in this study.

Research Questions

Based on Miller and Brickman's (2004) hypothesis about the relationships among future goals, proximal subgoals, task instrumentality, and self-regulation strategies (see Figure 2), the following research questions were asked:

Does the theoretical model depicted in Figure 2 provide an adequate fit of the data?

Do intrinsic and extrinsic future goals have differential relationships with the other variables in the theoretical model (see Figure 2)?

If the theoretical model depicted in Figure 2 provides an adequate fit of the data, how confident can we be that the model provides a plausible variable and path configuration, rather than just a chance fit?

Method

Participants

Participants were 421 student volunteers enrolled in 18 sections of a 2nd-year English course, open to all university students and titled Literary Heritage, at a large, southern, urban university. Students in all the sections of this course whose instructors gave permission were asked to volunteer (out of 26 regular on-campus sections, teachers in 18 sections gave their permission for the study). In each section, the maximum enrollment was 35 students. Originally, a total of 422 students volunteered to participate; 1 student, however, filled out the Scantron answer sheet incorrectly and was dropped from the study. The demographic description of the students who were retained in the present study ($N = 421$) was as follows: 88.6% were enrolled as full-time students, 11.4% were enrolled as part-time students, 52.5% were men, 47.5% were women, 13.5% were Black, 75.8% were White, .7% were American Indian/Alaska native, 3.1% were Asian, 1.2% were Mexican-American/Chicano, 1.4% were other Latino, and the rest were "other." Two participants did not report race. ACT scores were as follows: 3.3% reported ACT scores between 11 and 15 (or SAT scores between 500 and 750), 11.9% reported scores between 16 and 18 (SAT scores between 760 and 890), 26.8% reported scores between 19 and 21 (SAT scores between 900 and 1,010), 23% reported scores between 22 and 24 (SAT scores between 1,020 and 1,120), 21.4% reported scores between 25 and 27 (SAT scores between 1,130 and 1,230), and the rest (9.8%) reported scores greater than 27 (SAT scores greater than 1,230). Some students (3.8%) failed to report test scores, and personal discussions with teachers revealed that under special circumstances, students may be accepted without these standardized test scores.

Procedure

The study was conducted in the students' classrooms. Potential participants were informed of the general nature of the study, as well as of possible adverse effects, and they were told that anonymity and confidentiality would be strictly maintained. Students were offered a small incentive in the form of a candy bar for their

[3] The term "predict" (and its derivatives) in the present study refers to shared variance between the pertinent variables.

participation. After signing a consent form, students were asked to complete the Future-Oriented Student Motivation Survey (FOSS), an instrument containing demographic information as well as four scales, as detailed below.

Measures

The Future-Oriented Student Motivation Survey (FOSS). Participants were administered the FOSS (see sample items in Table 1). This instrument included a short demographic portion as well as four scales measuring different aspects of future- and proximally oriented motivation and self-regulation, as described below.

The Future Goals Scale. To measure the strength of personally valued future goals, the Aspirations Index (Kasser & Ryan, 2004) was used in a modified form. The Aspirations Index was chosen for the measurement of personal future goals because it includes seven major (and inclusive) aspirations, and it conceptually divides them into extrinsic and intrinsic aspirations. This allowed for more complexity in the data analysis and in our understanding of whether the intrinsic versus extrinsic nature of the aspirations are predictive of the other variables.

The 2004 version of the Aspirations Index (Kasser & Ryan, 2004) had a 7-point Likert-type scale. It included 35 aspirations representing seven life domains (each life domain being represented by five items). The extrinsic subscale included the life domains of wealth, attractive image, and fame, and the intrinsic subscale included the life domains of health, personal growth, affiliation, and community contribution. For each item representing a goal, three questions were asked: a value question (how important the goal is), an expectancy question (to what extent one expects to accomplish it), and an indirect commitment question (how much of the goal one has accomplished already).

In the present study, two modifications were made to the Aspirations Index: The expectancy question was dropped entirely, since it was not of interest in this study, and the indirect commitment question was changed to a direct commitment question (i.e., how committed one is to reaching the goal). Thus, in the present study, each aspiration item was followed by two questions: a value question and a direct commitment question. Based on the Miller and Brickman (2004) model and social-cognitive theory (Bandura, 1986, pp. 323, 477; Locke & Latham, 1990, p. 124), the value of, and commitment to, goals were thought to be among the most important goal aspects. Also, the change from an indirect to a direct commitment question reflects the present study's underlying assumption, in line with social-cognitive theory (see Locke & Latham, 1990, p. 5), that people are aware, to a large extent, of their goal commitment levels. The participants responded on a 7-point scale, with 1 denoting *not at all* and 7 denoting *very*. The value and commitment questions were combined and averaged for each of the seven life domains.

The College Graduation Subgoal Scale. This scale was developed specifically for the present study and was designed to measure a plausible middle-range mediating subgoal between the distal future goals (as measured by the modified Aspirations Index) and students' perceptions of task instrumentality (i.e., their viewing of their college course work as instrumental for their goal attainment). The scale was modeled after the modified Aspirations Index described above. Following pilot testing, the initial five-item scale was reduced to three items. Each item asked the same two questions that were asked in the modified Aspirations Index: one about value, and one about commitment, for a total of six questions. The participants responded on a 7-point scale, 1 denoting *not at all* and 7 denoting *very*. The responses for all the questions were averaged. The alpha reliability indicated by a pilot study was .97.

The Perceived Instrumentality Scale. The Perceived Instrumentality Scale used by Greene et al. (2004) was selected because it was designed to measure instrumentality for school work, which was the variable of interest in this study. Both Greene et al. (2004) and Miller et al. (1999) provided convincing evidence for the reliability and validity of the scale. The scale contains five items measuring perceptions of instrumentality for school work (e.g., "I do the work assigned in this class because my achievement plays a role in reaching my future goal"). Participants responded on a 7-point scale, with 1 indicating *strongly disagree* and 7 indicating *strongly agree*.

The Task-Oriented Self-Regulation Strategy Scale. The extent of proximal task-oriented self regulation strategies was measured by a subset of the Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia, & McKeachie, 1991) that included eight learning strategy subscales conducive to college graduation. The eight Motivated Strategies for Learning Questionnaire learning strategy subscales we used were Rehearsal, Elaboration, Organization, Critical Thinking, Metacognitive Self-Regulation, Time

Table 1
Scales Used in the Present Study With Sample Items and Measures of Central Tendency, Normality, and Reliability

Scale	Sample item(s)	*M*	*SD*	Skew	Kurtosis	α rel.
Future Goals Scale[a]	Extrinsic life goal: To be a very wealthy person.	3.95	1.09	−0.04	−0.52	.95
	Intrinsic life goal: To grow and learn new things.	5.85	0.64	−0.78	1.25	.93
College Graduation Subgoal Scale	Goal: To graduate from college.	6.68	0.66	−2.94	10.23	.88
Perceived Instrumentality Scale	I do my course work this semester because. . . My achievement plays a role in reaching my future goals.	5.72	1.33	−1.18	1.14	.92
Task-Oriented Self-Regulation Strategy Scale[b]	I usually study in a place where I can concentrate on my course work.	4.38	0.80	−0.12	0.03	.93

Note. The standard error of skew and kurtosis was .12 and .24, respectively, in most scales. α rel. = alpha reliability.
[a] This scale is a modified version of the Aspirations Index (Kasser & Ryan, 2004). [b] This scale is a subset of the Motivated Strategies for Learning Questionnaire (Pintrich et al., 1991).

and Study Environment, Peer Learning, and Help Seeking. Participants responded to these items on a 7-point scale, with 1 indicating *not at all true of me* and 7 indicating *very true of me*.

Results

Preliminary Data Analysis

Prior to conducting the path analysis, we performed a preliminary analysis of the data to gauge whether the data were appropriate for use in a path analysis. A number of two-way contingency table analyses were conducted to evaluate whether the missing values were missing at random, and thus whether they were proportionally distributed by gender, age, student status (part time or full time), race, and expected grade point average. The evidence suggested that the missing data were missing at random. In addition, a before-and-after-mean-substitution examination of instrument reliabilities, measures of central tendency and normality, and correlation matrixes revealed minimal differences. Based on the nature of the data and the results of the preliminary analyses, we used mean replacement for missing values.

Instrument reliabilities. Cronbach alpha reliabilities were computed for all scales and subscales on the FOSS instrument to gauge the internal consistency of the scales. A summary of the alpha reliabilities is listed in Table 1. The Future Goals subscales had alpha reliability values of .95 and .93 for the Extrinsic and Intrinsic subscales, respectively, and the alpha reliabilities of the College Graduation Subgoal Scale, the Perceived Instrumentality Scale, and the Task-Oriented Self-Regulation Strategy Scale were .88, .92, and .93, respectively. The reliabilities for the scales in this study were deemed adequate for the present study.

Measures of central tendencies and normality. Descriptive information about the variables can be seen in Table 1. The variable with the most pronounced skew and kurtosis was the college graduation subgoal (skew of −2.94, kurtosis of 10.23), and that was expected in view of the fact that most college students were likely to indicate a strong desire to graduate from college. Other variables were slightly skewed or kurtotic, as can be seen in Table 1, but their deviation from normality was of small magnitude. In view of the expected deviation from normality in variables related to college graduation goals among the college student population sampled, the variables were left untransformed (see Ullman, 1996, p. 790, for a similar opinion).

For the present path analytic study, we used the maximum likelihood (ML) estimation method. Although the ML estimation is considered fairly robust against small-to-moderate violations of normality (Anderson & Gerbing, 1988; Jöreskog & Sörbom, 1989; McDonald & Ho, 2002), moderate-to-major violations can adversely affect the chi-square statistic that serves as an important measure of model fit. However, the particular way in which the chi-square is affected under conditions of data nonnormality was considered to render the ML estimation method suitable for the present study. According to Curran, West, and Finch (1996), there are two concerns about using the chi-square statistic under conditions of nonnormality: (a) a model might be mistakenly rejected when it is correct, and (b) a model might be opportunistically modified until an acceptable chi-square level is achieved, even though the model might be basically correct and in no need of modification.

In the present study, these two concerns were addressed in a number of ways. First, model fit decisions were not based solely on the chi-square statistic but on other goodness-of-fit indices (GFIs) as well, such as the GFI, the normed fit index (NFI), the nonnormed fit index (NNFI), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA), all of which were reported in the present study.[4] Second, any consideration to remove or add a path was based on strong theoretical grounds rather than on chance trial-and-error opportunities. For example, such considerations were aided by the model parameter estimates, which have been found to be unbiased even under conditions of nonnormality (Curran et al., 1996; Enders, 2001; McDonald & Ho, 2002). Third, care was taken to limit model modifications to very few modifications to prevent "capitalization on chance characteristics of the data" (MacCallum, Roznowski, & Necowitz, 1992, p. 490). Finally, the path analysis was followed by a bootstrap resampling (replication) technique so we could investigate the stability and generalizability of our confirmatory factor analysis model (Efron & Tibshirani, 1998).

Correlations matrix. Bivariate scatterplots conducted on pairs of variables chosen at random indicated linear relationships in the data. No curvilinear relationships were observed. Table 2 presents the Pearson moment correlations among the variables of interest. The correlations were very consistent with the Miller and Brickman (2004) model. Nearly all the variables were significantly intercorrelated, and some of the relationships seemed stronger than others, mostly in expected directions. Following the theoretical predictions of Miller and Brickman (2004), future goals correlated significantly with the subgoal of college graduation. At the same time, in line with self-determination theory (Ryan & Deci, 2000), the relationship between extrinsic future goals and the college graduation subgoal ($r = .12$; $p < .05$) seemed to be weaker than the relationship between intrinsic future goals and the college graduation subgoal ($r = .39$, $p < .01$).

As theorized by Miller and Brickman (2004), the college graduation subgoal correlated with task instrumentality ($r = .42$; $p < .01$) as well as with the self-regulation strategies ($r = .37$; $p < .01$), and the self-regulation strategies were highly correlated with task instrumentality ($r = .58$; $p < .01$). In addition, extrinsic and intrinsic future goals correlated with task instrumentality ($r = .17$ and $r = .46$, respectively; $p < .01$), as well as with the self-regulation strategies ($r = .21$ and $r = .52$, respectively; $p < .01$). Again, extrinsic and intrinsic future goals seemed to have a differential relationship to task instrumentality and to self-regulation.

On the other hand, also consistent with self-determination theory and with Kasser and Ryan (1993, 1996), extrinsic and intrinsic goals were not mutually exclusive, and they correlated with each other. Extrinsic future goals correlated with intrinsic future goals ($r = .33$; $p < .01$).

[4] Most fit indexes have strengths and drawbacks. For example, Ullman (1996) reported that the NNFI may underestimate fit in samples with small numbers, although it is not clear how small. In this study, all four indexes were consulted, including the RMSEA indicator, before making judgments regarding model fit.

Table 2
Correlations Among the Variables in the Present Study

Variable	1	2	3	4	5
1. Extrinsic future goals	1				
2. Intrinsic future goals	.33**	1			
3. College graduation subgoal	.12*	.39**	1		
4. Perceived task instrumentality	.17**	.46**	.42**	1	
5. Task-oriented self-regulation strategies	.21**	.52**	.37**	.58**	1

* $p < .05$. ** $p < .01$.

Model Tested

Path analysis was performed, using PROC CALIS (Hatcher, 1994) from SAS/STAT (information on this software can be found at http://www.sas.com/technologies/analytics/statistics/stat/index.html), to test the theoretical model (see Figure 2) describing the relationships among four major variables in Miller and Brickman's (2004) model. In the analyses, the ML method of parameter estimation was used, and all analyses were performed on the variance–covariance matrix ($N = 421$ observations). In the theoretical model (see Figure 2), extrinsic future goals and intrinsic future goals (as measured by the Future Goals Scale) predict the subgoal of college graduation (as measured by the College Graduation Subgoal Scale), which, in turn, predicts task instrumentality (as measured by the Perceived Instrumentality Scale). Finally, perceived task instrumentality predicts task-oriented self-regulation strategies (as measured by the Task-Oriented Self-Regulation Strategy Scale). The extrinsic and intrinsic future goals are modeled as correlating, based on the significant correlations between them in the pilot study and in the present study. Theoretically, as well, these future goals, although shown to lead to differential well-being outcomes, have not been seen as mutually exclusive (e.g., Kasser & Ryan, 1993, 1996).

GFIs for the theoretical model, the revised model, and the final model are presented in Table 3, and the bootstrap goodness-of-fit estimates based on the final model (see Figure 3) are presented in Table 4. The chi-square statistic included in Tables 3 and 4 provides a test of the null hypothesis that the reproduced covariance matrix has the specified model structure—in other words, that the model fits the data. Tables 3 and 4 also provide four additional GFIs: the GFI, the NFI (Bentler & Bonett, 1980), the NNFI (Bentler & Bonett, 1980), the CFI (Ullman, 1996), and the RMSEA (Byrne, 2001). GFI, NFI, NNFI, and CFI values of more than .9, and RMSEA values of less than .05 are generally thought to indicate a good fit between the model and the data.

The "null model" in Table 3 represents a hypothetical path model in which none of the variables are related to any of the other variables. This null model chi-square is useful as a baseline against which the chi-square values obtained for the other models can be compared. If the theoretical model achieves a large reduction in chi-square in comparison with the null model (while considering the degrees of freedom), then the theoretical model gains support.

Estimation of the theoretical model. Estimation of the theoretical model revealed a significant model chi-square value, $\chi^2(5, N = 421) = 115.03$, $p < .001$, indicating that the observed and model-implied covariance matrices may be significantly different. Although the value of the GFI was an acceptable .916, the values of the NFI, CFI, and NNFI were .760, .531, and .765, respectively, much lower than the desired >.9, and the value of the RMSEA was .229, much higher than the desired <.05 value. Taken together, these values indicated that the fit between the model and data could probably be improved.

The path coefficients in the theoretical model (see Table 5) were reviewed to see whether any paths should be deleted or added to improve model fit. The *t* values for most path coefficients proved to be statistically significant ($p < .001$), with most *t* values exceeding 6.25.[5] Most standardized path coefficients were either equal to or exceeded .28 in absolute magnitude. One path, however, was not significant, namely, the path predicting the college graduation subgoal from the extrinsic future goals (standardized coefficient = −.004, $t = -.08$).

Despite the fact that this path did not reach statistical significance, we decided to leave it in place. This decision was based on three major considerations: First, it was theoretically conceivable that the Future Goals Scale did not capture all the possible extrinsic future goals that people might have. Second, in the literature (e.g., Kasser & Ryan, 1993, 1996), intrinsic and extrinsic goals tend to correlate, albeit at relatively small magnitudes between $r = .2$ and $r = .3$, indicating that people might operate with a mix of goals. Third, we wanted to see what the bootstrap technique would show about all these paths following 200 iterations of the model.

A careful examination of the parameter values in the model, along with a reexamination of the correlations table (see Table 2) and of other theoretical considerations, resulted in the decision to add a direct path predicting perceived task instrumentality from intrinsic future goals. The reasons for adding the path were at least threefold. First, in line with self-determination theory (Deci & Ryan, 2000), the theoretical model parameters indicated that intrinsic, rather than extrinsic, future goals were the ones directly predictive of the college graduation subgoal and, through this subgoal, of perceived task instrumentality. Second, the correlations table (Table 2) indicated a strong and significant relationship between intrinsic future goals and perceived task instrumentality ($r = .46$, in comparison with $r = .17$ for the relationship between extrinsic future goals and task instrumentality). Finally, because it was conceivable (likely) that our subgoal measure did not capture all the variance attributable to intrinsic future goals, we believed that adding a direct path leading from intrinsic future goals to perceived task instrumentality might capture additional variance and improve model fit.

Estimation of the revised model. After adding a path predicting perceived task instrumentality from intrinsic future goals, the estimation of the revised model revealed that the hypothesized model, although improved over the theoretical model, still did not fit the data adequately (see Table 3). The chi-square was significant, $\chi^2(4, N = 421) = 59.12$, $p < .001$, indicating that the observed and model-implied covariance matrices were again significantly different. The values of all the indices improved, with the GFI, NFI, NNFI, and CFI at .950, .877, .706, and .882,

[5] These *t* tests are statistically significant at the $p < .05$ level whenever their absolute value exceeds 1.96, at the <.01 level if *t* exceeds 2.58, and at the <.001 level if *t* exceeds 3.30 (two-tailed tests).

Table 3
Goodness-of-Fit Indices for the Theoretical, Revised, and Final Models

Model	χ^2	*df*	*p*	GFI	NFI	NNFI	CFI	RMSEA
Null model	478.70	10	<.001	0.000				
Theoretical model	115.03	5	<.001	.916	.760	.531	.765	.229
Revised model	59.12	4	<.001	.950	.877	.706	.882	.181
Final model	4.88	3	.181	.995	.990	.987	.996	.039

Note. $N = 421$ participants. The revised model is identical to the theoretical model, except that a path was added from intrinsic future goals to perceived task instrumentality. The final model is identical to the revised model, except that a path was added from intrinsic future goals to task-oriented self-regulation strategies. GFI = goodness-of-fit index; NFI = normed fit index; NNFI = nonnormed fit index; CFI = comparative fit index; RMSEA = root mean square error of approximation.

respectively. The RMSEA also improved and was .181. Despite the improvement, however, these various measures indicated that the fit was still not adequate. We decided to revise the model again.

Based on similar theoretical rationales that guided the first model revision, we decided to add an additional path predicting task-oriented self-regulation strategies from the intrinsic future goals. The reasons for adding the path were, again, at least threefold. First, in line with self-determination theory (Deci & Ryan, 2000), the theoretical model parameters indicated that intrinsic, rather than extrinsic, future goals were the ones directly predictive of the college graduation subgoal and, through this subgoal, of perceived task instrumentality and of task-oriented self-regulation strategies. Second, the correlations table (Table 2) indicated a strong significant correlation between intrinsic future goals and task-oriented self-regulation strategies ($r = .52$, in comparison with $r = .21$ for the relationship between extrinsic future goals and self-regulation strategies). Finally, as it was conceivable (likely) that our perceived instrumentality measure did not capture all the possible variance attributable to intrinsic future goals, we believed adding a direct path leading from intrinsic future goals to task-oriented self-regulation strategies might capture additional variance in self-regulation and improve model fit.

Estimation of the revised model—2. Following the second revision of the original theoretical model, the model fit the data quite well (see Table 3). The chi-square was not significant, $\chi^2(3, N = 421) = 4.88$, $p = .181$, indicating that there was no significant difference between the observed and the model-implied covariance matrices. The values of all the fit indices were over .98, as follows: GFI = .995, NFI = .990, NNFI = .987, and CFI = .996. The

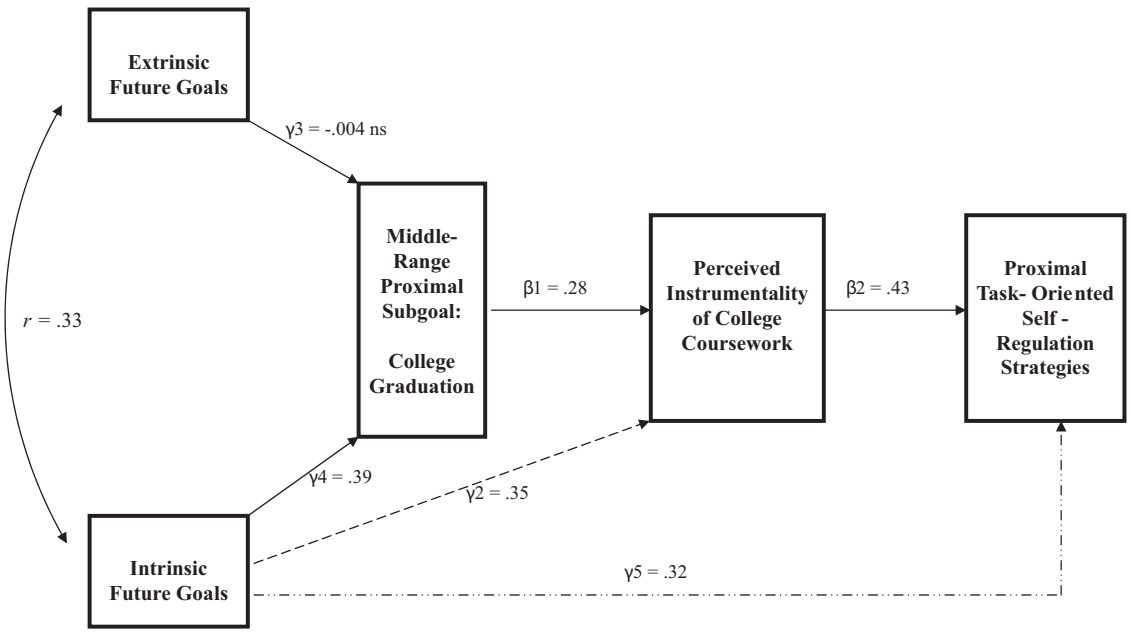

Figure 3. The final model. The broken lines indicate two paths that were added during two subsequent revisions of the theoretical model. These additional paths, predicting perceived task instrumentality from intrinsic future goals and predicting task-oriented self-regulation strategies from intrinsic future goals, constitute the only difference between the theoretical model and the final model. The numbers indicate standardized path analysis coefficients (betas and gammas), with the exception of *r*, which indicates the Pearson product-moment correlation between intrinsic and extrinsic future goals. The letters ns indicate that a path is nonsignificant. All significant standardized coefficients had significant *t*s at the $p < .001$ level.

Table 4
Bootstrap Goodness-of-Fit Indices for Final Model

Statistic or index	*M*	*SD*	25%	50%	75%	Min., max.
χ^2	7.889	5.681	3.947	6.546	10.715	0.103, 35.237
df	3	3	3	3	3	3
p	.189[a]	.239	.267[b]	.088[b]	.013[b]	<.001, .991
GFI	.993	.005	.990	.994	.996	.969, .999
NFI	.984	.011	.978	.987	.992	.930, .999
NNFI	.966	.038	.947	.976	.993	.783, 1.022
CFI	.989	.011	.984	.993	.998	.935, 1.000
RMSEA	.053	.036	.027	.053	.078	<.001, .160

Note. Bootstrap analysis was based on 200 iterations. Min. = minium value; max. = maximum value. GFI = goodness-of-fit index; NFI = normed fit index; NNFI = nonnormed fit index; CFI = comparative fit index; RMSEA = root mean square error of approximation.
[a] Average of all probabilities across 200 iterations. [b] Percentile values established by ordering probabilities from high to low values. Values are equivalent to calculating probabilities from the average percentile chi-squares with *df* = 3.

RMSEA was .039, clearly within the <.05 optimal level. It was decided to accept this model as the final model.

In the final model (see Table 5), the path values indicated that task instrumentality was significantly and positively predicted by the college graduation subgoal (standardized coefficient = .28, t = 6.25) and by intrinsic future goals (standardized coefficient = .35, t = 7.73). Self-regulation strategies were predicted by task instrumentality (standardized coefficient = .43, t = 10.19) and by intrinsic future goals (standardized coefficient = .32, t = 7.61). Finally, the college graduation subgoal was predicted by intrinsic future goals (standardized coefficient = .39, t = 8.10) but not by extrinsic future goals (standardized coefficient = −.004, t = −.08, *ns*). Together, the predictors in the final model (see Figure 3) accounted for approximately 84% of the variance in the predicted variables in the model.

Bootstrap Analysis

To investigate the stability and generalizability of our model, we used a bootstrap resampling or, to be more precise, replication technique (Efron & Tibshirani, 1998). In this process we created B = 200 new data sets from the original data set and inspected the distribution of several fit measurements.[6] Each new data set contained N = 421 observations, and each observation was sampled with a replacement from the original data set. The results of the bootstrap analysis for the final model are presented in detail in Tables 4 and 5.

Bootstrap model estimation. The bootstrap analysis based on the final model (see Figure 3) showed evidence of good fit and remarkable stability across the 200 iterations. Table 4 summarizes the mean estimate of the 200 iterations for various model fit indicators as follows: At 3 *df,* the mean chi-square was 7.889, and the mean probability was .189, indicating good fit. Other indicators also showed evidence of good fit, such as the mean GFI (.993), NFI (.984), NNFI (.966), and CFI (.989). The mean RMSEA, slightly above the optimal <.05 at .053, still showed evidence of fair fit (Browne & Cudeck, 1993; MacCallum, Browne, & Sugawara, 1996).[7] Table 4 further shows the values of the various fit indicators at the 25%, 50%, and 75% quartiles of the bootstrap iterations. At all of these points, most fit indicators showed evidence of good fit. For example, the GFI, NFI, NNFI, and CFI all had values above .94 at all the quartile points. The RMSEA values were between .027 and .053 at most of these quartile points, except for the 75% quartile, where the RMSEA value was .078, higher than the optimal <.05 but still within the fair fit guidelines (MacCallum et al., 1996; see also footnote 7). In addition, the standard deviation across the 200 iterations for most of the indicators was relatively small, indicating good model stability. For example, the standard deviation of the GFI, NFI, NNFI, CFI, and RMSEA fell between .005 and .038. The standard deviation of the chi-square was larger (5.681), and that of the probability was .239, but that was to be expected in view of the fact that some of the variables (notably the college graduation subgoal) deviated from normality. The chi-square statistic is known to be particularly sensitive to "departures from multivariate normality" (Ho, 2006, p. 285).

Bootstrap parameter estimation. The mean standard coefficients (betas and gammas) of the 200 bootstrap iterations tended to have nearly identical values to the paths in the final model (see Table 5), thus strengthening our confidence that the final model presents a very plausible explanation of the relationships among the variables of interest.

Discussion

A directional model based on Miller and Brickman's (2004) model of future-oriented motivation and self-regulation was tested to find out whether the directional ordering of variables was supported by data in an academic setting and whether the predicted influence of future goals on proximal subgoals, task instrumentality, and self-regulation strategies would differ if the extrinsic and intrinsic nature of the future goals was considered. Although we think that our findings clearly address these issues, we want to strike some notes of caution before discussing the interpretations of our findings.

The correlational and predictive methods used in this study do not provide cause-and-effect evidence among the variables examined. Although these nonexperimental methods can provide evidence regarding the plausibility of the proposed paths, model fit in itself is not an indication that the data would not fit other types of relationships or variable configurations. There is a need for future research that continues to investigate the relationships among future goals, proximal subgoals, task instrumentality, and self-regulation strategies using different methodologies, and there is a need for additional experimental research that tests whether observed predictions follow a cause-and-effect pattern.

In addition, although the size of the sample in the present study was adequate for the study's purpose (N = 421), the sampling

[6] Efron and Tibshirani (1998) found 200 iterations as adequate in most cases.

[7] MacCallum et al. (1996, p. 134) summarized the RMSEA model fit guidelines, while taking into account Browne and Cudeck's (1993) guidelines, as follows: RMSEA values of less than .05 indicate close fit, values between .05 and .08 indicate fair fit, values between .08 and .10 indicate mediocre fit, and values above .10 indicate poor fit.

Table 5
Standardized Coefficients for the Paths in the Theoretical, Revised, and Final Models and in the Bootstrap Analysis of the Final Model

Path	Standardized coefficient			Bootstrap analysis		
	Theoretical model	Revised model	Final model	Mean st. coeff.	*SD*	95% CI st. coeff.
Pred. self-regulation strategies from task instrumentality (β2)	.57[a]	.57[a]	.43[a]	.43[a]	.03	.37, .48
Pred. self-regulation strategies from intrinsic future goals (γ5)			.32[a]	.32[a]	.03	.27, .38
Pred. task instrumentality from the college graduation subgoal (β1)	.42[a]	.28[a]	.28[a]	.28[a]	.05	.19, .36
Pred. task instrumentality from the intrinsic future goals (γ2)		.35[a]	.35[a]	.35[a]	.05	.26, .44
Pred. college graduation subgoal from extrinsic future goals (γ3)	−.004, *ns*	−.004, *ns*	−.004, *ns*	.003, *ns*	.05	−.08, .09
Pred. college graduation subgoal from intrinsic future goals (γ4)	.39[a]	.39[a]	.39[a]	.38[a]	.05	.30, .47
Correlation between extrinsic & intrinsic future goals	$r = .33$[a]	$r = .33$[a]	$r = .33$[a]	$r = .33$[a]	.04	.26, 40

Note. Bootstrap analysis was based on 200 iterations. ns denotes a non-significant *t*. The standardized coefficient columns indicate the standardized betas or gammas of the various paths, except for *r*, which indicates the Pearson product-moment correlation. St. coeff. = standardized coefficient; CI = confidence interval; Pred. = predicting.
[a] Significant *t* at the $p < .001$ level.

method and the study design, involving a convenience sample and data collection during one limited period of time in one university department, limit the generalizability of the study. Additional studies will be needed before findings can be generalized to other disciplines, educational environments, and populations. For example, future research is needed in other disciplines such as business, law, engineering, and medicine to determine whether intrinsic future goals are still the most predictive of adaptive outcomes or whether extrinsic future goals play an important role as well. Additional research is needed at other levels of schooling, such as the elementary and high-schools levels, as well as in private and public schools. With these cautions in mind, we turn now to the discussion and interpretation of our findings.

The Final Model

The theoretical model in the present study (see Figure 2) was modified by the addition of two paths, and the final model (see Figure 3) showed evidence of good fit with the data. A bootstrap procedure consisting of 200 iterations performed on the basis of the final model added evidence of the model's stability and generalizability.

Consistent with social-cognitive theory (Bandura, 1986) and with Miller and Brickman (2004), future goals had a significant direct and/or mediated relationship to the college graduation subgoal, the perceived task instrumentality, and the self-regulation strategies. Consistent with self-determination theory (Kasser & Ryan, 1993, 1996), the extrinsic and intrinsic nature of the students' future goals had a differential relationship to their subgoal of college graduation, their perceptions of task instrumentality, and their self-regulation strategies. Perceived task instrumentality was directly predicted by the college graduation subgoal and both directly and indirectly by the intrinsic future goals. Self-regulation strategies were directly predicted by task instrumentality and both directly and indirectly by intrinsic future goals. Finally, the college graduation subgoal was directly predicted by intrinsic, but not by extrinsic, future goals.

Hypothesized Relationships Among the Variables of Interest

The present study's results indicate that Miller and Brickman's (2004) hypothesized mediated relationships among distal future goals, proximal subgoals, perceived task instrumentality, and task-oriented self-regulation are plausible ones: Future goals were found to predict the proximal subgoal of interest to this study, namely, college graduation, and, in turn, the college graduation subgoal was found to predict perceived task instrumentality. Finally, task instrumentality was found to predict task-oriented self-regulation strategies. The additional variance captured by two direct paths added to improve model fit (i.e., the path between future goals and task instrumentality and the path between future goals and task-oriented self-regulation strategies) was not surprising because the measures of the college graduation subgoal and perceived instrumentality used in the present study were unlikely to have accounted for all of the variation in these constructs attributable to intrinsic future goals.

The present study makes a contribution to the literature on goals by providing evidence that distal future goals are significantly related to proximal subgoals, to perceived task instrumentality, and to proximal task-oriented self-regulation, thus strengthening the argument that research on future-oriented and proximal motivation should be integrated (Husman & Lens, 1999; Kauffman & Husman, 2004). Also, the present study is among the first to test a specific hypothesis involving personally valued future goals and their predicted relationship to proximal subgoals, to task instrumentality, and to task-oriented self-regulation strategies in an educational setting. Results show a plausible directional path between the adoption of personally valued future goals, proximal subgoals, task instrumentality, and task-oriented self-regulation strategies at the college level.

Task Instrumentality

The present study's contribution to our understanding of factors predicting task instrumentality deserves particular attention. Perceptions of task instrumentality have been found to have many

adaptive educational outcomes (e.g., Greene et al., 2004; Raynor, 1970, 1974; Vansteenkiste, Simons, Lens, Soenens, et al., 2004), including the adaptive task-oriented self-regulation strategies tested in the present study. Until recently, most studies of perceived task instrumentality have used task instrumentality as the predictor variable, which has made it hard to find out what factors may predict task instrumentality itself (e.g., Malka & Covington, 2005; Simons, Dewitte, & Lens, 2003). Because of the importance of perceptions of task instrumentality in educational environments, there has been a need to find factors that may predict task instrumentality.

Recently, Greene et al. (2004) found classroom-level context variables (perceived task meaningfulness, autonomy support, and mastery evaluation) to be important direct and indirect predictors of perceived task instrumentality. Earlier, Maehr and Midgley (1991) suggested that students' motivation regarding the tasks that they are asked to engage in may be influenced not only by classrooms and teachers, but also by school-level factors. In three case studies, Brickman and Miller (2001) found that students' past experiences in the larger sociocultural context (e.g., at home, at school, with peers, and through the media) were related to their perceptions of task instrumentality, possibly through the students' future goals, proximal subgoals, and perceptions of ability.

The present study found that the college graduation subgoal was a direct predictor of task instrumentality, and that intrinsic future goals were both direct and indirect (through the college graduation subgoal) predictors of task instrumentality. According to the directional model tested, the present study suggests that the students' own college graduation subgoal and future goals were the variables predicting perceived task instrumentality. Thus, to the possibility that task instrumentality may be predicted by community-, school-, and classroom-level factors, we may now add the possibility that task instrumentality may also be predicted by the students' own intrinsic future goals and by their own proximal subgoals, such as the college graduation subgoal.

Intrinsic Versus Extrinsic Future Goals

The present study found that a focus on intrinsic, rather than extrinsic, future goals may be more predictive of the adoption of robust proximal subgoals, of adaptive perceptions of task instrumentality, and of the adoption of task-oriented self-regulation strategies in college environments. Kasser and Ryan (1993, 1996) have noted earlier that not all personally valued future goals were equally likely to predict similarly positive outcomes. These researchers found that extrinsic future goals were associated with diminished well-being in the present, while intrinsic future goals were associated with relatively high levels of well-being in the present. The present study is among the first to find evidence for a similar differential effect of extrinsic and intrinsic future goals in a different context than the studies mentioned above, namely, when future goals were used to predict proximal subgoals, task instrumentality, and task-oriented self-regulation strategies among college students.

Although this finding should be treated with caution until further evidence emerges, there is some indirect evidence that lends it additional support. Writing from a goal orientation theoretical perspective, Nicholls, Patashnick, and Nolen (1985) examined whether high school students' (relatively proximal) personal goals in school were related to their perceptions of what the (relatively distal) aims of education should be. Despite the fact that Nicholls et al.'s (1985) construct of "aims of education" differed considerably from the present study's construct of personally valued future goals, their findings were in the same direction as those in the present study. The authors found that high school students who perceived the aim of education to be furthering one's wealth and status tended to have maladaptive personal school goals such as work avoidance, and they also tended to have ego, rather than task, orientations. On the other hand, students who perceived the aim of education to be commitment to society or understanding of the world tended to have adaptive personal school goals such as working hard, and they also tended to have task, rather than ego, orientations. These results are consistent with self-determination theory (Ryan & Deci, 2000).

In the present study, consistent with Kasser and Ryan (1993, 1996), personally valued intrinsic future goals were the pivotal point in predicting many positive factors, both directly and indirectly (e.g., college graduation subgoal, task instrumentality, task-oriented self-regulation strategies), whereas personally valued extrinsic future goals failed to produce a statistically significant relationship with the college graduation subgoal, the primary mediator for the rest of the model. The personally valued intrinsic future goals that the present study tested were individual growth, relationships, community involvement, and health. The personally valued extrinsic future goals tested were wealth, fame, and appearance.

Educational Implications

Although the correlational nature of our study prohibits drawing causal conclusions, the clarity of the findings and the strong theoretical basis of the directional ordering underlying the model tested lead us to speculate about possible educational implications, should the model be supported by additional research using various methodologies (e.g., longitudinal studies) and by experimental research in particular. It is interesting to note that it may be the types of interventions hinted at below that provide experimental support for the model's validity. We see three areas with potential implications: the importance of students clarifying their future goals and subgoals, the utility of perceived instrumentality as a diagnostic tool for important motivation problems, and the importance of emphasizing the intrinsic goals of schooling. Each of these ideas is elaborated below.

Clarification of personal goals and subgoals. The high dropout rates in high schools and colleges in the United States, especially among poor students (National Center for Educational Statistics [NCES], 2004), raise the possibility that at least some of the students do not have an awareness of their own goals, have not done much thinking about aligning their future and proximal goals and subgoals in any coherent way, and have no idea where they are headed. The present research has indicated that the direction in which goals affect students may be from distal intrinsic future goals to proximal subgoals. Based on this knowledge, it may be possible to design goal-based interventions targeting at-risk students that would explain how a goal system works, help students identify their own long-term intrinsic goals, and set subgoals along the way, leading to the more distal future goals. For students with

no adaptive long-term intrinsic goals, it may be possible to design an intervention to foster such beneficial goals.

Students at risk of dropping out of school are often offered courses in remedial or study skills, and yet most college students enrolled in these remedial courses end up dropping out of school (NCES, 2004). The present study points to a possible reason. Study skills are the types of things that make up the self-regulation strategies that students normally set for themselves, such as study in a quiet place, study with a friend for a test, and summarize main ideas to oneself, among others. In the present study, these types of strategies were shown to be directly predicted by perceived instrumentality, directly and indirectly predicted by intrinsic future goals, and indirectly predicted by the college graduation subgoal. It may well be the case that students exhibiting problems in the self-regulation strategy area may have motivational problems that start with a lack of awareness of the larger goals at hand. Rather than focus on teaching a battery of standardized study skills, remedial programs may be more beneficial if they first helped students clarify or develop intrinsic future goals and proximal subgoals leading to their personal future goals, and if they then helped students perceive their work as instrumental toward achieving their goals. With their future goals and subgoals in place, and with well-developed perceptions of instrumentality, students may be in a much better position to act on improving their task-oriented self-regulation strategies or study skills.

Perceived task instrumentality as an indicator. The contribution of perceived task instrumentality to achievement and to other motivational factors in academic settings has been widely recognized (e.g., Brickman & Miller, 2001; Greene et al., 2004; Miller & Brickman, 2004; Raynor, 1970, 1974; Vansteenkiste, Simons, Lens, Soenens, et al., 2004). For example, Miller and Brickman (2004) as well as Greene et al. (2004) suggested that perceived task instrumentality may function as a helpful incentive when a student has to do school work that is not inherently pleasurable. The present study suggests that evident problems with perceived task instrumentality may serve as an early warning signal that can alert teachers and parents that their student may be having a more serious motivational problem. The present study found that the paths leading to perceptions of task instrumentality from intrinsic future goals and from the college graduation subgoal were significant. In other words, problems with task instrumentality (e.g., not seeing the reason why one should do a school assignment or thinking that all assignments are worthless) may be related to much larger problems, such as a lack of appropriate subgoals (e.g., school graduation), a lack of appropriate intrinsic future goals, or a combination of these factors. Accordingly, when a student exhibits signs of weak or nonexistent task instrumentality, educators should take it seriously and look beyond the specific assignment that was not turned in to identify other possible underlying problems. Such problems may include not only the student-level goal factors identified by the present study, but also classroom- and school-level factors identified by other studies (e.g., Brickman & Miller, 2001; Greene et al., 2004; Maehr & Midgley, 1991). In dealing with perceived task instrumentality problems on the part of students, educators may start by addressing student-level factors, such as discussing the student's intrinsic future goals and their subgoal or subgoals. If needed, educators may then widen their intervention to include classroom-, school-, and community-level factors, to the extent possible.

Focus on intrinsic future goals. The present study has found that the major predictor of a positive educational goal system and task instrumentality is the adoption of intrinsic, rather than extrinsic, future goals. Although these results need to be treated with caution until more evidence becomes available, it is interesting to note that, whereas some studies have identified possible drawbacks to extrinsically focused future goals (e.g., Kasser & Ryan, 1993, 1996; Nicholls et al., 1985; Ryan et al., 1999; Vansteenkiste, Simons, Lens, Soenens, et al., 2004), there are almost no studies identifying drawbacks to intrinsically focused future goals. In the present study, the paths from the intrinsic future goals to all other variables were significant, whereas the path from extrinsic future goals linking this variable to the rest of the mediated model was not significant. At the same time, intrinsic and extrinsic future goals were not mutually exclusive. In the two models tested, extrinsic and intrinsic future goals had a moderate correlation, implying a relationship. The implication may be that, although people may have a mix of extrinsic and intrinsic future goals, in order to be successful in an academic environment, they may need a stronger focus on intrinsic goals, such as personal growth, relationships, community involvement, and health.

For educators, these findings imply that they should encourage students to excel not by pointing out how much higher their salaries would be if they graduated from their respective schools, but by pointing out, for example, how much the students would know or how they might be able to contribute to society. The great importance accorded to educational improvement in the United States (e.g., United States Department of Education, 1983, 1994, 2001), coupled with the recognized potential of intrinsic future goals in particular, and of intrinsic factors in general, to improve schools, has already led many educators and researchers to design programs of school improvement that emphasize intrinsic elements (e.g., Brown, 1997; Huffman & Hipp, 2003; Mertens, Flowers, & Mulhall, 2001; Newmann & Wehlage, 1993; O'Hair & Odell, 1995; O'Hair & Reitzug, 1997; Raywid & Oshiyama, 2000; Wenger & Snyder, 2000).

Conclusion

The purpose of the present study was to test a portion of the Miller and Brickman (2004) model of future-oriented motivation and self-regulation to find out whether students' distal future goals are related to their adoption of proximal subgoals, to their perceptions of task instrumentality, and to their task-oriented self-regulation strategies. The results supported Miller and Brickman's (2004) hypothesis that future goals predict the adoption of proximal subgoals, that proximal subgoals predict perceptions of task instrumentality, and that perceived instrumentality, in turn, predicts task-oriented self-regulation strategies. In line with self-determination theory (Kasser & Ryan, 1993, 1996), the present study also found that future goals had a differential relationship to the variables of interest: Although extrinsic future goals were not significant predictors of the college graduation subgoal, the primary mediator for the rest of the model, intrinsic future goals were significant direct predictors of the college graduation subgoal and direct and indirect predictors of perceptions of task instrumentality and of task-oriented self-regulation strategies. This finding suggests that, pending additional research, educators should consider emphasizing intrinsic future goals (and other intrinsic factors),

such as personal growth, meaningful relationships, and community contributions, in school environments to better facilitate the development of students' future goals, proximal subgoals, perceptions of task instrumentality, and task-oriented self-regulation strategies. In addition, the results of the present study indicate that the Miller and Brickman (2004) model of future-oriented motivation and self-regulation may serve as a basis for designing goal-based interventions to help at-risk students stay in school and succeed academically.

In their article about future-oriented motivation and self-regulation, Miller and Brickman (2004) urged that

> those interested in proximal research issues and those with more future-oriented research agendas need to join forces in studying the phenomenon of academic motivation and self-regulation, and in planning interventions designed to improve the lives of the countless students who fail to see the relevance of schooling in their lives. (p. 29)

By finding a meaningful and significant connection between future goals, proximal subgoals, perceived task instrumentality, and task-oriented self regulation strategies, the present study lends additional support to the need for continued attempts at integrating future-oriented and proximally oriented motivation and self-regulation.

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