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Personal Goal Setting in University Students: Effects on Academic Achievement, Executive Functioning, Personality, and Mood

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Abstract

One fourth of students who enroll in 4-year universities never finish. Precipitating causes of early departure include poor academic progress and a lack of clear goals and motivation. A major cause of trouble adjusting to university is students' failure to cognitively assimilate new experiences. Recent studies have demonstrated that goal setting leads to heightened well-being. Neuroscience research has also closely linked working memory (WM) and goal setting, because WM is related to the use of attention to activate information, for example, goal states or action plans. The present study investigated whether an intensive goal-setting program for struggling students who have experienced a substantial drop in performance would have positive effects not only on academic achievement, but also on well-being, personality (specifically conscientiousness and emotional stability), and cognitive functioning (specifically WM). Students ($N = 101$) experiencing subjectively perceived academic difficulty and a cumulative GPA of less than 3.0 were recruited from McGill University. Participants completed baseline measures of mood, personality, and cognition, and were randomly assigned to one of two intervention groups: Half completed an intensive goal-setting program and half a control task with intervention-quality face validity. Every month for 4 months, students were retested on mood measures. After 4 months, students were retested on all measures. Official transcripts were gathered at the end of the semester subsequent to the intervention, in order to compare grades pre- and post-intervention as well as retention rates. A mix of parametric (i.e., MANOVAs, *t*-tests, ANOVAs) and nonparametric statistics (i.e., Chi-square) was used to compare group performance on dependent measures. With regard to academic achievement, the Goal Group performed

significantly better, but all participants appeared to improve over time in mood and cognitive functioning. Applications of this research can be extended to students in university, as well as in earlier stages of education, when underperforming and dropping out have severe repercussions.

Sommaire

Le quart des étudiants inscrit dans un programme universitaire ne termineront pas leurs études. Les causes qui précipitent cet abandon incluent une faible progression académique, un manque de motivation, ainsi qu'une absence de buts clairement établis. Une des raisons principales pouvant expliquer ce manque d'ajustement à la vie universitaire peut également s'expliquer par l'incapacité des étudiants à assimiler de nouvelles expériences sur le plan cognitif. Des études récentes ont démontré que se donner des objectifs aide à développer un sentiment accru de bien-être. La recherche neuroscientifique a aussi établi un lien étroit entre la mémoire de travail (MT) et la capacité de se fixer des objectifs. C'est à dire, la MT est reliée au déploiement des ressources attentionnelles, qui en retour sont importantes dans la planification et l'élaboration de stratégies pour faciliter l'atteinte d'un but ainsi que le retour sur l'état de ces buts. Cette étude vise à découvrir si l'utilisation d'un programme avec des objectifs claire peut avoir des bienfaits sur le plan académique, le bien-être, la personnalité (stabilité émotive et l'état de conscience) et le fonctionnement cognitif (MT) d'étudiants à faible rendement académique. Des étudiants ($N = 101$) en difficultés scolaires et ayant une note pondérée de moins de 3.0/4.0 ont été recrutés à l'Université McGill. Ceux-ci ont complété des tests mesurant leur bien-être, personnalité, fonctionnement cognitif et ont ensuite été assignés par hasard soit au groupe expérimental (assignation intensive d'objectifs) ou au groupe contrôle (intervention neutre apparaissant efficace). Chaque mois, pendant quatre mois, les étudiants ont rempli des questionnaires sur leur état émotionnel. À la fin, les étudiants ont été réévalués sur toutes les mesures ci-haut. Les relevés de notes ont également été récupérés pour comparer les notes avant et après

l'intervention ainsi que le taux d'abondon en cours d'études. Différentes statistiques (MANOVA, test-*t*, ANOVA, Chi carré) ont été utilisées pour comparer la performance des groupes. Les résultats ont démontré que le groupe expérimental a mieux réussi par rapport à la réussite scolaire. Par contre, tous les participants ont semblé s'améliorer sur les plans cognitifs et émotionnels. Cette étude démontre donc que l'utilisation d'objectifs peut être un outil important pour aider les étudiants universitaires ou pré-universitaire en difficulté lorsque la sous-performance scolaire ou le décrochage peut avoir des répercussions sévères.

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CHAPTER 1

Introduction

> Whatever the reasons many students do not achieve their postsecondary educational goals or benefit at optimal levels from the college experience, the waste of human talent and potential is unconscionable. What can colleges and universities do to uphold their share of the social contract and help more students succeed? (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2007, p. 4)

The Problem of Academic Failure, Poor Progress, and School Departure

Approximately 25% of students who enroll in 4-year university programs in the United States never finish. These departure rates have varied little since 1987 (American College Testing Program, 2001). According to the Canadian government's Youth in Transition Survey, among the 963,000 Canadian youth who were between 18- and 20-years-old in December 1999, and had participated in postsecondary education by December 2005, about 143,000 had dropped out (Statistics Canada, 2007). In effect, this statistic translated a postsecondary dropout rate of nearly one in every seven students (about 15%) in Canada, and it did not even include students who left postsecondary education after 6 years. On a provincial basis, dropout rates were highest in Quebec, Manitoba, Alberta, and British Columbia.

A surge in university enrolments across North America and Western Europe over the last 2 decades has amplified the difference between the number of students who enter the system and the number who graduate (Montmarquette, Mahseredjiana, & Houle, 2001). Only about 35% of first-time, full-time, bachelor-degree seeking university students at 4-year schools in the United States earn their degree in 4 years; 57% graduate

in 6 years (Knapp, Kelly-Reid, Whitmore, & Miller, 2007). These rates are even lower when public school graduation rates are analyzed separately.

Such significant rates of school departure negatively affect the stability of student enrolments, university budgets, and public opinions about university quality (Braxton, Hirschy, & McClendon, 2004). Publicly funded institutions face growing political pressure to improve completion rates (Charlton, Barrow, & Hornby-Atkinson, 2006; Pascarella & Terenzini, 1998). Furthermore, many organizations and at least one popular news magazine in the United States include retention rate measures when they rank institutions of higher education (Tinto, 2006/2007), which affects the pool of students that individual schools are able to attract.

The effects on students themselves are even greater. A pilot study conducted in the United Kingdom found that non-completers of university earned less and experienced longer durations of unemployment than graduates when both groups were followed over several years (Johnes & Taylor, 1991). More recent data from the United States suggest that this earnings gap is ever-widening (Carey, 2004). Pennington (2004) reported that, on average, individuals with Bachelor's degrees earn 70 percent more than high school graduates. With regard to levels of employment, individuals who complete a Bachelor's degree or higher have lower rates of unemployment (2 percent in 2007) than those who have only their high school diploma (4.4 percent in 2007; U.S. Bureau of Labor Statistics, 2008).

Potential Causes of the Problem of Academic Failure and Departure

Precipitating causes of early university departure might include poor academic progress, uncertainty about future employment, and a lack of clear goals and motivation

(Braxton et al., 2004; Dale & Sharpe, 2001). In a review and summary of 3 decades of research on university students, Pascarella and Terenzini (2005) concluded that undergraduate grades appear to be the best predictor of student persistence and completion of the Bachelor's degree. Similarly, Adelman (1999, 2006) conducted two major analyses of data from a pair of grade-cohort longitudinal studies carried out by the National Center for Education Statistics across the United States between 1982-1993 and 1988-2000. Adelman found that first-year Grade Point Average (GPA) and the nature of the subsequent GPA trend over subsequent years (i.e., rising, falling, or flat grades) were both strong and positive contributors to the prediction of Bachelor's degree completion, beyond the effects of a multitude of other variables. Furthermore, Kuh et al.'s (2007) review of the student-success literature indicated that for students at 4-year postsecondary institutions, GPA is associated with a variety of factors, including the amount of time students prepare for class, their levels of participation in class, the quality of their relationships with and feedback from faculty members, and their general feelings about their overall university experiences. It is clear that grades are important, perhaps even of the utmost importance, to achieving a university degree.

Numerous factors, such as a lack of goal clarity, low motivation, disorganized thinking, mood issues, financial stress, and relationship problems, are potential contributors to the outcome of poor grades. Without proper intervention, sub-par school performance can precede demotivation, which can lead to poorer grades, which can result in course failures, which can give rise to ultimate school departure or expulsion. It is a vicious cycle. Regardless of the point in time that the performance drop occurs (i.e., first, second, third year or beyond) or the reason for the difficulty, intervention is key. Many

universities have fought to prevent academic failure and school departure by instating programs in the first year (e.g., freshman orientation, first-year seminars, mentorship programs; see "Attempted Interventions" section below). Fewer programs are available for students that experience difficulty mid-degree, and of these, it is difficult to locate empirical data regarding programmatic effects on overall GPA (i.e., beyond one course).

What happens, then, when a formerly successful student, for example, a student who does very well in high school, enters postsecondary education and runs into difficulty, either in the first year or mid-way along their course of studies? The literature on general causes of academic success and failure is large[1], but very little of it deals with successful students who run into academic difficulty. The majority of existing research, as scanned in a search of the PsychInfo, ERIC, and Google Scholar[2] databases, addresses students who attempt higher education with several elements of risk, for example, students with disabilities, part-time community-college students, or specific subgroups of minority students (e.g., Bempechat, Graham, & Jimenez, 1999; Fuller, Healey, Bradley, & Hall, 2004; Glass & Bunn, 1998; Grimes, 1997; Ishitani, 2003; Napoli & Wortman, 1998; Russell & Atwater, 2005; Saenz, Marcoulides, Junn, & Young, 1999; Schwartz & Washington, 1999/2000; Strage, 1999). Many of these studies compare and focus on students who have never before experienced outstanding academic success, or who are entering postsecondary education without adequate skill-sets, resources, or feelings of confidence and autonomy. These investigations are extremely important for the academic

[1] An unrestricted search in Google Scholar of the terms "academic," "success OR failure," "students" and "college OR university" yielded approximately 1,930,000 scholarly documents (e.g., articles, chapters, books). When the search was restricted to the last 10 years (1998-2008), the number dropped significantly, to 132,000 (still a large number).

[2] A free, online public search engine (scholar.google.com) indexing a variety of types of scholarly literature (e.g., books, articles, chapters) across an array of disciplines. It includes most peer-reviewed online journals of the world's largest scientific publishers, and is more comprehensive than either ERIC or PsychInfo.

retention literature, but are not as relevant to the present study, which focuses on previously successful students.

Within the literature scan, even those few studies in the search that reported on predictors of academic success in university appeared to focus on general methods to achieve success, rather than on ways to intervene when previously successful students fall into academic failure. For example, Pascarella and Terenzini (1998) summarized the major evidence-based predictors of university student success: size of the school (smaller is better), full-time enrolment status, living on campus, a strong institutional focus on teaching and student development, an emphasis on shared educational experience in the curriculum, and the potential for frequent interaction with peers and faculty members (inside and outside of class). According to Kuh et al. (2007), empirically supported factors related to post-secondary student success (as evaluated by enrolment, persistence, grades, and ultimate educational attainment) include (a) quality of high school academic preparation; (b) family education demographics; (c) socioeconomic status (as it influences prior academic preparation, pursuing steps to postsecondary enrolment and admission, enrolment, and degree completion); (d) the availability and type of financial aid; and (e) enrolment patterns (full-time or part-time, 2-year or 4-year institution, immediate or postponed enrolment). Most of these factors are not portals for in-course intervention.

An exception to the literature gap on descriptions of currently struggling, previously successful students is a series of articles by Professor Raymond Perry, at the University of Manitoba. He defined the case of intelligent, motivated, high-school students falling into trouble in university as a "paradox of failure" (Perry, 1991, 2003;

Perry, Hladkyj, Pekrun, & Pelletier, 2001). Perry and colleagues theorized that previously successful students might encounter difficulty in university as a result of low levels of "perceived academic control" (defined as students' personal beliefs about the underlying causes of their successes and failures). According to Perry (2003), "Students who describe themselves psychologically as being 'out of control' do worse academically than their 'in control' counterparts." In their 1991 study of students from an introductory psychology class at a large Midwestern Canadian Research I university, Perry et al. concluded (among other things) that students high in perceived academic control had put more effort into school, reported lower levels of anxiety and boredom and higher levels of motivation, believed that they had performed better, felt more in control of their course assignments and of their life as a whole, and, ultimately, obtained higher grades in the course. The authors suggested that the first year of university has the potential to lower the level of control that students feel, via changes in the following components from secondary to postsecondary school life: (a) emphasis on success versus failure, (b) level of academic competition, (c) pressure to excel, (d) frequency of academic failure, (e) familiarity level of academic assignments, (f) association of decisions with impact on career, and (g) social networks. Perceived academic control is inextricably tied to the social cognitive theory of self-regulation (Bandura, 1991) and self-regulated learning, the latter of which was described by Perry et al. (2001) as involving "setting academic goals, enacting strategies and plans to attain them, and monitoring successes and failures" (p. 776) when contextualized in educational settings.

In university, good grades are harder to achieve than entering students might initially expect (or hope). Most undergraduates face more difficult courses and greater

levels of social and academic competition than ever before (Pennebaker, Colder, & Sharp, 1990). Furthermore, many students face new physical environments, unfamiliar faces, separation from their families and grade-school friends, and a level of required independence and responsibility that is difficult to prepare for. Fisher (1988) indicated that one of the biggest causes and correlates of difficulty adjusting to university is the failure of students to cognitively assimilate their new experiences. Adjustment problems often lead to academic problems, which can result in a phenomenon known as academic underachievement.

What is academic underachievement? The most basic definition of underachievement in the literature points to a discrepancy between actual achievement and intelligence (or potential, or ability, depending on the author; Baum, Renzulli, & Hébert, 1995; Peters, Grager-Loidl, & Supplee, 2000; Reis & McCoach, 2000; Richert, 1991; Rimm, 1997; Whitmore, 1980). There is extensive debate among researchers about how best to define the terms ability and achievement (Reis & McCoach, 2000; Richert, 1991), let alone underachievement and its root causes (Colangelo & Assouline, 2000; Pendarvis, Howley, & Howley, 1990; Reis & McCoach, 2000; Whitmore, 1980, 1986). Some writers dismiss underachievement as a useless term altogether, such as Seely (1994), who stated, "Underachievement is a complex phenomenon which is value-laden and ambiguous as a generic term to describe student behavior" (p. 155). Others are very specific in their definitions of the term, differentiating between short-term and chronic academic underachievement (Reis, 1998; Whitmore, 1980). In the case of the population focus for the present study, "short-term" academic underachievement appears to be the most appropriate term, because participants were drawn from a pool of university

students who had achieved some level of academic success in high school.

Underachievement in a broad sense might be reflected in low grades and occasionally in performance on achievement tests (Pendarvis et al., 1990), in credit hours accumulated in consecutive university terms (Kuh et al., 2007), in low levels of effort on extracurricular tasks or within interpersonal relationships, in a lack of life goals or general direction, or in avoidance of challenging or creative projects in and out of school, among other possibilities.

It is not the intention of this review section to bring closure to the debate about what constitutes underachievement in previously successful students, or to delineate an exhaustive list of its potential causes. There is little agreement on its contributing factors in the literature. After an extensive review of the student persistence literature, Kuh et al. (2007) concluded, "No one theoretical perspective can adequately account for all the factors that influence student success in college" (p. 19). However, some researchers suspect that underachievement results from a combination of factors related to the student (e.g., self-esteem, willingness to take risks, need for achievement), the student's parents (e.g., educational-level, economic status, expectations, values), and the student's school (e.g., educational policies, ability level of peers, teaching methods; Fehrenbach, 1993; Reis, 1998; Vlahovic-Stetic, Vidovic, & Arambasic, 1999). Some writers have noted a loss of motivation that accompanies decreasing achievement (Baum et al., 1995; Butler-Por, 1993, Gallagher & Gallagher, 1994), while others have argued that it is inaccurate to speak of a lack of motivation altogether, as even students with mediocre grades or dwindling interest in school might be quite motivated to engage in learning activities unrelated to specific schoolwork assignments (Grant, 1995; Whitmore, 1986). It is also

possible that some bright students underachieve due to a poor sense of self-efficacy (i.e., confidence in one's own ability to succeed on a task). According to Bandura (1977), "People will approach, explore, and try to deal with situations within their self-perceived capabilities, but they will avoid transactions with stressful aspects of their environment they perceive as exceeding their ability" (p. 203).

Previously Attempted Interventions

Bean and Eaton (2001/2002) reviewed how "successful retention programs," such as freshman interest groups or learning communities, freshman seminars, service-learning programs (e.g., peer tutoring, community health internships; cf. Sax & Astin, 1997), and mentoring programs, help students to develop psychologically (e.g., effects on approach-avoidance coping strategies, locus of control, and academic or social self-efficacy). Although these programs all seem to have some effect on aspects of the student experience, very few of the analyses outlining their success appeared to use rigorous, randomized, controlled trial models of experimentation in which the effects of an experimental intervention (e.g., one of the programs) was compared to a control intervention-program (with baseline demographic data and enrolment in other interventions considered). Furthermore, a scan of the literature in Google Scholar, Psych Info, and ERIC indicates that even fewer retention or academic-success program evaluations appeared to examine before-and-after overall grades, or GPA, which, again, is one of the most important predictors of ultimate degree completion (Adelman, 1999, 2006; Pascarella & Terenzini, 2005).

The Proposed Solution

The present longitudinal study explored the possibility that participation in a

formalized and intensive personal goal-setting program might serve as an effective intervention for bright but struggling university students, with the hypothesized potential to positively affect grades, mood, personality, and aspects of cognitive functioning. According to Elliot, Chirkov, Kim, and Sheldon (2001), "Personal goals . . . represent the consciously articulated, personally meaningful objectives that individuals pursue in their daily lives" (p. 505). Other investigators attribute a more active role to personal goals, defining them as "internal representations of desired states . . . that are expected to guide individuals' thoughts and action" (Wiese & Freund, 2005, p. 287; see also Emmons, 1986). In the present study, the author defines personal goals as a combination of the latter conceptualizations, and adds the idea that the very process of creating personal goals is important to outcomes, whether the goals or outcomes are related to academic or career success, interpersonal-relational improvement, or personality and mood. To the author's knowledge, no research study on goal setting has ever empirically addressed this question.

Possibility of and Review of Goal Setting as an Intervention

General benefits of goal setting. Goal-setting theory falls within the general domain of cognitive psychology, and is rooted in the premise that conscious goals influence action (Locke & Latham, 1990, 2002; Locke, Shaw, Saari, & Latham, 1981; Ryan, 1970). The theory was created within the industrial-organizational (I/O) psychology field over the course of over 35 years, and was based on approximately 400 correlational and experimental laboratory and field studies, which provided evidence for the theory's high internal and external validity (Latham & Locke, 2007; Locke & Latham, 1990). These studies, which were conducted across Asia, Australia, Europe, and

North America (cf. Locke & Latham, 2002), included over 40,000 male and female participants. All of these empirical investigations were further focused on variations of one original question, set by Locke (1968): "Does goal setting affect one's performance on a task?" (Latham & Locke, 2007, p. 290).

According to Holahan (1988), "The ability to establish and maintain appropriate goals and commitments appears to be integral to development throughout adulthood" (p. 286). Humans have the ability and fortitude to actively regulate their lives through purposeful thought (Bandura, 1997; Locke & Latham, 2002). Goals affect performance through four mechanisms, by (a) both cognitively and behaviorally directing attention and effort toward goal-relevant activities and away from goal-irrelevant activities, (b) energizing, with high goals leading to greater effort than low goals, (c) increasing persistence, with demanding goals prolonging effort, and (d) affecting action indirectly by leading to the arousal, discovery, and utilization of task-relevant knowledge and strategies (Locke & Latham, 2002; Locke et al., 1981; Smith, Locke, & Barry, 1990).

Emmons and Diener (1986) investigated the relationship between affect and personal situational goal setting (i.e., setting specific goals within a number of recently experienced brief situations) in undergraduate students. They hypothesized and found that goal attainment was strongly correlated with positive affect. Furthermore, they found that the lack of goal attainment was correlated with negative affect (though to a lesser extent). They also discovered, however, that the mere *having* of self-rated "important" goals was as strongly correlated with positive affect as actually attaining those goals. Indeed, it has even been suggested that there is a form of happiness, labeled "pregoal attainment positive affect," that arises as an individual anticipates a future positive

outcome (Davidson, 1994, 1998).

When personal goals are written out, other gains are achieved. King and Miner (2000) proposed that any writing that might be thought to improve self-regulation should lead to health benefits. According to Bandura (1991), "Self-regulatory systems . . . provide the very basis for purposeful action" (p. 248), mediating divergent influences and allowing individuals control over their own thoughts, feelings, incentives, and actions. The self-regulatory processes involved in establishing, planning, striving, and deciding on goals should help to monitor emotions and internal conflict (Austin & Vancouver, 1996).

King (2001) explored the physical and mental health benefits of narrating life goals and ideals, as opposed to past traumatic experiences--the latter being a common topic for many expressive writing researchers. Participants engaged in a writing task in which they were asked either to write about their best possible self or their plans for the day, for 20 minutes a day over 4 consecutive days. Three weeks later, those who wrote about their ideal selves scored significantly higher on measures of subjective psychological well-being (personal happiness and life satisfaction) than those who described short-term plans (control condition). Furthermore, participant health records were obtained and analyzed for all participants, and although the two groups did not differ in average health-care use prior to the experiment, in the 5 months following the writing manipulation, individuals who wrote about their ideal future visited a health center for medical reasons significantly less often than those in the control condition.

In a study related to the effects of written goals on specific types of psychological well-being, Stein, Folkman, Trabasso, and Richards (1997) found that the creation of

explicated goals was predictive of adaptive coping for a population of caregivers who had lost their partners to AIDS. In another investigation of the relationship between goals and mental health, Elovainio and Kivimäki (1996) examined the moderating effects of goal clarity on a population of Finnish nurses ($N = 433$). The degree to which job- and organization-specific goals were clearly stated and well comprehended by the nursing staff moderated the amount of stress that each nurse experienced individually.

In addition to physical and mental health benefits, cognitive benefits as a result of explicitly narrating long-term personal goals seem likely, given the steps involved in laying out one's ideal future. Creating a narrative is a highly intricate endeavor that integrates numerous cognitive processes, for example, cause-and-effect reasoning, theory of mind, language, and spatial reasoning (Sugiyama, 2001). Klein and Boals (2001) demonstrated in two studies that university students who completed an expressive writing task (e.g., thoughts and feelings about coming to university) displayed significant increases in working memory, a fundamental component of cognition. Working memory increases were also associated with higher grade-point averages earned over the following two semesters.

It is probable that some of the benefits of goal setting are similar to those observed in expressive writing studies--the process of setting goals and organizing plans likely minimizes intrusive and avoidant thinking. Such invasive thoughts often characterize stress, and can lead to impairments in cognitive functioning, for example in diminished memory, attention, and planning abilities. These types of impairments can, in turn, contribute to inefficient study habits, disorganization, and mediocre academic performance, that is, academic underachievement. When these intrusive thoughts decline,

cognitive resources (such as working memory) are freed up. Furthermore, when more cognitive resources are available, one is likely to be more successful in endeavors requiring mental power, for example, challenging school assignments, creative projects, and the establishment of more demanding goals.

In theory, personality traits should also impact both the way in which people set and go about achieving their goals, and at the same time be affected themselves when an intervention such as intensive personal goal setting is used to minimize the type of intrusive and avoidant thinking discussed above. Chamorro-Premuzic and Furnham (2003) suggested that both personality and intelligence incorporate important individual differences that can influence performance, with intelligence directly impacting one's ability to do certain things, and personality affecting how one will complete a task. Much of the current literature on personality focuses on the Big Five model, which breaks down personality across five broad dimensions: Neuroticism (reverse Emotional Stability), Extraversion, Openness, Agreeableness, and Conscientiousness (Digman, 1990; Goldberg, 1992; John & Srivastava, 1999). There is some disagreement about defining these traits (mostly with regard to the names and specific content), however, there are many qualities that the broad dimensions are generally agreed to represent (Barrick, Mount, & Judge, 2001). Extraversion generally includes aspects of dominance, positive emotionality, drive, sensation seeking, and sociability. Agreeableness is associated with trustfulness, cooperation, compliance, and empathy. Conscientiousness is comprised of traits such as self-discipline, planfulness, and organization. Openness is linked with intelligence, creative achievement, curiosity, and broad-mindedness. Although these traits are considered to be relatively stable across an individual's lifespan (Costa & McCrae,

1997), it is theoretically possible that changes might occur within certain trait dimensions if longitudinal changes are occurring simultaneously across mood, cognition, and achievement as a result of specific intensive interventions such as those described above.

Among the Big Five, the trait of Conscientiousness has most consistently been linked with academic performance (Goff & Ackerman, 1992; Gray & Watson, 2002; Higgins, Peterson, Pihl, & Lee, 2007; Rothstein, Paunonen, Rush, & King, 1994). Higgins et al. (2007) suggested that Conscientiousness might reflect a motivational tendency to be organized, responsible, thorough, efficient, and reliable. If an external force such as a goal-setting intervention were applied to an individual, it might impact aspects of self-regulation in ways that directly affect one's motivational tendencies. Through this process, one's level of Conscientiousness might also measurably improve.

It is possible that the other personality traits might change in similar ways. For instance, if one's academic performance began to improve, and this had a domino effect on other areas in one's life, one might start to feel more agreeable (or vice versa). In the same sense, if an intervention such as goal setting had a positive effect on affect and cognition, one's ability to self-regulate might improved. This might be evidenced by Emotional Stability scores. There is not much of a large literature on the ability of writing interventions or cognitive exercises to change personality; therefore, hypotheses in this regard would be largely exploratory.

Conditions Related to Successful Goal Setting

Structure. Koestner, Lekes, Powers, and Chicoine (2002) summarized the reasons why not all goals are good goals, and why simply making a list of goals is not especially beneficial. They concluded that one of the most important components of

successful goal setting involves structure. Oftentimes, people set too many goals at once, or they establish goals that create internal conflicts, for example, a smoker who wishes to quit but also hopes to avoid the headaches and cravings that come with smoking cessation (Baumeister & Heatherton 1996; Koestner et al., 2002). With regard to goal-difficulty levels, a positive linear relationship exists between the difficulty (or "height") of the goal and the effort and performance invested in achieving that goal (Locke & Latham, 2002). Goal performance plateaus or worsens when goal commitment declines or actual ability levels reach their peak (cf. Locke & Latham, 2002), but in general, goals must be challenging enough to inspire the quest for their attainment.

Furthermore, when the difficulty of a goal is held constant, goal specificity (the level of clarity and detail given to a goal) reduces ambiguity about expected outcomes and can reduce variation in performance levels (Locke, Chah, Harrison, & Lustgarten, 1989). With regard to what level of proximity to accord one's goals, Latham and Seijts (1999) followed Bandura's (1986) lead on the topic, by suggesting that setting close-at-hand goals "reduce[s] the risk of self-demoralization that can occur when current accomplishments are gauged against a distal goal" (p. 422). They noted that when large or complex future goals are set, smaller goals (or "subgoals" that are instrumental to the achievement of the larger goal) are often needed to provide the aspirer with clear benchmarks of progress (i.e., feedback). Latham and Seijts (1999) and others (e.g., Bandura & Simon, 1977; Morgan, 1985; Stock & Cervone, 1990) demonstrated that setting and meeting subgoals optimized performance in the achievement of more complex goals.

In sum, then, the goals that are established must be specific (Locke & Latham,

2002; Locke et al., 1981), attainable (Brunstein, 1993; Schunk, 1991), optimally challenging, and relatively close at hand (cf. Koestner et al., 2002).

Motivation and commitment. Furthermore, when people settle on goals, they should have positive outcome expectations regarding their ability to actually achieve these goals, or they are unlikely to be highly motivated to follow through with goal-relevant behavior (Bandura, 1977; Perrone, Civiletto, Webb, & Fitch, 2004; Schunk, 1991). Even the perception of an external obstacle, for example, a poor emotional support system, can hinder the conversion of goals into action (Lent, Brown, & Hackett, 2000). Goals that are too vague, difficult, or distal are unlikely to serve as effective guides for behavior (Austin & Vancouver, 1996; Koestner et al., 2002). Also, when children set inappropriate goals, it can put their developing self-esteem at risk. Goals that are set too high, or too low, or in terms that are too vague (e.g., to be "nice"), might lead the child to think of himself or herself as a failure (Webb, Meckstroth, & Tolan, 1982).

In addition, people do not always think through why they want to reach certain goals. The motivation behind a goal directly affects both the regulation of goal pursuit and the ultimate success of goal attainment (Koestner et al., 2002; Ryan, Sheldon, Kasser, & Deci, 1996). In fact, the very process of representing future consequences of a goal might provide a cognitively based source of motivation (Bandura, 1977; Schunk, 1991). According to Gollwitzer (1999), "Forming good intentions or setting goals is understood as committing oneself to reaching desired outcomes or to performing desired behaviors" (p. 493). It is almost as if the act of establishing a goal sets forth a binding agreement with one's self.

Implementation. People often fail to develop specific implementation strategies

for goal attainment. Without time frames and alternate game plans for persistence when distractions and obstacles arise, even the best goals can fall apart (Gollwitzer, 1999). Goal progress is optimized when goals are specific, personally motivating, in line with one's values, and bolstered by detailed implementation plans (Gollwitzer, 1999; Koestner et al., 2002; Locke et al., 1981). Latham and colleagues noted that although it is just beginning, the study of implementation intentions and subconscious goals is an especially exciting and potentially rich area of future goal-setting research (Latham & Locke, 2007; Latham & Pinder, 2005).

Personalization and feedback. A 2001 study by Sheldon and Houser-Marko demonstrated that when an individual progresses toward goal attainment, well-being is enhanced. Progress is monitored through feedback mechanisms (Locke & Latham, 2006) that let the individual know when gains are made. Setting proximal subgoals is one way of guaranteeing frequent feedback when a complex, distal goal is the ultimate quest (Latham & Seijts, 1999). Locke & Latham (2002) noted that in order for goals to work, people need to receive some sort of progress report (i.e., summary feedback) with regard to their goals along the way. Without this, it would be nearly impossible for individuals to hone their performance strategies, or to adjust their efforts in order to match the requirements of the goals that they have set. Furthermore, feedback affects mood, and ultimately, goal success. Brunstein (1993) provided preliminary evidence that even *perceived* progress in goal achievement can act as a catalyst for increased feelings of subjective well-being. This enhanced sense of well-being promotes the setting of more self-concordant goals, which are linked to greater goal progress than externally defined goals (Diener, 1984; Koestner et al., 2002). Levels of perceived self-efficacy are also

likely to increase as progress is made and one's sense of well-being rises (cf. Latham & Seijts, 1999). According to Bandura (1977), "Having accomplished a given level of performance, individuals often are no longer satisfied with it and make further self-reward contingent on higher attainments" (p. 193). In other words, goals beget goals. Furthermore, if participating in goal setting improves self-efficacy, then individuals are not only encouraged to set higher goals, but they are also likely to have higher expectations of success in reaching their goals (Karakowsky & Mann, 2008).

Neuropsychological functioning. Another less often considered, but fundamental contributor to goal setting involves specific neuropsychological functioning. Recent discoveries in neuropsychology provide a direct link between goal setting and the brain. Miller and Cohen (2001) noted that one of the most basic mysteries of neuroscience is how "coordinated, purposeful behavior arises from the distributed activity of billions of neurons in the brain" (p. 167). The prefrontal lobes reach their phylogenetic and ontogenetic peak in adult humans, where they occupy between 30% and 40% of the neocortical area (Fuster, 2002; Kane & Engle, 2002). Although historically there has existed extensive speculation regarding the importance of the prefrontal cortex for human cognition (Fuster, 1997, as cited in Higgins et al., 2007), and many even thought that this part of the brain was dispensable (e.g., frontal lobotomies), the evolutionary and physical prominence of the lobes has led many theorists to assign them the highest and most abstract of human cognitive reasoning capabilities (Fuster, 2002; Higgins et al., 2007; Kane & Engle, 2002). Miller and Cohen (2001) outlined a comprehensive theory of prefrontal cortex function, and concluded that the prefrontal cortex, in particular, maintains the representation of goals and one's means for achieving them.

The three subdivisions of the primate prefrontal cortex that have been consistently distinguished include the dorsolateral prefrontal cortex, the ventromedial prefrontal cortex, and the orbitofrontal cortex. The lateral prefrontal cortex's most general executive function is the temporal organization of goal-directed actions in the areas of behavior, reasoning, and language (Kalbfleisch, 2004). The dorsolateral sector of the prefrontal cortex has long been considered an important part of the circuit underlying working memory and the representation of mental activity for stimuli and events not physically present (Goldman-Rakic, 1987; Kane & Engle, 2002). This kind of mental activity is key for operations that require the anticipation of possible future outcomes, such as planning (Davidson, 2000). In fact, neuropsychological studies have shown that when certain parts of the prefrontal cortex are damaged, so is an individual's capacity to anticipate future emotional outcomes--this results in an inability to guide behavior and make adaptive decisions (Davidson, 2004). Individuals with prefrontal damage frequently lose the ability to perform complex, goal-directed actions (Higgins et al., 2007). On the other hand, when a healthy person's behavior meets with success, reinforcement signals augment the corresponding pattern of activity by strengthening connections between the prefrontal cortex neurons activated by that behavior and other neurons whose activity represents the situation in which the behavior was useful, establishing an association between these circumstances and the prefrontal pattern that supports the correct behavior (Huettel, Misiurek, Jurkowski, & McCarthy, 2004).

There is important evidence that cognitive processes play a key role in the attainment and maintenance of new behavior patterns; even fleeting experiences are coded and retained symbolically in memory representation (Bandura, 1977; Gollwitzer,

1999). In a situation in which the availability of an immediate reward does not fit with the overall goals of a person, the prefrontal cortex would be required to produce a bias signal to other brain regions that guide behavior toward the attainment of a more adaptive goal, that is, the delay of gratification (Davidson, 2003; Miller & Cohen, 2001). When one purposefully decides to pursue some goal, and makes anticipatory decisions about how one will behave in a goal-relevant situation, goal-directed behaviors can be immediately activated upon confrontation with a goal-relevant situation, with little to no conscious intent required (Bargh & Ferguson 2000; Gollwitzer, 1999; Latham & Pinder, 2005). Locke and Latham (2006) theorized that "a goal, once accepted and understood, remains in the periphery of consciousness as a reference point for guiding and giving meaning to subsequent mental and physical actions" (p. 267).

Even frontal lobe patients with impaired conscious behavior control benefit from implementation intentions, which suggests that the effect of these intentions (e.g., action initiation) somehow becomes automatic (Gollwitzer, 1999). And the links between goal setting and the brain do not stop here. On the basis of a large body of human and animal studies, Davidson, Pizzagalli, Nitschke, and Kalin (2003) proposed that greater left-sided dorsolateral EEG activity might be associated with approach-related, goal-directed action planning. Hypoactivation in left-sided prefrontal cortex circuits has been linked to depression, and it has been suggested that depressed individuals with left-sided prefrontal cortex hypoactivation might be deficient in the instantiation of goal-directed behavior (Davidson, 2003). Such deficits would likely be revealed in situations in which decision-making is ambiguous and the maintenance of goal-directed behavior is required in the face of potentially strong alternative responses. It is clear, then, that many aspects of goal

setting and goal follow-through are intimately intertwined with the prefrontal cortex and associated higher-order cognitive processes.

The prefrontal cortex is therefore of special importance in discussions of cognitive ability and achievement. It not only facilitates sophisticated cognitive abilities such as fluid intelligence, decision-making, problem-framing, planning, and problem-solving, but also plays a prominent role in one's reactions to novel situations, ability to delay gratification and anticipate consequences to actions, and general reasoning ability (Higgins et al., 2007; Kalbfleisch, 2004). All of these forms of cognitive activity are associated, in principle, with academic success.

The aforementioned studies highlight growing evidence for the efficaciousness of personal goal setting in improving mood, subjective well-being, and physical health in several populations. Furthermore, although many of the interventions aimed at academic underachievement involve the establishment of goals, few if any researchers have specifically addressed the importance of the personal goal-setting process in impacting the positive results of these interventions. There is still a large amount of work to be done in the empirical exploration of the effects of delineating specific, proximal, and attainable personal goals on cognitive processes (e.g., working memory, attention) and achievement in the general population.

Objectives and Hypotheses

Keeping the above review of the literature in mind, it is conceivable that a formalized goal-setting program for new students as well as students experiencing academic difficulty might have positive effects not only on cognitive functioning, mood, and personality, but also on academic achievement.

Hypotheses.

1. Primary Research Goals
    a. A one-time intensive goal-setting intervention will cause Semester II grades in the Goal Group to be significantly higher than grades in the Control Group.
    b. There will be group differences in self-reported change outcomes (*Concluding Questionnaire*). It is expected that overall, students in the Goal Group will feel better emotionally as a result of their intervention (e.g., less sad, less anxious, more satisfied with life, less stressed), when compared to students in the Control Group.
2. Secondary Research Goals
    a. It is expected that although most people will probably feel better as a result of being a part of an intervention study in general, personal goal setting will differentially improve different aspects of mood (i.e., depression, anxiety, perceived stress, satisfaction with life) as measured by self-report questionnaires across the duration of the study.
    b. It is expected that the personal goal-setting program will have an effect on aspects of cognition related to dorsolateral prefrontal cortex cognitive ability (D-PFCA). It is expected that students in the Goal Group will differentially improve in aspects of working memory when compared to students in the Control Group.
    c. It is expected that the intensive personal goal-setting program will have a differential effect on aspects of personality (i.e., Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness). It is specifically

expected that students in the Goal Group will experience greater improvements in levels of Conscientiousness and Emotional Stability than the Control Group over time.

d. In line with expected changes in mood, personality, and academic performance (above), the goal-setting program will have a differential effect on student retention and ability to maintain course credits.

e. It is expected that the type of "top goal" chosen (i.e., top goal in a ranked list of goals) will not be related to the grade improvement observed within the Goal Group. It is expected that the process of goal setting will affect academic achievement, and not be related to whether or not a student chooses an academic goal as his or her top goal versus a personal goal.

CHAPTER 2

Methods and Materials

Participants

Recruitment

Recruitment procedures, aimed at self-nominated "academically struggling" students with McGill University cumulative Grade Point Averages (cGPAs) of below 3.0[3] (3.0 = B), included a series of posters and flyers posted on nearly every available bulletin board in every building on campus, with headlines ranging from "Are you experiencing academic difficulty?" to "Are you getting poor grades?" and "You're smart. You know it. But do your grades show it?" The investigator also spoke about the study at nine of the largest undergraduate classes at McGill, left flyers about the study at the front of these classrooms, posted study ads on the McGill Classifieds website (www.mcgill.ca/classified), and provided information and flyers about the study to Faculty Student Affairs Offices, all undergraduate advisors for the Faculties of Arts, Science, and Education, undergraduate Student Societies, and all Student Services offices. Email recruitment was additionally aimed at students who were placed in probationary standing at McGill. The Associate Deans of Science, Arts, and Education sent out two letters about the study (July 2005, October 2005) to all undergraduates with a designated probationary standing (GPA < 2.0). The letters indicated that the study was designed to investigate the effects of two in-development brief interventions to help

[3] McGill University students entering in Fall 2005 ranked #1 overall, as well as with regard to highest "average entering grades" and "student awards" among Canada's 15 Medical-Doctoral Universities in *Maclean's* annual evaluation of Canadian universities (Dwyer, 2006, p. 74). Therefore, it was expected that cGPAs of 2.99 or lower would be considered problematic for many of these students. The 2007 issue of *Maclean's* rankings, which again ranked McGill #1 with regard to highest entering grades, gave the entering average percentage for McGill students in Fall 2006: 89.2% (Queens University followed close behind at 88.2%; Dwyer, 2007, p. 112).

improve the academic performance of students experiencing academic difficulty; these letters included contact information for the Principal Investigator.

Students interested in participating underwent a brief 10- to 15-minute phone interview with the Principal Investigator in October 2005. The interview was designed to screen potential participants for cGPA criteria and subjective feelings of academic difficulty. Students who confirmed that they were experiencing academic difficulty (and were concerned about it) were included. Those calling for other reasons were not included. All the calls included the same information. Students were told that the study would take place over the course of 4 months, and require an overall time commitment of 10 to 12 hours. It was explained that all but two tasks could be completed online from any computer with Internet access, and that only phone and email contact would be necessary with the Principal Investigator until the last day of the study. On this day, 4 months from the start date, students would be required to come in to complete a brief cognitive test and a feedback questionnaire, sign a release for official transcripts, and get remunerated for their time.

If students expressed interest in the study, they were then told that two possible interventions for students experiencing academic difficulty were being tested to see if they had any effect on academic achievement and related variables. It was clearly stated that the participants would be randomly assigned to a group, and that it was not known whether either intervention would have a positive effect (students were assured that no negative effects were expected).

Students were then told how time required for the study would be divided up into two major sections of time over 4 months, with minor tasks in between. Five to six hours

of task completion would be required before October 25, 2005, followed by emails with questionnaires attached that would be sent for completion every 2 weeks until the end of the study in March. These follow-up emails would each require 1 to 10 minutes of time depending on how many questionnaires were attached. A second section of time (about 4 hours) would be required in February and March to complete a second computer battery of tasks, more questionnaires, and a short standardized test.

If students agreed to participate in the study, they were randomly assigned to a group (every alternate person who agreed to participate was put in the Goal Group), and an email was sent out to them with a username, password, and link to a website (two versions depending on group) which contained the baseline surveys, personality inventory, and neuropsychological inventory, as well as the intervention for their assigned group. Recruitment aimed for at least 50 students in each group, in order to ensure a range of abilities (and course difficulty) and sufficient power for statistical analyses.

Recruited participants initially included 119 students (37 males, 82 females) experiencing self-defined academic difficulty at McGill. Entrance criteria included several components: (a) students must be enrolled at McGill University; (b) students must plan to take at least nine course credits per semester while enrolled in the study (based on the Quebec Government's definition of "full-time" status for funding purposes); and (c) student must be in official academic probationary standing or have a cumulative grade-point average (cGPA) of less than 3.00. First-year (n = 15) and exchange students (n = 1) who did not have cGPA data were included based on their subjective feelings regarding academic difficulty (i.e., they felt that they were struggling) and proof of preliminary

course grades (i.e., average paper, test, and quiz scores of B- or less).

Seventeen students in total dropped out before completing the study. Twelve of these students withdrew before completing Stage I of the assigned intervention (i.e., they completed some or all of the baseline testing, but did not go through either the control or goal intervention program). Therefore, they were not considered to reflect on either of the provided interventions. Three students from the Goal Group formally dropped out after completing Stage I of the study (including all baseline testing and the intervention, but no follow-up testing): two from serious illness; one without providing a reason. One student from the Control Group formally dropped out after completing Stage I, after withdrawing from McGill University before the criterion semester (Winter 2006) began. Of the 102 students who remained in the study until the end, one participant from the Control Group was excluded after it was discovered that she had not met the initial inclusion criterion for cGPA; an official transcript obtained at the end of the study indicated that this student's cGPA before Fall 2005 was greater than a 3.0.

Therefore, in the end, 101 students were included in all statistical analyses except those that compared pre- and post-intervention grade-point averages (GPAs). First-year (n = 15) and exchange students (n = 1) were not included in these analyses, as they did not have pre-intervention grade data. Instead, the remaining 85 students were included. Demographic information for both the overall sample (N = 101) and the sub-sample (N = 85) follow below. All participants provided their informed consent and were treated in accordance with the ethical principles and code of conduct of the American Psychological Association, Canadian Tri-Council, and McGill University (See Appendix A for a copy of the research ethics approval certificate from McGill University).

Demographics of the Overall Student Sample (N = 101)

Within the overall participant sample, students ranged in age from 17 to 27 years (M = 20.28 years, SD = 1.62 years). In order to check whether the distribution of males and females in this sample differed from the overall sex distribution within the University population, the number of females and males observed in the sample was compared with expected values. According to a McGill University's Enrolment Report (McGill University, 2005), a total of 22,787 undergraduate students (all degrees) were enrolled in Fall 2005, with a distribution of 60.1% females and 39.9% males. Therefore, in a sample of 101 students, the expected sex distribution would include 60 females and 41 males. A simple Chi-square test based on the observed (actual) numbers of 69 females (68.3%) and 32 males (31.7%) was not significantly different from the University distribution, $\chi^2(1, N = 101) = 2.65, p = .10$. With regard to ethnicity within the overall sample (N = 101), please see Table 1 for frequency counts and percentages across categories.

Table 1

Ethnicity of Individuals in Overall Sample (N = 101)

Ethnicity	*n*	*Percent (%) of Sample*
African Origin/Black (Non Hispanic)	3	3.0
European Origin/White/Caucasian (Non Hispanic)	56	55.4
Asian/Pacific Islander	15	14.9
Hispanic/Latino	7	6.9
Native American or Canadian/Aboriginal/Alaska Native/First Nations	3	3.0
Other*	17	16.8

*Within the "Other" Category, individuals filled in the following descriptions: "Parents from Trinidad," "Spanish/Mayan," "Italian/Palestinian," "Arab," "Indian," "Mixed: Asian and Latino/Hispanic," "Half White/Half Hispanic," "Asian and French Canadian," "European/Middle Eastern/Native American," "Sri Lankan," "Persian" (2 students used this descriptor), "European Origin/Hispanic," "Mixed: Irish/Hispanic," "Mixed: Indian/White," "South Asian," "Mixed ethnicity: African, Caribbean, European, Hispanic."

In terms of socioeconomic status, as estimated by student reports of their parents or guardians' total income, participants were distributed over a wide range. See Table 2 for frequency counts and percentages across 13 potential categories.

Table 2

Socioeconomic Distribution of Individuals in Overall Sample (N = 101)

Parents' Income: "What is your best estimate of your parent(s)' or guardian(s)' total annual income?"	*n*	*Percent (%) of Sample*
$10,000 to 14,999	2	2.0
$15,000 to 19,999	3	3.0
$20,000 to 24,999	5	5.0
$25,000 to 29,999	2	2.0
$30,000 to 39,999	9	8.9
$40,000 to 49,999	3	3.0
$50,000 to 59,999	6	5.9
$60,000 to 74,999	15	14.9
$75,000 to 99,999	19	18.8
$100,000 to 149,999	17	16.8
$150,000 to 199,999	9	8.9
$200,000 to 249,999	3	3.0
$250,000 or more	8	7.9

Demographics of Reduced Student Sample (N = 85)

Within the participant sample used for grade and retention rate analyses ($N = 85$), students ranged in age from 18 years to 23 years ($M = 20.49$ years, $SD = 1.34$ years). Again, in order to check whether the distribution of males and females in this sample differed from the overall sex distribution within the University population, the numbers

of females and males observed in the sample were compared with expected values (39.9% males and 60.1% females; McGill University, 2005). In a sample of 85 students, the expected sex distribution would include 51 females and 34 males. A simple Chi-square test based on the observed values of 60 females (70.6%) and 25 males (29.4%) was significantly different from the University distribution, $\chi^2(1, N = 85) = 3.97, p = .046$, although it is not expected that this small difference would have a large effect on overall GPA results. With regard to ethnicity, please see Table 3 for frequency counts and percentages across categories.

Table 3

Ethnicity of Individuals in GPA Analysis Sub-Sample (N = 85)

Ethnicity	*n*	*Percent (%) of Sample*
African Origin/Black (Non Hispanic)	2	2.4
European Origin/White/Caucasian (Non Hispanic)	48	56.5
Asian/Pacific Islander	14	16.5
Hispanic/Latino	4	4.7
Native American or Canadian/Aboriginal/Alaska Native/First Nations	3	3.5
Other*	14	16.5

*Within the "Other" Category, individuals filled in the following descriptions: "Parents from Trinidad," "Spanish/Mayan," "Italian/Palestinian," "Arab," "Indian," "Mixed: Asian and Latino/Hispanic," "Half White/Half Hispanic," "Asian and French Canadian," "European/Middle Eastern/Native American," "Sri Lankan," "European Origin/Hispanic," "Mixed: Irish/Hispanic," "Mixed: Indian/White," and "South Asian."

In terms of socioeconomic status, as estimated by student reports of their parents or

guardians' total income, participants in the reduced sample were again distributed over a wide range. See Table 4 for frequency counts and percentages across 13 potential categories.

Table 4

Socioeconomic Distribution of Individuals in Sub-Sample (N = 85)

Parents' Income: "What is your best estimate of your parents' or guardians' total annual income?"	*n*	*Percent (%) of Sample*
$10,000 to 14,999	2	2.4
$15,000 to 19,999	2	2.4
$20,000 to 24,999	3	3.5
$25,000 to 29,999	2	2.4
$30,000 to 39,999	9	10.6
$40,000 to 49,999	1	1.2
$50,000 to 59,999	5	5.9
$60,000 to 74,999	14	16.5
$75,000 to 99,999	15	17.6
$100,000 to 149,999	14	16.5
$150,000 to 199,999	9	10.6
$200,000 to 249,999	3	3.5
$250,000 or more	6	7.1

Design

This study was exploratory in nature, but at the same time it followed a classic clinical-treatment, experimental-research design with both between-subjects and within-subjects variables[4]. One of two possible brief single-episode interventions (one goal-setting treatment, one control "treatment") lasting approximately 2.5 hours were used with self-nominated academically struggling student volunteers in a comparative design model to observe whether changes might occur in grades, retention of full-time course loads, executive functioning, personality, and mood as a result.

Participants were randomly assigned to one of the intervention groups, with every other eligible person who contacted the Primary Investigator placed in a different group. Baseline data (pre-intervention) in all domains were compared with post-intervention data, which were collected at regular intervals over 4 months following the intervention. The primary independent variable was the intervention group in which students were placed. Primary dependent variables included academic achievement, as measured by before-and-after term GPAs and retention of a full-time course load; mood, as measured by self-report surveys of depression, anxiety, mood, and satisfaction with life, as well as a feedback questionnaire (*Concluding Questionnaire*) created by the author (two versions in which the wording was changed in order to reflect the specific intervention referred to); personality, as measured by a self-report battery; and cognitive functioning, as measured by a battery of computer tasks designed to tap dorsolateral prefrontal cortex functioning, as well as a *Brief Cognitive Measure* containing SAT-like items.

[4] More data were collected than are presented here, in order to compare data with other studies as part of a larger research program, and to answer some questions that were not directly related to the dissertation topic or goal-setting. The methods and instruments used in these extraneous analyses, as well as the resulting data, are not relevant to the present questions and therefore not included in the current manuscript.

Demographic data and other information were also collected about variables that might be correlated with observed qualities, test results, and academic achievement.

Measures and Materials (Instruments)

Academic Achievement

Grades. Grades were measured by before-and-after term GPA. Official university transcripts were collected for all participants ($N = 101$), although pre-intervention GPAs were only available for continuing students ($n = 85$). GPA was measured on the following scale, with A = 4.0, A- = 3.7, B+ = 3.3, B = 3.0, B- = 2.7, C+ = 2.3, C = 2.0, D = 1.0, and F = 0.0. "Pass" grades were not entered into GPA calculations. Furthermore, "J" grades, defined as "Absent," which are given at the professor's discretion when a student enrolls in a course but does not attend class or complete assignments (but does not withdraw from the course), are considered the equivalent of "F" (0.0 points) by the University and were treated as such in this study.

For GPA1 (pre-intervention GPA), term GPA was used for the semester immediately prior to the intervention in which at least nine course credits were attempted. For GPA2 (post-intervention GPA), term GPAs for all students were taken from Winter 2006, the semester immediately following the intervention. The intervention was conducted in the middle of Fall 2005; therefore, for the majority of students (80 out of the 85 involved in GPA analyses), GPA1 was represented by the term GPA for Winter 2005. For five participants, however, a previous semester was used to represent GPA1, as these students took fewer than nine credits during Winter 2005 (three of the five students took no credits at all). Two of these students were in the Control Group; three were in the Goal Group. For four of these students, GPA from Fall 2004 was used for GPA1, because this

was the semester most immediate to Fall 2005 with at least nine course credits. For the remaining student, Winter 2004 was used for GPA1, as it was the semester most immediately prior to Fall 2005 with grade data.

When entering transcript data, "term GPA" represented the term GPA of courses taken in a given semester, regardless of whether or not McGill recognized the courses for degree credit. When "degree credit excluded" credits needed to be entered into the GPA calculation, the Berkeley GPA calculator (UC Berkeley Academic Services, 2007) was used, because the grade-point system in the calculator was equivalent to McGill's. Furthermore, it was learned that as of Winter 2007 (almost 1 year after the conclusion of the study), two students from the Control Group had still not completed the exams for some of their Winter 2006 (Semester 2) courses (i.e., they had "L," or deferred, grades--one student had one "L" and the other student had two "Ls"). Because of the length of time that had passed since the classes were expected to be completed, these grades were considered to be "Fs" for the purposes of this study.

Retention rates. The Goal Group and the Control Group were compared for the number of students whose course load dropped below that of full-time status. A semester course load of nine credits or more is considered "full-time" for government funding purposes in the Province of Quebec (because McGill University's internal definition of a "full-time" semester load is 12 credits, an alternative chi-square analysis using the 12-credit criteria is offered in Appendix B).

Mood

All mood scales were adapted from their original form in the sense that they were computerized and put online on the study website, so that participants could complete

them anywhere that they had Internet access (see Appendices C and D for a reproduction of the main webpage for each group). A number of studies assessing the reliability and effectiveness of online and computer versus and paper-and-pencil survey methodologies have found none or relatively few differences between the two methodologies (Chuah, Drasgow, & Roberts, 2006; Cronk & West, 2002; Knapp & Kirk, 2003; Meyerson & Tryon, 2003).

Depression. Symptoms of depression were measured by the *Zung Self-Rating Depression Scale* (ZSDS; Zung, 1965; Zung, Magruder-Habib, Velez, & Alling, 1990), a 20-item self-report instrument. Participants rate each item in terms of how often they have felt that way during the preceding week ("*none or a little of the time*," "*some of the time*," "*good part of the time*," "*most or all of the time*") and items are scored using a 4-point Likert scale, with 4 representing the most unfavorable response. The sum of the 20 items, after correcting for 10 reverse-scored items, produces a raw score that can be categorized on four levels: I, within normal range, no significant psychopathology (raw score of < 40); II, presence of minimal to mild depression (raw score of 40 to 47); III, presence of moderate to marked depression (raw score of 48 to 55); and IV, presence of severe to extreme depression (raw score of > 55). Scores are not meant to be diagnostic but rather indicate levels of depressive symptoms that may be of clinical significance. Several studies have established the Zung scale as a reliable and valid instrument for measuring depressive symptoms (Biggs, Wylie, & Ziegler, 1978; Dugan et al., 1998; Gabrys & Peters, 1985).

Anxiety. Symptoms of anxiety were measured by the 20-item *Zung Self-Rating Anxiety Scale* (ZSAS; Zung, 1971; Zung et al., 1990). This instrument was devised with

some items worded in a symptomatically positive way, and some items worded in a symptomatically negative way (depending on suitability and usage), so that respondents would be less able to discern a trend in their answers. In addition, an even-number of columns was used to eliminate the possibility of respondents checking middle and extreme columns. In using the scale, respondents are asked to rate each of the 20 items as to how it applied to them within the past week, with a frequency range of "*none or a little of the time*" to "*most or all of the time*"). In scoring the ZSAS, a value of 1, 2, 3, and 4 is assigned to a response depending upon whether the item is worded positively or negatively. The five positively phrased items are reversed-scored, and item scores are summed to create a raw total score, with higher scores representing higher levels of subjective anxiety. The sum of the 20 items, after correcting for 10 reverse-scored items, produces a raw score that can be categorized on four levels to offer a global clinical impression: I, within normal range (raw score of < 36); II, presence of minimal to moderate anxiety (raw score of 36 to 47); III, presence of marked to severe anxiety (raw score of 48 to 59); and IV, presence of extreme anxiety (raw score of > 60). Several studies have found the ZSAS to be a reliable and valid instrument for measuring anxiety symptoms (Bystritsky, Stoessel, & Yager, 1993; Burlingame, Lambert, Reisinger, Neff, & Mosier, 1995; Zung, 1971; Zung et al., 1990).

Stress. Symptoms of stress were measured by a 10-item computerized version of the *Perceived Stress Scale* (PSS; Cohen & Williamson, 1988; Wright et al., 2004), an originally 14-item instrument (Cohen, Kamarck, & Mermelstein, 1983) designed to indicate subjective perceptions of stress in generalized life situations. Both versions of the scale were administered across a probability sample of the United States (2,387 males

and females over the age of 18 years), which allowed for the creation of norms for the scale and evidence for differences in perceived stress across population subgroups. PSS items were designed to tap the degree to which respondents found their lives unpredictable, uncontrollable, and overloading. Participants rate each item on a five-point frequency scale ranging from "*never*" to "*very often*," in terms of how often they have felt that way during the preceding month. PSS scores are obtained by reversing the scores on the seven positive items, and then summing across all 10 items. Higher scores indicate more stress.

The 10-item PSS inventory (Cohen & Williamson, 1988) was created after the original authors factor analyzed the 14-item PSS, using a principal components method with Varimax rotation, and found that 10 items loaded positively on the first factor at .48 or above (with the remaining four items having relatively lower loadings of .17 to .39). These ten items were submitted to the same factor-analysis procedures, and all items loaded positively on the first factor at .42 or above. For both the 14- and 10-item factor analyses, two factors emerged with eigenvalues over 1.0, with the first factor most heavily weighting items that were negatively worded (e.g., been upset, unable to control things, felt nervous), and the second factor reflecting more positively phrased statements (e.g., dealing effectively with hassles, effectively coping, feeling confident). Deletion of the four items from the original scale resulted in an improvement in both the total explained variance (48.9% for both factors in the 10-item scale versus 41.6% for both factors in the 14-item scale) and internal reliability (10-item PSS alpha coefficient = .78 versus 14-item PSS alpha coefficient = .75); therefore, the 10-item version of the scale was recommended by the authors for use in future research.

Test-retest reliability of the 14-item scale was reported by Cohen et al. (1983) in two samples, one with a two-day interval (correlation = .87) and one with a six-week interval (correlation = .55). Both Cohen et al. (1983) and Cohen and Williamson (1988) found that PSS scores were moderately correlated with other measures of appraised stress, as well as to measures of potential sources of stress as assessed by event frequency. Frequency of physical illness and symptoms of physical stress were also positively related to reports of stress measured by the PSS. The PSS was also found to predict outcomes independently of psychological symptoms, demonstrating good discriminant validity.

General life satisfaction. Subjective global life satisfaction was measured by the *Satisfaction With Life Scale* (SWLS; Diener, Emmons, Larsen, & Griffin, 1985; Lucas, Diener, & Suh, 1996). The SWLS, developed as part of a body of research on subjective well-being, taps the cognitive-judgmental aspects of general life satisfaction. The five-item questionnaire takes less than 5 minutes to complete, and each item is scored from 1 to 7 in terms of "*strongly disagree*" to "*strongly agree*." Items are summed for a total score, which can range from 5 (low satisfaction with life) to 35 (high satisfaction with life). With regard to reliability, the five items on the SWLS were originally selected from a pool of 48 based on factor analysis. The instrument's internal consistency is high, with a Cronbach's α of .87. The instrument also appears to have high temporal reliability, with a 2-month test-retest coefficient of .82. The SWLS was originally tested for concurrent validity using two samples of university students (Diener et al., 1985). Scores correlated with nine measures of subjective well-being for both samples. Favorable discriminant validity was also found for the SWLS when it was compared to other measures of

emotional well-being, for example, positive affect, negative affect, optimism, and self-esteem (Lucas et al., 1996).

Concluding Questionnaire

At the end of the study, all students were required to come to McGill to complete a paper-and-pencil version of a final feedback questionnaire (*Concluding Questionnaire*) created by the Principal Investigator (two versions in which the wording was changed only to reflect the specific intervention referred to; please see Appendices E and F for both versions). This questionnaire included 16 brief, scaled feedback item questions asking participants directly about their motivation for completing the study, the seriousness with which they took the intervention and associated tasks, and how they felt as a result of the intervention (or how things had changed for them). Students were told that their answers needed to be as honest as possible in order for the study to be a successful intervention, and that negative feedback was perfectly acceptable. Each question was followed by a line continuum. Instructions were given about how to mark the line continuum on the blackboard. They were asked to make one straight vertical mark through the spot on the continuum that they felt was the most reflective of how they felt. The Principal Investigator put up an example on the blackboard to demonstrate how to mark the items. For the example, students were shown the question, "How tired are you?" with a line drawn below it on the blackboard. On the far left of the continuum was the phrase "Not At All" and, on the far right, "Very." Students were told that they should mark the line directly in the middle if they felt neutral about their response. Items were scored by measuring to the point where the mark was made on the line. Measurements were made in millimeters (possible range: 0 to 96.5 mm).

Personality

A computerized version of a personality inventory, based on a standard model known as the "Big Five" (Goldberg, 1992; McCrae & John, 1992), was completed by participants at two different time points: pre-intervention (baseline) and approximately 4 months following the intervention (follow-up). The Big Five comprise a well-defined model of measurement for assessing personality across five broad trait aspects: Neuroticism (reverse Emotional Stability), Extraversion, Openness, Agreeableness, and Conscientiousness (Digman, 1990; Goldberg, 1992; John & Srivastava, 1999). The personality dimensions measured by this five-factor model seem to have cross-cultural validity (McCrae & Costa, 1997), significant heritability (Loehlin, McCrae, Costa, & John, 1998), and some degree of relative stability across the lifespan (Costa & McCrae, 1997).

Big Five Inventory (BFI; John, Donahue, & Kentle, 1991; John & Srivastava, 1999). For a traditional Likert personality questionnaire, the Big Five personality traits were measured with the BFI, a reliable and widely used measure of the five factors. The BFI contains 44 items spread across the five trait dimensions of Extraversion, Agreeableness, Conscientiousness, Emotional Stability (reverse Neuroticism), and Openness. The BFI uses short phrases based on the trait adjectives known to be classic markers of the Big Five. Therefore it preserves the advantages of adjectival items (briefness and simplicity) while avoiding some of their drawbacks (ambiguous or multiple meanings and obvious desirability). Participants rate the extent to which they can be described by the items on a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*). Sample items include "I see myself as someone who is helpful and unselfish with

others," and "I see myself as someone who is curious about many different things." In North American samples, the alpha reliabilities of the BFI scales typically range from .75 to .90 and average above .80; three-month test-retest reliabilities range from .80 to .90, with a mean of .85. Validity evidence includes considerable convergent and divergent relations with other Big Five measures as well as with peer ratings.

Cognition

Brief Cognitive Measure (BCM). The BCM was designed as a brief scholastic aptitude test, featuring a mix of 28 SAT-like items assessing verbal (critical reading; 18 items) and quantitative (a mix of trigonometry, geometry, and algebra questions; 10 items) ability. Items were chosen nonsystematically from five sections of the free official SAT® practice test (October 2005 version) available from The College Board website (http://www.collegeboard.com)[5]. Selection of items was based on attending to content and providing face validity for the brief measure, finding a mix of easy and difficult questions, and keeping the time needed to complete the measure under one hour (e.g., choosing shorter reading passages with questions attached versus longer passages; omitting a Writing section). Students were told that they were not allowed to use calculators, but just "to do their best." Items were scored either correct or incorrect, and an unweighted total score of correct items was utilized for subsequent analyses. Tests containing such reasonably representative question sets provide a good proxy for measuring general cognitive ability, weighted somewhat towards crystallized intelligence (Carroll, 1993; Jensen, 1998).

[5] Please note that due to SAT® copyright restrictions, the specific items used in the BCM could not be reproduced for this manuscript. Please see http://www.collegeboard.com for item samples.

Dorsolateral Prefrontal Cognitive Ability (D-PFCA)

Dorsolateral prefrontal cognitive ability (D-PFCA) was measured using a computerized battery of seven neuropsychological tasks (*ExamCorp Battery*; Higgins et al., 2007). Battery administration typically requires about 90 minutes. The battery includes conditional associative learning tasks (a spatial conditional associative task, a nonspatial conditional associative task, and a go/no-go task), working memory tasks (a self ordered pointing task, a randomization task, and a recency discrimination task), and a word fluency task. A complete description of the background, references, administrative methods, and scoring for each task (and overall D-PFCA), taken directly from Higgins et al. (2007, pp. 301-302), is provided in Appendix G. Higgins et al. (2007) established the psychometric properties for this battery and analyzed the relationship of D-PFCA to psychometric intelligence as well as academic and job performance. The battery was found to have predictive validity for academic and workplace performance.

Procedure

All tasks aside from the *Brief Cognitive Measure* (BCM) and the *Concluding Questionnaire* were completed over the Internet via the *ExamCorp* website (www.examcorp.com) and online survey software (SelectSurveyASP Advanced 8.1.10; ClassApps, 2004). As noted above, previous research suggests equivalence between online and paper administration of self-report questionnaires (Chuah et al., 2006; Cronk & West, 2002; Knapp & Kirk, 2003; Meyerson & Tryon, 2003). Participants were free to complete the questionnaires from any computer with Internet access (e.g., the library, if they did not have a computer at home). They were told that the study would occur in three stages: Stage I would include the collection of baseline data and the intervention,

Stage II would include a series of follow-up tasks sent out approximately every 2 weeks for 4 months, and Stage III would include the complete repeat of all baseline tasks, as well as a brief pencil-and-paper cognitive measure, a final feedback questionnaire, and permission to access the student's official transcript. Participants were emailed instructions and a username for accessing the questionnaires online, and were required to sign an online informed consent form (see Appendix H) before completing any tasks. The study and tasks were also described verbally to potential participants during the initial phone interview, with an opportunity to ask questions.

Stage I

All participants started by completing a demographic questionnaire (Appendix I) and baseline measures of mood (symptoms of depression, anxiety, stress, and overall well-being), cognitive functioning, and personality. Mood was measured by the *Zung Self-Rating Depression Scale* (ZSDS; Zung, 1965; Zung et al., 1990), the *Zung Self-Rating Anxiety Scale* (ZSAS; Zung, 1971, Zung et al., 1990), the *Satisfaction with Life Scale* (Diener et al., 1985; Lucas et al., 1996), and the *Perceived Stress Scale* (Cohen & Williamson, 1988; Wright et al., 2004); cognitive performance was measured by the *ExamCorp Battery* (Higgins et al., 2007); and personality was measured by the *Big Five Inventory* (BFI; John et al., 1991).

The initial webpage presented the participants with links to all of the questionnaires that needed to be completed for the study. The tasks on this page were divided up into three "sessions" with estimated time requirements. It was recommended that participants use these "sessions" as a guideline to completion. Students were instructed that they must complete the tasks one at a time, in order, but that they could

take a break between sessions, or even complete the sessions on different days. Session I (estimated to take 1.5 hours) included the Informed Consent, Demographic Questionnaire, BFI, SWLS, PSS, ZSDS, and ZSAS. Session II included the *ExamCorp Battery* (estimated to take between 1 and 2 hours), and Session III included the intervention (estimated to take 2.5 hours). After completing each questionnaire, they were automatically returned to the initial index page where they could continue to the next task.

The only difference between the two possible web pages that students were directed to was found in Session III (the intervention). Students were not informed that this session comprised the intervention, however. Group 1 (the Goal Group) participated in a web-based intensive goal-setting program (see Appendix J). The goal-setting instrument, originally developed by Peterson and Mar (2004) for clinical use with psychotherapy patients (cf. Mar & Peterson, 2004 for background on instrument development), was adapted by the Principal Investigator (with Peterson's permission) for use with a university student population (Appendix J includes a full copy of the modified program). The program, which had eight steps, led the participant through a series of expressive writing tasks that included delineating specific personal goals for the future and planning strategies for achieving these goals (Peterson & Mar, 2004). Students were told that writing seriously and thoughtfully about their personal goals could help them to organize and simplify their future, as well as decrease anxiety, depression, and fear. They were told that it would make their lives in the present more meaningful and satisfying, and that they would be more likely to attain their desired goals once they had written them down. They were instructed, both in the original phone call and in the program

itself, that it was imperative that they should allow themselves at least 2.5 uninterrupted hours to complete the program, and that they would need to complete it in one sitting. They were told that a short break or two of 5 to 10 minutes was acceptable, if they needed to use the washroom, eat à snack, or stretch their legs, but that they should not do anything that might be too distracting (e.g., go outside for a walk, take a nap, interact with other people) during these breaks, and they should stay logged into the program with the computer screen on. Finally, it was emphasized that they should complete the task when they were feeling alert and relatively unrushed. They were told that they would be asked to write down their private thoughts and feelings, and that, at times, they would be asked to write non-stop, without regard for grammar or spelling. At other times, they might be asked to revise what they had written. They were told that the writing program was meant to benefit them personally, that everything they wrote would be strictly confidential, and that they would receive a copy of what they had written shortly after completing the program. They were advised to have a clock nearby in order to stay on task when different questions asked them to free-write for specified amounts of time (e.g., 1 to 2 minutes, 10 minutes).

Students not assigned to the goal-setting program (Control Group) underwent a web-based comparative Control Group intervention that was matched with the Goal Group Intervention primarily with regard to estimated completion time and the inclusion of free writing tasks. In this intervention, students completed three different tasks (see Appendix K for copies of first two tasks). In the first task, students completed six questionnaires designed to measure "positive psychology" traits (all found at http://www.ppc.sas.upenn.edu/ ppquestionnaires.htm). These included the *Personal*

Growth Initiative Scale (PGIS; Robitschek, 1998), the *Mindful Attention Awareness Scale* (MAAS; Brown & Ryan, 2003), the *Meaning in Life Questionnaire* (MLQ; Steger, Frazier, Oishi, & Kaler, 2006), the *Inspiration Scale* (IS; Thrash & Elliot, 2003), the *Gratitude Questionnaire - 6* (GQ-6; McCullough, Emmons, & Tsang, 2002), and the *Curiosity and Exploration Inventory* (CEI; Kashdan, Rose, & Fincham, 2004). These questionnaires were not scored, and results were not given to the students. They were included to get control participants thinking about different personal characteristics (but without a focus or resolution), which added an aspect of face validity to the intervention. In the second task (Writing Task; see Appendix K), students were asked to think through and write about some positive experiences from their pasts. They were instructed to write down their thoughts and feelings about these experiences, and to write non-stop, without regard for grammar or spelling. They were given a choice of answering three out of six questions that focused on neutral topics (e.g., a favorite extra-curricular activity or hobby), and were asked to spend 10 to 15 minutes on each response (a clock was recommended to help them keep track of time). They were asked to answer each question "in a descriptive and objective way, writing seriously and thoughtfully, with minimum expression of [their] emotions." Furthermore, as with the Goal Group intervention, instructions in the Control Group intervention assured respondents of the confidentiality of their answers, informed them that this task was meant to benefit them personally, and indicated to them that they would receive a copy of their responses at the end of the Session. This second task was included to match the "free writing" aspect of the Goal Group Intervention. Finally, in the third task, students completed a widely used career-interest measure, the *Newly Revised Strong Interest Inventory® Assessment* (Strong

Interest Inventory®, 2004), and after completion, were sent an automatically generated and individualized interpretive report of their results (*Strong Interest Inventory® Profile and Interpretive Report* generated by the publisher's website). This third task was included to provide the intervention with additional face validity.

Stage II

Approximately every 2 weeks for the 4 months following the primary intervention, students in both groups were sent a "follow up" email with six brief questions (see Appendices L and M for a copy of follow-up questionnaires--two versions). The only difference between the emails concerned the intervention to which the questionnaire referred. Students in the Goal Group were asked if, in the previous week, they had read through their goal report, thought about the goals they had set, thought about their plans for reaching those goals, or made progress towards any of their goals. Students in the Control Group were asked if, in the previous week, they had read through either their *Strong Interest Inventory®* report or their Writing Task results (copy of their writing responses) or thought about either of the two. At weeks 2, 6, 10, and 14, hyperlinks to the four mood measures (ZSDS, ZSAS, SWLS, and PSS) were also attached. Students were told that they had up to 72 hours to complete all of the email surveys, but that it would be better if they completed them in 24 hours.

Stage III

All baseline measures were repeated approximately 16 weeks after the initial intervention was completed. Students were given 10 days to complete all of the online mood and personality measures that they had completed at baseline, as well as the *ExamCorp Battery*. Shortly thereafter, students came to McGill to complete the final

testing in-person. The *Brief Cognitive Measure* (in conjunction with a final study feedback questionnaire) was administered over several group sessions (six to 14 students per group) held between March 4, 2006 and March 13, 2006 in a classroom at McGill University. Seating was staggered to prevent cheating, and no discussion was allowed. The Principal Investigator supervised every session. Students were informed that they had one hour to complete the *Brief Cognitive Measure* as well the *Concluding Questionnaire*. All students finished within the hour. At this time, they provided consent (with signature) for the Principal Investigator to collect their official transcripts at the end of the term. Students were then were remunerated for their time over the previous 4 months ($80 for approximately 10 to 12 hours).

CHAPTER 3

Results

Primary analyses were focused on one main research question. Would a brief but intensive personal life-goal-setting program intervention have a positive effect over time on academic performance (i.e., grades and retention rates) in self-described academically struggling university students? Secondary analyses focused on the prospective contributors to this potential change. Specifically, would the goal-setting program have distinguishable effects on mood (i.e., depression, anxiety, perceived stress, satisfaction with life), cognition (e.g., attention, working memory, word fluency), or personality (i.e., Conscientiousness, Emotional Stability, Openness, Agreeableness, and Extroversion)? Furthermore, within the Goal Group, would the type of primary goals set (academic or other) have an effect on grade change?

The data were entered into the Statistical Package for Social Sciences (SPSS v. 14.0 for Windows). All analyses were preceded by an exploratory phase during which the variables of interest were plotted to explore distribution and variances.

Baseline Sample Descriptive Statistics

Before any major analyses were run to determine whether the interventions (control and goal) had had differential effects on the participant sample, several analyses were conducted to explore whether there were any significant differences between groups on a variety of demographic variables (e.g., sex, ethnicity, socioeconomic status) on first the overall sample ($N = 101$), and then as well on the smaller ($N = 85$) sample used for GPA and retention-rate analyses (i.e., those students who had "before intervention" grade data at McGill; see the Methods section for more details). These analyses were used as a

confirmation of the adequacy of the randomization procedure employed.

No significant differences were found between the Control Group ($n = 50$) and the Goal Group ($n = 51$) on any demographic variables, regardless of sample size: Specifically, for the overall sample ($N = 101$), groups did not differ significantly by:

- sex, $\chi^2(1, N = 101) = 3.16, p = .08$;
- ethnicity, $\chi^2(5, N = 101) = 5.35, p = .38$;
- parents' income, $\chi^2(12, N = 101) = 8.65, p = .73$;
- self-reported average of high-school grades, $\chi^2(6, N = 101) = 3.35, p = .76$;
- whether their first language was English (all students were fluent in English but 38 students or 37.6% of the total sample's first language was a language other than English), $\chi^2(1, N = 101) = .11, p = .74$;
- whether they were studying in English for the first time: $\chi^2(1, N = 101) = .34, p = .56$;
- whether they were on official academic probation (27 students or 26.7% of total sample was), $\chi^2(1, N = 101) = .54, p = .46$;
- whether they were receiving current tutoring at the beginning of the study (nine or 8.9% of 101 students were; $p = .49$, two-tailed, Fisher's Exact Test);
- or whether they were enrolled in any other kind of intervention at the beginning of the study (four or 4% of 101 students had enrolled in either short-term procrastination or test anxiety workshops offered by McGill University Counselling Services; $p = .62$, two-tailed, Fisher's Exact Test).

Furthermore, there was no statistically significant difference between the ages of Control Group participants ($M = 20.18$, $SD = 1.77$) and Goal Group participants ($M = 20.37$, $SD = 1.47$), $t(99) = .60, p = .55$ (two-tailed), $d = .12$ (small effect).

For the reduced sample ($N = 85$), results were similar when comparing students in the Goal Group ($n = 45$) and students in the Control Group ($n = 40$). Groups did not differ significantly by:

- sex, $\chi^2(1, N = 85) = 2.38, p = .12$;
- ethnicity, $\chi^2(5, N = 85) = 5.10, p = .40$;
- parents' income, $\chi^2(12, N = 85) = 7.06, p = .85$;
- self-reported average of high-school grades, $\chi^2(6, N = 85) = 4.21, p = .65$;
- whether their first language was English (all students were fluent in English, but 30 students or 35.3% of the reduced sample's first language was a language other than English), $\chi^2(1, N = 85) = .00, p = .96$;
- whether they were studying in English for the first time: $\chi^2(1, N = 85) = .32, p = .57$;
- whether they were on official academic probation (27 students or 31.8% of the reduced sample was), $\chi^2(1, N = 85) = .15, p = .28$;
- whether they were receiving current tutoring at the beginning of the study (nine or 10.6% of 85 students were; $p = .49$, two-tailed, Fisher's Exact Test);
- or whether they were enrolled in any other kind of intervention at the beginning of the study (four or 4.8% of 85 students had enrolled in either short-term procrastination or test anxiety workshops offered by McGill University Counselling Service; $p = .62$, two-tailed, Fisher's Exact Test).

Again, there was no statistically significant difference between the ages of Control Group participants (M =20.40, $SD = 1.36$) and Goal Group participants (M =20.58, $SD = 1.37$), $t(83) = .60, p = .55$ (two-tailed), $d = .13$ (small effect).

Primary Analyses: Goal Setting and Academic Performance

Grade Point Average (GPA)

The reduced sample of students with both pre- and post-intervention grades (N = 85) was used for GPA analyses. The first and primary research question explored whether the one-time goal-setting intervention (Fall 2005) would differentially improve grades a semester later in the Goal Group (n = 45) as compared to the effect of the control intervention on grades in the Control Group (n = 40). No baseline group differences were found between GPA1 for the Control Group (M = 2.26, SD = 0.72) and GPA1 for the Goal Group (M =2.25, SD = .93), $t(83) = .08$, $p = .93$ (two-tailed), $d = .02$ (zero-order effect). Distribution of the overall GPA difference scores (GPA2 minus GPA1) was assumed to be normal, and tests of skewness and kurtosis proved to be within acceptable limits for the reduced student sample.

Initially, a one-way repeated measures analysis of variance (ANOVA) was conducted to test for differences between groups on the dependent variable GPA (pre- and post-intervention). There was a significant main effect of time, $F(1, 83) = 13.66$, $p < .001$, $\eta^2 = .14$ (large effect), as well as a significant interaction of group and time, $F(1, 83) = 4.01$, $p < .05$, $\eta^2 = .05$ (moderate effect).

As a follow-up to the ANOVA, t-tests were used to explore the nature of the significant interaction between group and time. Over time, both the Control and Goal Groups demonstrated grade improvements, but only the Goal Group improvements were statistically significant. Paired-sample t-tests were used to determine the significance of the improvement within each group. In the Goal Group, GPA2 (M = 2.91, SD = .65) was significantly higher than the baseline GPA1 (M = 2.25, SD = .93), $t(44) = 4.39$, $p < .001$

(two-tailed), and the effect size was moderate-to-large, $d = .65$. In the Control Group, there were no significant differences between baseline GPA1 ($M = 2.26$, $SD = .72$) and post-intervention GPA2 ($M = 2.46$, $SD = 1.06$), $t(39) = 1.10$, $p = .28$ (two-tailed), and the effect size was small, $d = 0.17$. A planned comparison of GPA2 (post-intervention) was also run between groups. GPA2 for the Goal Group ($M = 2.91$, $SD = .65$) was significantly greater than GPA2 for the Control Group ($M = 2.46$, $SD = 1.06$), $t(63) = 2.30$, $p = .03$, and the effect size was moderate, d = .50 (see Figure 1 for a comparison of group changes in mean GPA over time).[6]

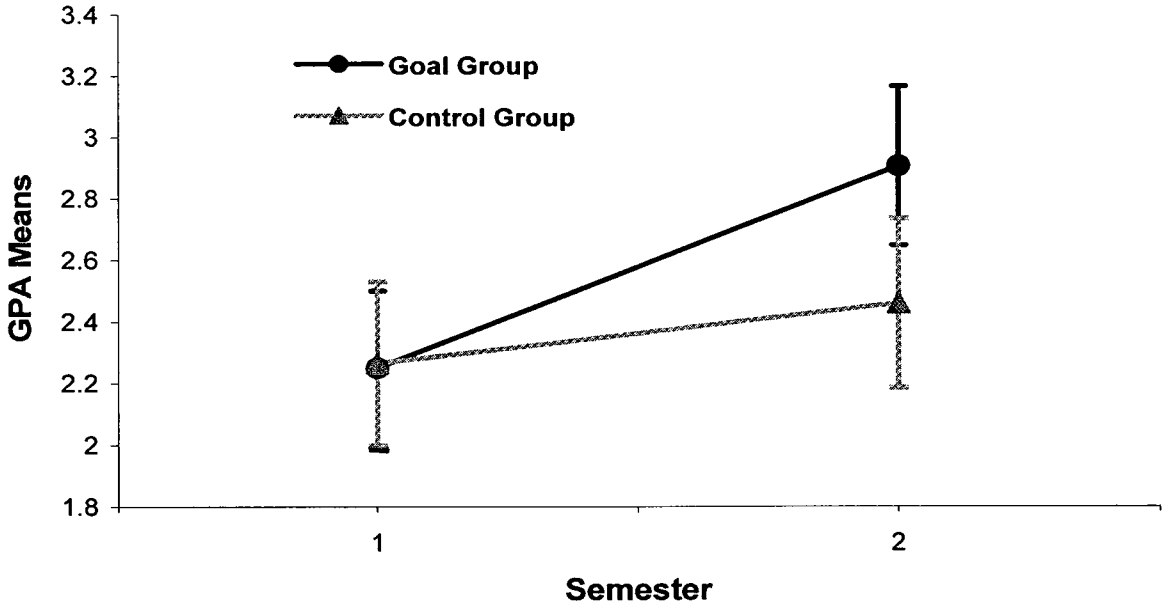

Figure 1. Group differences in GPA change post-intervention. Error bars show 95% confidence intervals for each group at each time point.

Retention Rates

Assessing the number of students who continued carrying a full course load was

[6] As these analyses included two students who withdrew from their full course load mid-way through the semester, please see Appendix N for an alternate analysis without these students ($n = 99$). The same pattern of results is illustrated.

another important target of this study. Within the group of 85 students for whom baseline course load data was available, there was no significant difference between the number of credits in the pre-intervention semester taken by Control Group participants ($M = 13.21$, $SD = 1.68$) and Goal Group participants ($M = 13.88$, $SD = 1.91$), $t(83) = 1.69$, $p = .09$ (two-tailed), and the effect size was small-to-moderate, $d = .36$.

In order to determine whether the proportion of students within each group differed in the post-intervention semester with regard to retaining a full course load (or even maintaining enrolment through to the end of the post-intervention semester), a Fisher's Exact Test of probability was conducted. Within the full sample of students ($N = 101$), no students in the Goal Group dropped below nine credits in the semester post-intervention, however eight students in the Control Group (16% of the total) dropped below nine credits, including two who withdrew from all of their courses completely by the end of the semester. The course load retention rate difference between groups was significant at $p < .005$ when all students were included in the analysis ($N = 101$).

A Fisher's Exact Test was also conducted with the 85 students (the same set of students used in the before-after GPA analyses), in order to show that a similar general retention pattern applied across this group as well. No students in the Goal Group dropped below nine credits in the semester post-intervention, but eight students in the Control Group (20%) dropped below nine credits (two withdrawing completely). The retention rate difference between groups was again significant at $p < .005$ when the partial sample was used ($n = 85$). Figure 4.2 depicts this difference graphically. It should be noted that McGill University's internal definition of a "full-time" semester load is 12 credits. See Appendix B for an alternative chi-square analysis using the 12-credit criteria;

the results are the same.

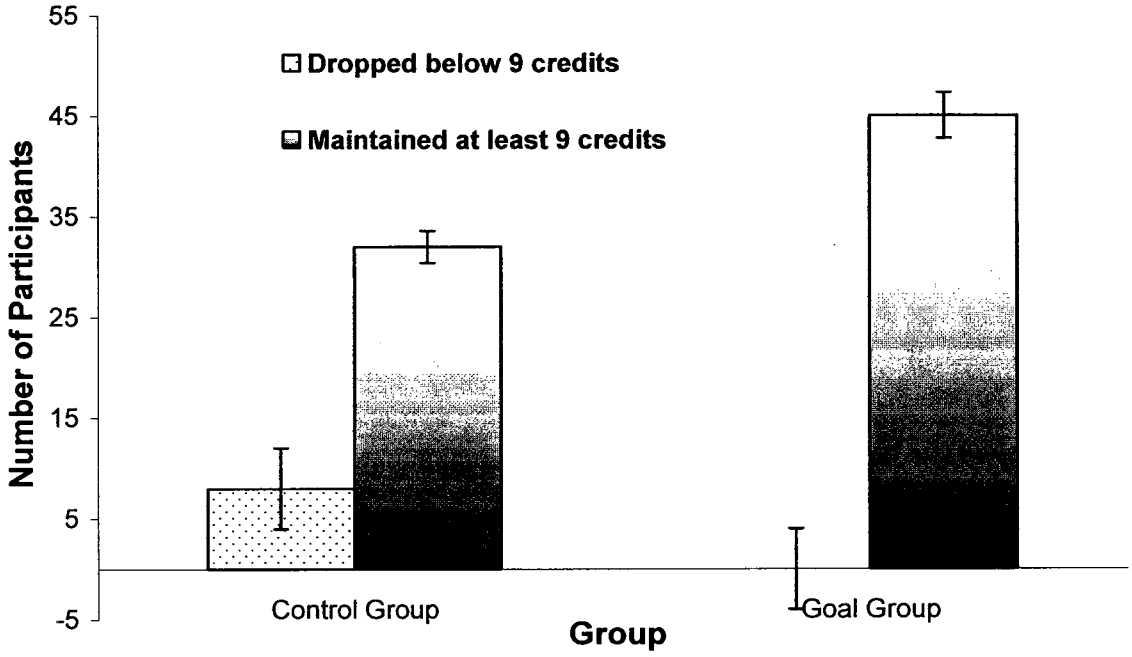

Figure 2. Number of students taking ≥ 9 credits vs. number of students taking < 9 credits, separated by group. Error bars show plus and minus an estimate of one standard error.

Secondary Analyses: Potential Contributors to Change

Goal Setting and Self-Reported Outcomes

The next set of analyses explored group outcome differences in self-reported change in the overall sample of students ($N = 101$). These differences were measured using the *Concluding Questionnaire* (see Appendices E and F). The dimensionality of the 16 items from this measure was then analyzed, as the questions were constructed to elicit similar information on general emotional status, concentration, motivation, and the seriousness with which participants took their involvement in the study. The 16 items did not represent 16 different dimensions of variation. Principal Components Analysis (PCA) grouping was used in order to minimize overlap. Within the Concluding Questionnaire

data for all participants, only three individual questions had missing data; therefore, mean-response data for that particular question were filled in accordingly (Tabachnick & Fidell, 2001).

Two criteria were used to determine the number of factors to rotate: The scree test and the interpretability of the factor solution. Five factors were rotated using a Varimax rotation procedure, which was chosen in order to extract maximally distinct components from the questionnaire items. The rotated solution yielded five interpretable variable clusters: Decreased Negative Emotion; Enthusiasm for Intervention; Improved Concentration; Commitment to Intervention; Motivation for Academic or Cognitive Gains. Decreased Negative Emotion accounted for 32.36% of the variance, Enthusiasm for Intervention accounted for 16.43%, Improved Concentration accounted for 9.18%, Commitment to Intervention accounted for 8.20%, and Motivation for Academic or Cognitive Gains accounted for 6.64%. See Table 5 for the Rotated Component Matrix solution (and see Appendices E and F for exact questions).

Table 5

Rotated[a,b] Component Matrix for Self-Reported Change on the Concluding Questionnaire

Condensed Items	*Component*				
As a result of the intervention:	1	2	3	4	5
12. Do you feel less stressed?	**.89**				
13. Do you feel less anxious?	**.88**				
14. Do you feel less sad?	**.81**				
15. Are you more generally satisfied with life?	**.58**		.53		
11. Will/have your grades improve(d)?	**.49**	.41	.35		
1. Would you recommend the intervention?		**.87**			
2. To what extent would you recommend it?		**.84**			
7. How helpful did you find it?		**.78**	.31		
9. Is it easier to study?			**.89**		
10. Is it easier to concentrate?			**.87**		
16. Have you been more generally conscientious?	.43		**.46**		
4. How seriously did you take the associated tasks?				**.85**	
3. How seriously did you take the intervention?		.37		**.69**	
8. Rate the value of taking part.		.39		**.58**	
5. To what extent did you do it for the money?					**-.85**
6. To what extent did you do it for potential academic or cognitive gains?					**.84**

[a] Extraction Method: Principal Component Analysis.
[b] Rotation Method: Varimax with Kaiser Normalization. Rotation converged in six iterations.

Because Principal Components Analysis (PCA) requires large sample sizes, it was only used to cluster variables. The initial PCA groupings were used as a guide for constructing averaged totals for the items within each factor. There were only six items that loaded above .2 on more than one factor[7]. Each of these items was therefore kept with the grouped component in which the correlation with that factor was the highest. For each participant, the mean of the items within each of the grouped components was used to create a cluster score. The mean of Items 11, 12, 13, 14, and 15 became the Decreased Negative Emotion cluster score (Cronbach's $\alpha = .85$), the mean of Items 1, 2, and 7 became the Enthusiasm for Intervention cluster score (Cronbach's $\alpha = .75$), the mean of Items 9, 10, and 16 became the Improved Concentration cluster score (Cronbach's $\alpha = .81$), the mean of Items 3, 4, and 8 became the Commitment to Intervention cluster score (Cronbach's $\alpha = .66$), and the mean of Items 5 (inverted: maximum score minus individual score; 95 - x) and 6 became the Motivation for Academic or Cognitive Gains cluster score (Cronbach's $\alpha = .65$). These five cluster scores were used in the following analyses. See Table 6 for a correlation matrix of the cluster scores in the overall sample of $N = 101$.

[7] It is interesting in the light of the main results that students who felt that their grades had improved or would improve as a result of the intervention loaded on the first three factors, with correlations ranging from .35 to .49.

Table 6

Correlations Between Five Cluster-Score Variables

N = 101	*Cluster-Score Variables*				
Cluster-Score Variables	*Decreased Negative Emotion*	*Enthusiasm for Intervention*	*Improved Concentration*	*Commitment to Intervention*	*Motivation for Academic/ Cognitive Gains*
Decreased Negative Emotion	---	---	---	---	---
Enthusiasm for Intervention	.31***	---	---	---	---
Improved Concentration	.55***	.45***	---	---	---
Commitment to Intervention	.05	.44***	.27***	---	---
Motivation for Academic/ Cognitive Gains	.01	.19	.18	.29***	---

One-way multivariate analysis of variance (MANOVA) was used with the constructed factor-based scores to determine the effect of group on the five resulting clusters of self-reported change. Significant differences were found between the two groups on the dependent measures, Wilks's $\Lambda = .83$, $F(5, 95) = 3.98$, $p < .005$. The multivariate η^2 based on Wilks's Λ was equal to .17 (large effect), indicating that 17% of the multivariate variance of the dependent variables was associated with the group factor. However, because the five cluster variables measure different constructs, it was decided that it would be more appropriate to determine the effect of group on these constructs in a series of separate ANOVAs.

One-way analyses of variances (ANOVAs) on each dependent variable were conducted as follow-up tests to the MANOVA. The ANOVA on Decreased Negative Emotion was significant, as was the ANOVA on Improved Concentration. In both cases, students in the Goal Group self-reported significantly greater improvements in Decreased Negative Emotion and Improved Concentration as a result of their intervention, as compared to students in the Control Group. ANOVAs on the remaining three clusters were nonsignificant. Table 7 contains the means and the standard deviations on the dependent variables for the two groups, as well as the ANOVA results.

Table 7

Descriptive Statistics and Analysis of Variance on Mean-Constructed Factor-Based Scores

Cluster	Intervention Group	*n*	*M* (*SD*)[a]	*df*	*F*	η^2
Decreased Negative	Control	50	32.68 (19.42)	1, 99	7.98*	.08
Emotion	Goal	51	43.01 (17.30)			
Enthusiasm for Intervention	Control	50	54.57 (22.25)	1, 99	3.10	.03
	Goal	51	61.26 (15.63)			
Improved Concentration	Control	50	37.64 (22.12)	1, 99	7.75*	.07
	Goal	51	48.89 (18.35)			
Commitment to	Control	50	65.52 (13.71)	1, 99	1.40	.01
Intervention	Goal	51	62.09 (15.36)			
Motivation for Academic	Control	50	49.66 (19.00)	1, 99	2.55	.03
or Cognitive Gains	Goal	51	55.44 (17.36)			

[a] Possible score range: 0 to 96.5 (with one person scoring a 97 on one item because he or she marked .5 mm over the end point of the score range line). A score halfway between was intended to imply neutrality.

* $p < .01$

As shown in Table 6, Decreased Negative Emotion and Improved Concentration were correlated with each other at $r = .55$, $p < .01$, two-tailed. A linear regression confirmed that group membership was predicted by the shared variance between these two measures. Although the overall regression was significant, $F(2,98) = 5.15$, $p < .01$, combining the measures led to non-significant results for both Decreased Negative Emotion, $t(98) = 1.56$, $p = .12$, and Improved Concentration, $t(98) = 1.49$, $p = .14$. Any

improved concentration as a result of the goal setting intervention thus appears to be related to a decrease in negative emotion.

Goal Setting and Mood

Part of the secondary analyses concerned whether intensive personal goal setting would have an effect on different aspects of mood (i.e., depression, anxiety, perceived stress, satisfaction with life) as measured by self-report questionnaires. In these analyses, data were available for all students ($N = 101$). Within the mood data for all participants (four questionnaires, completed six times each by 101 students), only 14 individual surveys out of a total of 2,424 surveys completed had missing data: three individual *Zung Self-Rating Depression Scales* (ZSDSs; one at Time 1, two at Time 5), seven individual *Zung Self-Rating Anxiety Scales* (ZSASs; one at Time 1, one at Time 2, one at Time 3, two at Time 4, and two at Time 5), three *Satisfaction With Life Scales* (SWLSs; one at Time 1, one at Time 4, and one at Time 5), and two *Perceived Stress Scales* (PSSs; one at Time 4 and one at Time 5). Mean-response data for those particular scales (at the corresponding Time point) were filled in accordingly (Anderson, Basilevsky, & Hum, 1983).

Two analyses were done. One examined the evolution of the different aspects of mood across all six time points over the four-month course of the study, and one compared the long-term effects of being in a given intervention group across two time points: Time 1 (pre-intervention) and Time 6 (final follow-up post-intervention, after the study was complete).

Analysis of baseline differences. No baseline group differences were found in symptoms of depression, anxiety, satisfaction with life, and perceived stress.

- ZSDS (Zung, 1965; Zung et al., 1990): There were no baseline differences in depression symptoms in the Control Group ($M = 42.22$, $SD = 8.26$) versus the Goal Group ($M = 41.67$, $SD = 7.50$), $t(99) = .35$, $p = .73$ (two-tailed), $d = .07$ (zero-order effect).[8]
- ZSAS (Zung, 1971; Zung et al., 1990): There were no baseline differences in anxiety symptoms in the Control Group ($M = 32.88$, $SD = 7.68$) versus the Goal Group ($M = 33.27$, $SD = 8.48$), $t(98) = .25$, $p = .81$ (two-tailed), $d = .05$ (zero-order effect).
- PSS (Cohen et al., 1983; Cohen & Williamson, 1988; Wright et al., 2004): There were no baseline differences in perceived stress in the Control Group ($M = 31.28$, $SD = 6.41$) versus the Goal Group ($M = 30.29$, $SD = 5.30$), $t(99) = .84$, $p = .40$ (two-tailed), $d = .17$ (small effect).
- SWLS (Diener et al., 1985; Lucas et al., 1996): There were no baseline differences found in general satisfaction with life in the Control Group ($M = 21.74$, $SD = 7.06$) versus the Goal Group ($M = 23.08$, $SD = 5.89$), $t(98) = 1.03$, $p = .31$ (two-tailed), $d = .21$ (small effect).

Six time-point analyses. A one-way repeated measures analysis of variance (ANOVA) was conducted with each mood measure to determine the effect of the independent variable Group (two levels: Goal vs. Control) over the within-subjects factor of Time (Time 1 to Time 6). Participants were nested within group and crossed with time and the dependent measure. The overall design notation (Lee, 1966) was as follows: $\text{Subjects}_n (\text{Group}_2) \times \text{Time}_6 \times \text{Measures}_1$ (where $n = 51$ for the Control Group, and $n = 50$ for the Goal Group).

[8] It should be noted that ZSDS baseline data for both groups indicated the possibility of minimal to mild depression (pre-intervention), with mean scores for both groups falling between 40 and 47. ZSAS baseline data indicated anxiety symptoms in the normal range for both groups.

- Depression: There was a significant effect of time, which remained significant after a Greenhouse-Geisser correction, $F(5, 495) = 5.43$, $p < .001$, $\eta^2 = .05$ (moderate effect), but no significant time by group interaction, $F(5, 495) = .56$, $p = .73$, $\eta^2 = .01$ (small effect). See Figure 3.

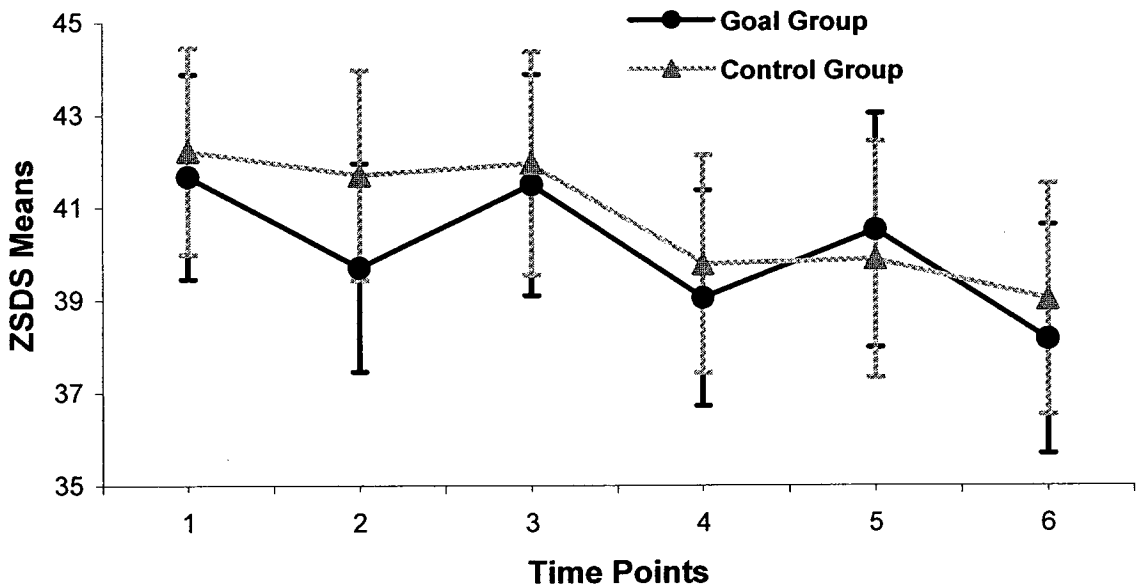

Figure 3. Plot of changes in depression (as measured by the *Zung Self-Rating Depression Scale*, ZSDS; Zung, 1965; Zung et al., 1990) over time by group. Error bars show 95% confidence intervals for each group at each time point.

- Anxiety: Again, there was a significant effect of time, which remained significant after a Greenhouse-Geisser correction, $F(5, 495) = 9.67$, $p < .001$, $\eta^2 = .09$ (moderate effect), but no significant time by group interaction, $F(5, 495) = .89$, $p = .49$, $\eta^2 = .01$ (small effect). See Figure 4.

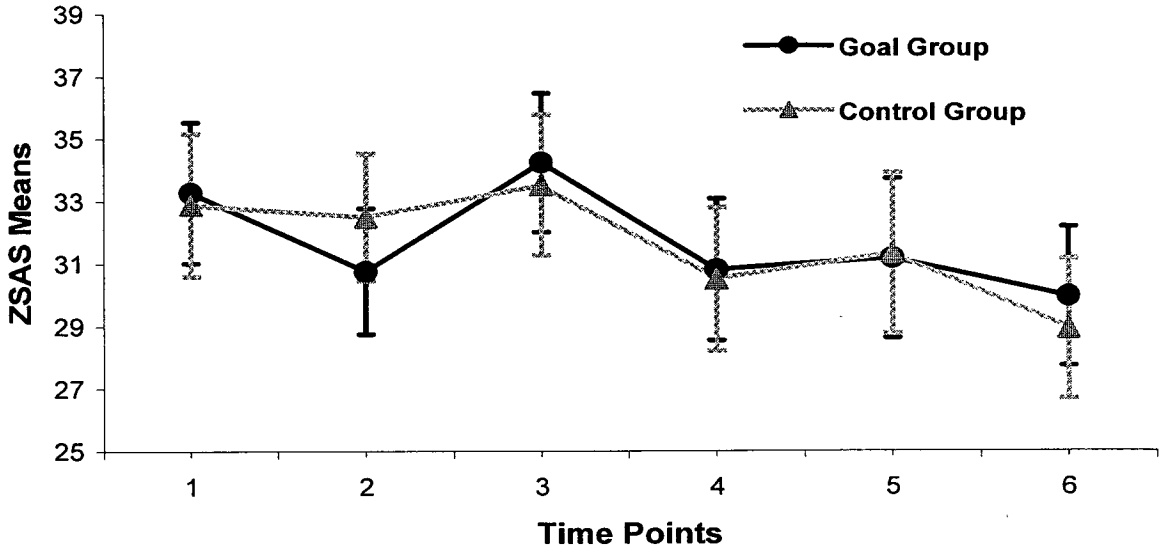

Figure 4. Plot of changes in anxiety (as measured by the *Zung Self-Rating Anxiety Scale*, ZSAS; Zung, 1971; Zung et al., 1990) over time by group. Error bars show 95% confidence intervals for each group at each time point.

- Perceived Stress: Again, there was a significant effect of time, which remained significant after a Greenhouse-Geisser correction, $F(5, 495) = 6.97$, $p < .001$, $\eta^2 = .07$ (moderate effect), but no significant time by group interaction, $F(5, 495) = .93$, $p = .46$, $\eta^2 = .01$ (small effect). See Figure 5.

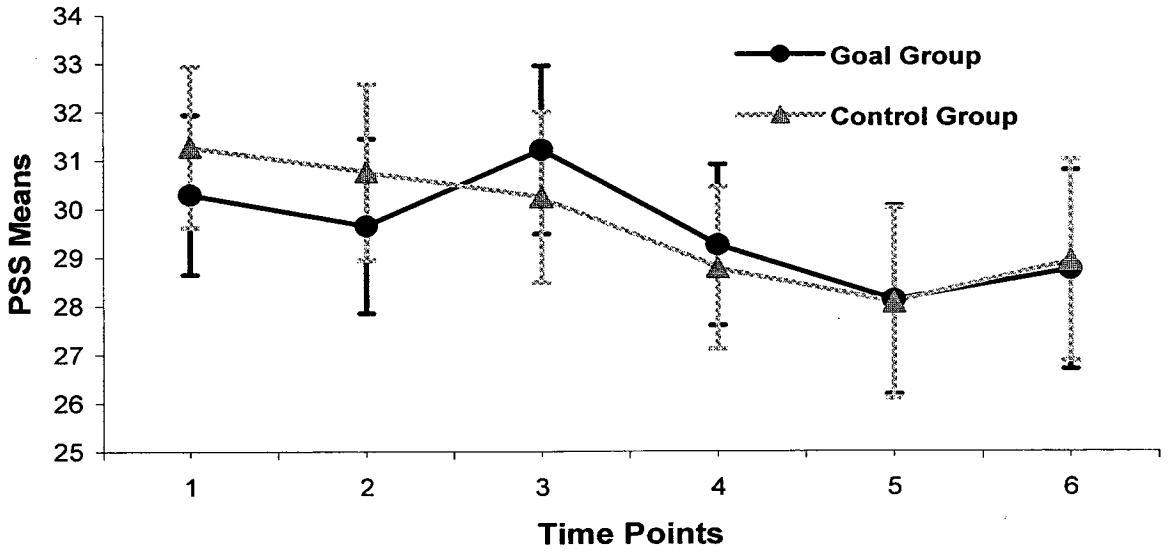

Figure 5. Plot of changes in perceived stress (as measured by the *Perceived Stress Scale*, PSS; Cohen & Williamson, 1988; Wright et al., 2004) over time by group. Error bars show 95% confidence intervals for each group at each time point.

- Satisfaction with Life: There was no effect of time according to the repeated measures ANOVA, either before or after a Greenhouse-Geisser correction, $F(5, 495) = 1.82$, $p = .11$, $\eta^2 = .02$ (small effect), nor was there a significant time by group interaction, $F(5, 495) = .26$, $p = .93$, $\eta^2 = .003$ (zero-order effect). See Figure 6.

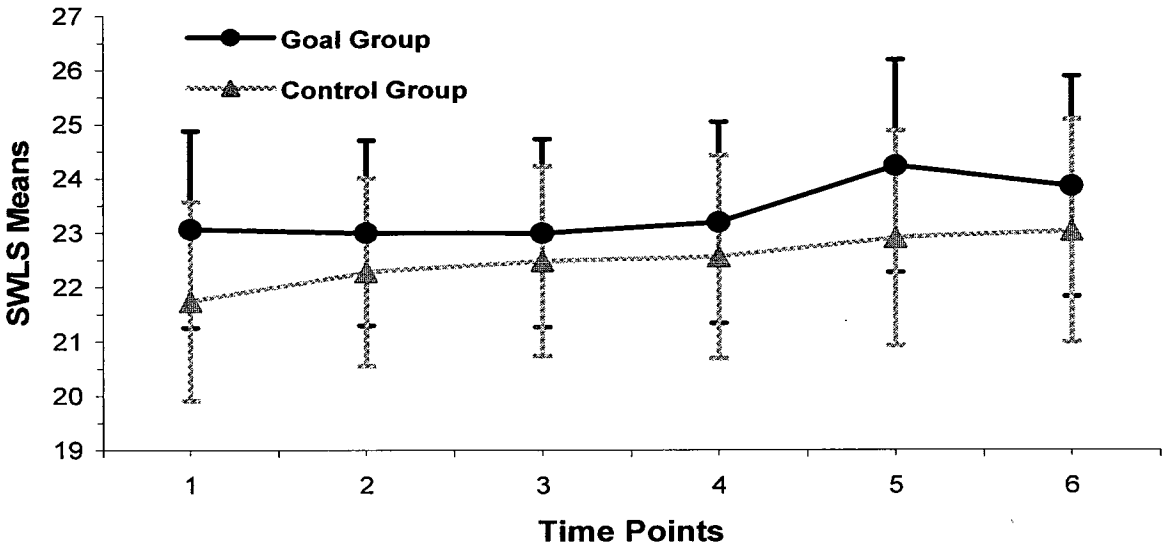

Figure 6. Plot of changes in satisfaction with life (as measured by the *Satisfaction With Life Scale*, SWLS; Diener et al., 1985; Lucas et al., 1996) over time by group. Error bars show 95% confidence intervals for each group at each time point.

Graphs of the six time points (see Figures 3 through 6) suggested that both groups improved over time in a nearly identical fashion. Tests of linear trend were used as a planned comparison to investigate the statistical level of improvement in each case.

First- to fifth-order possible contrasts were run. Because of the manner in which contrasts divide up the sums of squares to look at particular trends, they are often more sensitive tests. For anxiety, there were significant linear and Order 5 contrasts: linear, $F(1, 99) = 22.87, p < .001, \eta^2 = .19$ (large effect); and Order 5, $F(1, 99) = 14.14, p < .001, \eta^2 = .13$ (large effect). For depression, similar effects were found, with significant linear and Order 5 contrasts: linear, $F(1, 99) = 13.50, p < .001, \eta^2 = .12$ (moderate-to-large effect); and Order 5, $F(1, 99) = 8.34, p < .01, \eta^2 = .08$ (moderate effect). The Order 5 contrast results are likely due to changes in high-stress points during the school year (e.g., finals, mid-terms). The participant sample, comprised of self-described academically

struggling students, is probably particularly sensitive to pressure points in the school year. Most notable are the significant linear contrasts, which indicate a general decrease in anxiety and depression among all participants. For perceived stress, there were significant linear, cubic, and Order 4 contrast effects: linear, $F(1, 99) = 13.61, p < .001$, $\eta^2 = .12$ (moderate-to-large effect); cubic, $F(1, 99) = 5.79, p = .02$, $\eta^2 = .06$ (moderate effect); and Order 4, $F(1, 99) = 4.26, p = .04$, $\eta^2 = .04$ (small-to-moderate effect).

Interestingly, for satisfaction with life, the contrast test picked up a significant linear effect, $F(1, 99) = 4.10, p < .05$, $\eta^2 = .04$ (small-to-moderate effect), with no other contrast effects, indicating a small linear increase over time in general satisfaction with life among all participants. Perhaps participation in a study with close monitoring by the Principal Investigator over a period of 4 months would be enough to induce such changes in mood, regardless of the specific initial intervention used. It would be difficult to prove this idea experimentally, because no longitudinal access to struggling students without any intervention was obtained; the issues with validity and ethics posed by the recruitment and use of a non-treatment clinical control group were determined to be too problematic to warrant anything but a comparative design with a "control" treatment intervention (Basham, 1986).

Two time-point analysis. Analyzing only the pre-intervention Time 1 and final post-intervention Time 6 yielded a picture of the long-term effects of the interventions on mood, and a more easily interpreted result, as Time 6 truly represented the "end" of the experiment and the conclusion for students of participating in an intervention study (as opposed to the intermediary follow-ups with incumbent distractions, e.g., final exams, represented by Times 2 through 5). A one-way repeated-measures analysis of variance

was again conducted on each dependent measure (ZSDS, ZSAS, PSS, SWLS) to determine the effect of the independent variable Group (two levels: Goal vs. Control) over the within-subjects factor of Time (Time 1 and Time 6). Participants were nested within group and crossed with time and the dependent measures. The overall design notation (Lee, 1966) was as follows: $Subjects_n (Group_2) \times Time_2 \times Measures_1$ (where n = 50 for the Goal Group, and n = 50 for the Control Group).

Again, there were no significant group-by-time interaction effects on any of the analyses, but there were significant main effects of time on three of the measures. There was a significant main effect of time on anxiety, $F(1, 99) = 24.59$, $p < .001$, $\eta^2 = .20$ (large effect). Similarly, there was significant main effect of time on depressive symptoms, $F(1, 99) = 17.10$, $p < .001$, $\eta^2 = .15$ (large effect), as well as an effect of time on perceived stress, $F(1, 99) = 8.48$, $p < .005$, $\eta^2 = .08$ (moderate effect). There was a marginally significant effect of time on satisfaction with life, $F(1, 99) = 3.54$, $p = .06$, $\eta^2 = .04$ (small-to-moderate effect). The results of the six-time-point analyses are essentially the same as the two-time-point analyses, but illustrate that, although the changes in mood over 4 months were linear, they were not smooth.

Goal Setting and Cognitive Performance

Another secondary question concerned whether intensive personal goal setting would have an effect on aspects of cognition related to dorsolateral prefrontal cortex cognitive ability (D-PFCA; cf. Higgins, Peterson, Pihl, & Lee, 2007). If they occurred, would changes in D-PFCA precipitate changes in academic performance? In these analyses, data were available for all students (N = 101). No baseline differences in D-PFCA, as measured by the cognitive portion of the *ExamCorp Battery* (Higgins et al.,

2007), were found between the Control Group ($n = 50$, $M = -.02$, $SD = .54$) and the Goal Group ($n = 51$, $M = .07$, $SD = .54$), $t(99) = .82$, $p = 0.41$ (two-tailed), $d = .16$ (small effect).

In order to test for the effects of the Control versus the Goal Group intervention on aspects of cognitive functioning specifically related to the dorsolateral prefrontal cortex (per hypotheses), a one-way repeated measures analysis of variance (ANOVA) by group was performed. The dependent variable was the overall D-PFCA score, which is a composite of the seven neuropsychological tests included in the *ExamCorp Battery* (See Appendix G). The independent variable was the intervention group (Goal vs. Control). The within-subjects factor was Time (Times 1 and 2: pre-intervention and post-intervention). Analyses of pre- and post-intervention D-PFCA scores revealed that both groups improved over time in a nearly identical fashion (see Figure 7), with little difference in Time 2 scores between the Control Group ($M = .20$, $SD = .49$) and the Goal Group ($M = .24$, $SD = .56$). There was a significant main effect of time across groups, Wilks's $\Lambda = .86$, $F(1, 99) = 16.68$, $p < .001$, $\eta^2 = .14$ (large effect), but no significant interaction of group and time, Wilks's $\Lambda = 1.00$, $F(1, 99) = .29$, $p = .59$, $\eta^2 = .003$ (zero-order effect). Please see Table 8 for means and standard deviations of the overall D-PFCA score at Times 1 and 2, as well as for the seven individual tasks whose average comprised the D-PFCA score.

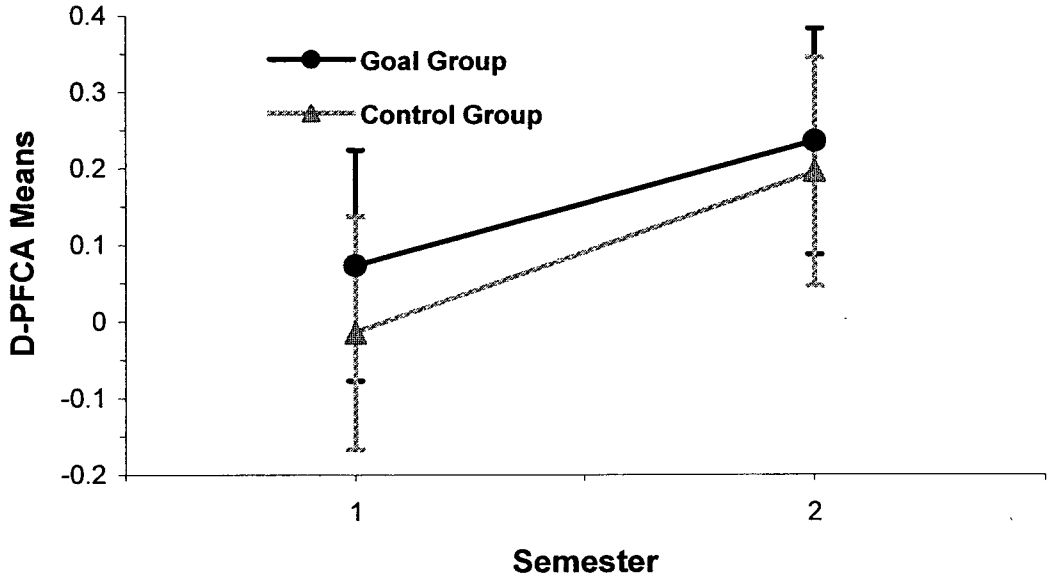

Figure 7. Plot of changes in Dorsolateral Prefrontal Cortex Cognitive Ability (as measured by the cognitive portion of the *ExamCorp Battery*, Higgins et al., 2007) over time by group. Error bars show 95% confidence intervals for each group at each time point.

Table 8

Descriptive Statistics on the ExamCorp Battery Tasks and Overall Score

ExamCorp Battery Task	*Group**	*n*	*Pre-Intervention M (SD)*	*Post-Intervention M (SD)*
Acquired Nonspatial Association Task	Control	50	-.17 (.81)	.39 (.85)
	Goal	51	.23 (.77)	.36 (.79)
Acquired Spatial Association Task	Control	50	-.05 (.89)	.47 (.93)
	Goal	51	.24 (1.00)	.45 (.98)
Go/No-Go Task	Control	50	.22 (1.09)	.27 (.80)
	Goal	51	-.10 (1.02)	.34 (.99)
Random Letter Span Task	Control	50	.02 (.94)	-.15 (.92)
	Goal	51	.18 (.86)	.08 (1.02)
Self-Ordered Pointing Task	Control	50	.02 (1.01)	-.12 (1.04)
	Goal	51	.05 (1.02)	.12 (1.03)
Recency Judgment Task	Control	50	.07 (1.02)	.26 (1.13)
	Goal	51	.06 (1.01)	.07 (1.16)
Word Fluency Task	Control	50	-.22 (1.10)	.25 (.94)
	Goal	51	-.14 (1.00)	.25 (.92)
Average of Above Tasks: D-PFCA Score	Control	50	-.02 (.54)	.20 (.49)
	Goal	51	.07 (.54)	.24 (.56)

Goal Setting and Personality

Part of the secondary analyses concerned whether intensive personal goal setting would have an effect on aspects of personality (i.e., Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness) as measured by a pre- and post-intervention personality inventory, the Big Five Inventory (BFI; John & Srivastava, 1999). Within the personality data for all participants, the pre-intervention BFI measure for one female participant in the Goal Group was missing due to a file corruption. For the analysis of BFI data, then, this participant was excluded from analyses, so that $N = 100$ (Goal Group: $n = 50$, and Control Group: $n = 50$).

Analysis of baseline differences. No baseline group differences were found in the five dimensions of personality as measured by the BFI:

- Extraversion:
    - BFI: No baseline group differences were found in the Control Group ($M = 26.08$, $SD = 5.97$) versus the Goal Group ($M = 25.54$, $SD = 6.17$), $t(98) = .45$, $p = .66$ (two-tailed), $d = .09$ (zero-order effect).
- Agreeableness:
    - BFI: No baseline group differences were found in the Control Group ($M = 33.52$, $SD = 4.88$) versus the Goal Group ($M = 33.90$, $SD = 5.40$), $t(98) = .37$, $p = .71$ (two-tailed), $d = .07$ (zero-order effect).
- Conscientiousness:
    - BFI: No baseline group differences were found in the Control Group ($M = 28.62$, $SD = 6.51$) versus the Goal Group ($M = 29.18$, $SD = 6.19$), $t(98) = .44$, $p = .66$ (two-tailed), $d = .09$ (zero-order effect).

- Emotional Stability (reverse Neuroticism):
    - BFI: No baseline group differences were found in the Control Group (M = 22.72, SD = 6.19) and emotional stability in the Group Goal (M = 22.82, SD = 5.83), $t(98) = .08$, $p = .93$ (two-tailed), $d = .02$ (zero-order effect).
- Openness:
    - BFI: No baseline group differences were found in the Control Group (M = 36.46, SD = 6.18) versus the Control Group (M = 37.66, SD = 6.28), $t(98)$ = .96, $p = 0.34$ (two-tailed), $d = .19$ (small effect).

Analysis of pre- and post-intervention personality scores. A one-way repeated-measures analysis of variance was conducted to determine the effect of the independent variable Group (two levels: Goal vs. Control) on each of the five dependent personality dimensions (Extraversion, Agreeableness, Emotional Stability, Conscientiousness, Openness) over the within-subjects factor of Time (Time 1 and Time 2). Participants were nested within group and crossed with time and each dependent personality dimension. The overall design notation (Lee, 1966) was as follows: $\text{Subjects}_n (\text{Group}_2) \times \text{Time}_2 \times \text{Dimension}_1$ (where $n = 50$ for the Control Group, and $n = 50$ for the Goal Group). The BFI dimension difference scores (e.g., Extraversion at Time 2 minus Extraversion at Time 1) were assumed to be normally distributed, and tests of skewness and kurtosis were within acceptable limits.

On the dimension of Agreeableness, there was no main effect of time, Wilks's $\Lambda = 1.00$, $F(1, 98) = .13$, $p = .72$, $\eta^2 = .001$ (zero-order effect), but there was a significant interaction effect of group × time, Wilks's $\Lambda = .95$, $F(1, 98) = 5.65$, $p = .02$, $\eta^2 = .05$ (moderate effect). A post-hoc independent samples t-test was used to explore the nature

of the significant interaction between group and time. Change in Agreeableness (Time 2 minus Time 1) for the Goal Group (M = .68, SD = 3.11) was significantly greater than Change in Agreeableness for the Control Group (M = -.92, SD = 3.61), $t(98) = -2.38$, p = 0.02 (two-tailed), and the effect size was moderate, d = .48 (see Figure 8 for a comparison of group changes in Agreeableness over time). While the Goal Group collectively increased in Agreeableness over time, the Control Group collectively decreased in this personality trait.

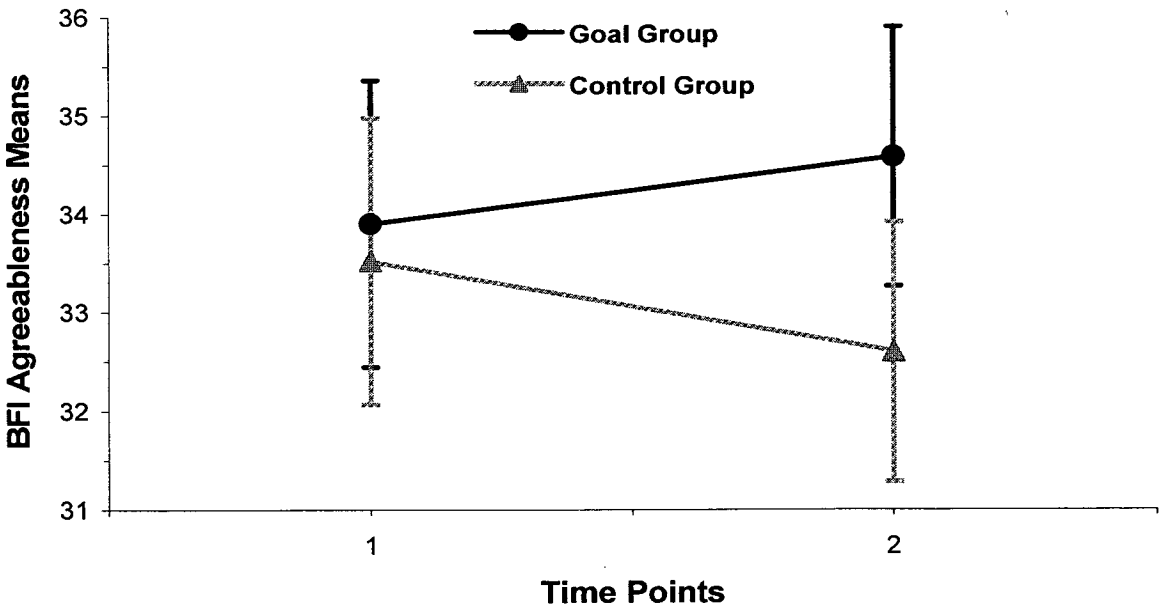

Figure 8. Plot of changes in Agreeableness (as measured by the BFI, John et al., 1991) over time by group. The error bars show 95% confidence intervals for each group at each time point.

On the dimension of Emotional Stability, there was a significant main effect of time, Wilks's $\Lambda = .95$, $F(1, 98) = 5.68$, $p = .02$, $\eta^2 = .06$ (moderate effect), but no significant interaction effect of group × time, Wilks's $\Lambda = 1.00$, $F(1, 98) = .04$, $p = .85$, $\eta^2 < .001$ (zero-order effect). See Figure 9 for graph of changes in Emotional Stability from

Time 1 to Time 2.

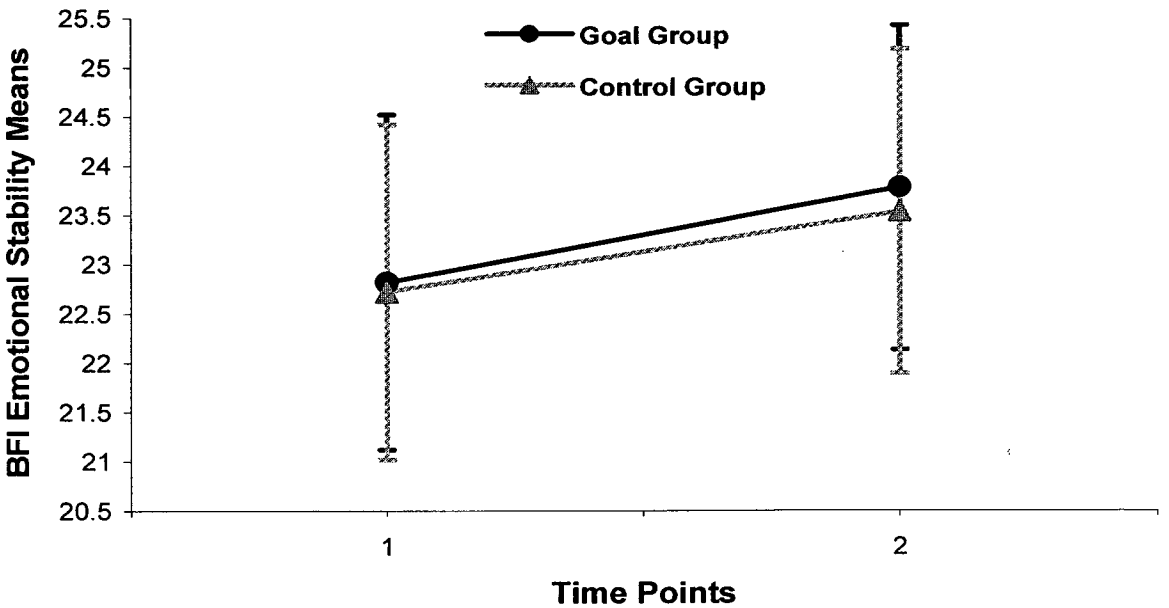

Figure 9. Plot of changes in Emotional Stability (or reversed Neuroticism, as measured by the BFI, John et al., 1991) over time by group. The error bars show 95% confidence intervals for each group at each time point.

As for the other three dimensions of Conscientiousness, Extraversion, and Openness, there were no significant main effects of time, no significant interactions of group and time, and no hints of any underlying trends. See Table 9 for means and standard deviations by group, pre- and post-intervention.

Table 9

Descriptive Statistics by Group on the BFI, Pre- and Post-Intervention

BFI Dimension	Group*	*n*	*Pre-Intervention* *M* (*SD*)*	*Post-Intervention* *M* (*SD*)*
Extraversion	Control	50	26.08 (5.97)	25.82 (6.12)
	Goal	50	25.54 (6.17)	25.06 (6.59)
Agreeableness	Control	50	33.52 (4.88)	32.60 (4.45)
	Group	50	33.90 (5.40)	34.58 (4.86)
Emotional Stability	Control	50	22.72 (6.19)	23.54 (6.43)
(reversed Neuroticism)	Group	50	22.82 (5.83)	23.78 (5.14)
Conscientiousness	Control	50	28.62 (6.51)	28.06 (5.30)
	Goal	50	29.18 (6.19)	29.44 (5.79)
Openness	Control	50	36.46 (6.18)	36.06 (6.04)
	Goal	50	37.66 (6.28)	37.20 (6.63)

Type of Goals Set: Academic Goals Versus Other Goals

A follow-up analysis to the GPA change analyses concerned the type of goals that individuals in the Goal Group chose to focus on. Was the type of "top goal" chosen (i.e., top goal in a ranked list of goals) related to the grade improvement observed within the Goal Group? Was it the process of goal setting or the type of goals set that really led to a change? In order to analyze grade-change results, top goals from the 45 people in the Goal Group with before and after grade data were selected. Three raters who were blind to the study were each given a separate pile of the 45 top goals and asked to sort them

into three categories, and then to give each category a name. From these initial rater suggestions, the author created four separate goal content categories: (a) academic goal, (b) personal/self-improvement goal, (c) relational/interpersonal goal, and (d) miscellaneous/other goal. The three raters were again asked to individually sort through the goals and put them in the four aforementioned categories. On the first pass, 82.22% of the items were coded identically by the three raters. After a consensus meeting, in which all of the items falling into multiple categories were discussed, the three raters achieved 100% consensus on all item categorizations. In the end, 13 goals (28.89%) were classified as academic, 20 goals (44.44%) were classified as personal/self-improvement, five goals (11.11%) were classified as relational/interpersonal, and seven goals (15.56%) were classified as miscellaneous/other.

In order to determine whether having an "academic goal" as one's top goal led to differential grade improvement within the Goal Group, the Goal Group was broken down into two smaller groups: those with an academic top goal ($n = 13$) versus those with a nonacademic top goal ($n = 32$). No baseline group differences were found between GPA1 for the academic goal group ($M = 2.06$, $SD = 0.92$) and GPA1 for the nonacademic goal group ($M = 2.33$, $SD = .94$), $t(43) = .86$, $p = .39$ (two-tailed), $d = .28$ (small-to-moderate effect size). The overall GPA difference scores (GPA2 minus GPA1) were assumed to be normally distributed, and tests of skewness and kurtosis proved to be within acceptable limits for the 45-student Goal Group.

A one-way repeated measures analysis of variance (ANOVA) was conducted to test for differences between groups on the dependent variable GPA (pre- and post-intervention). There was a significant main effect of time, $F(1, 43) = 14.41$, $p < .001$, $\eta^2 =$

.25 (large effect), but no significant interaction of group and time, $F(1, 43) = .12, p = .74$, $\eta^2 = .003$ (zero-order effect). The general improvement in grades experienced by goal-setting students did not appear to be influenced by the selection of an academic goal (see Figure 10), which suggests that this particular intervention's intensive process of setting personal goals was more important to academic outcomes than the content of those goals (i.e., whether they had anything to do with school).

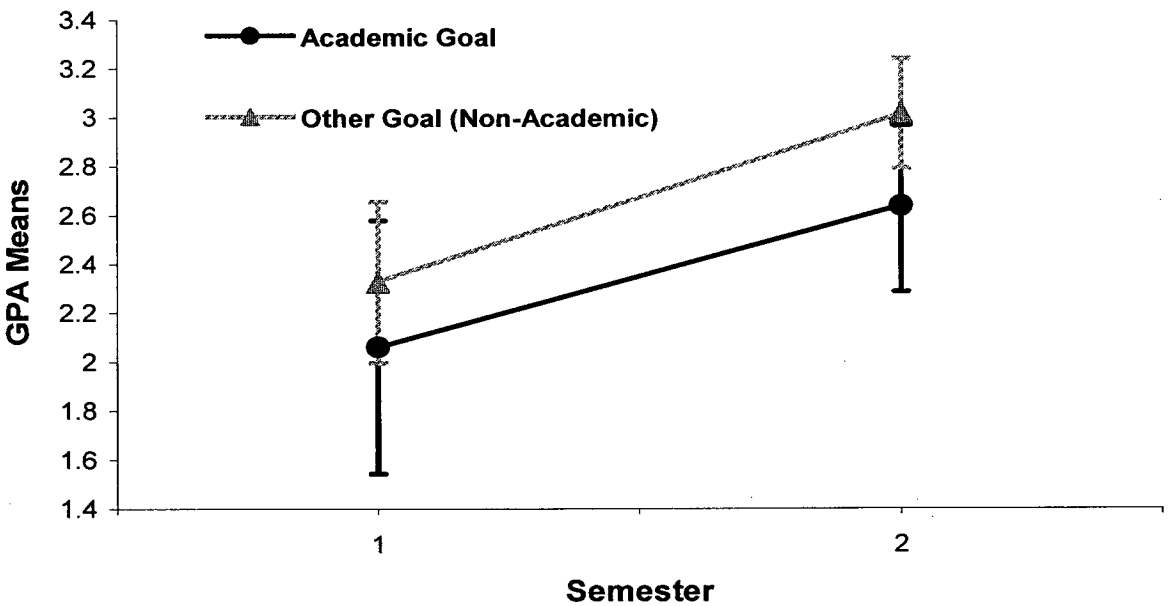

Figure 10. Plot of GPA changes in the Goal Group over time, depending on whether the students' top goals were Academic or non-Academic. Error bars show 95% confidence intervals for each group at each time point.

This concludes the main section of results. The correlation analysis section that follows was added in order to explore the data for possible relationships that might explain the difference found in overall GPA change between the Goal and Control Groups.

Correlation Analyses between GPA Change and Potentially Related Variables

Earlier analyses had some theoretical basis for anticipatory outcomes with causal attribution. In the following correlational analyses, however, there is no case for causal attribution. Because of the exploratory nature of the following analyses, a .10 level of significance was set in order to investigate potential relationships within each group between different variables and the grade changes observed. Prior hypotheses suspected that a differential change in grades (with the Goal Group doing better academically) would likely be related to improvements in Conscientiousness and Emotional Stability, mood, and working memory.

The variable of "grade change" (i.e., GPA2 minus GPA1) was correlated with 50 other variables in the data set, first within the overall sample with both before and after GPA data ($n = 85$), then within the Goal Group ($n = 45$), and finally within the Control Group ($n = 40$). These 50 variables comprised baseline and post-intervention personality scores (plus change scores), baseline and post-intervention *ExamCorp Battery* individual task scores (plus change scores), before and after overall D-PFCA scores (plus change score), GPA1, *Brief Cognitive Measure* score, *Concluding Questionnaire* self-reported outcome cluster scores, and mood change scores (Time 2 minus Time 1 for Anxiety, Depression, Perceived Stress, and Satisfaction with Life). Out of 50 correlations overall, there were 10 significant correlations in the overall sample of students, seven significant correlations in the Goal Group, and nine significant correlations in the Control Group. The vast majority of significant correlations were just below .30, or, in a small number of cases, just above.

Given the high number of correlations that were calculated, the relatively small *n*

within each group, and the concomitant risk that many of the correlations are artifacts of high Type I error, any interpretation of these data (see Discussion section) should be considered speculative and driven only by the desire to impart some exploratory meaning to the primary results of the study. See Table 10 for the significant correlations found among the overall sample, Goal Group, and Control Group. For cases in which a particular variable was found to be correlated with grade change in only one group, correlations between that variable and grade change were also provided for the other groups (although these correlations were not found to be significant).

Table 10

Correlations between Grade Change and Potentially Related Variables Across Groups

Variable	*Overall Sample (n = 85)*	*Goal Group (n = 45)*	*Control Group (n = 40)*
Cognitive Variables			
Acquired Nonspatial Association Task (Baseline)	.376***	.283*	.406***
Acquired Nonspatial Association Task (Change Score: Time 2 - Time 1)	-.274**	-.259*	-.225
Self-Ordered Pointing Task (Post-Intervention)	.192*	.140	.242
Random Letter Span Task (Post-Intervention)	.273**	.328**	.180
Random Letter Span Task (Change Score: Time 2 - Time 1)	.225**	.260*	.210
Recency Judgment Task (Post-Intervention)	-.163	-.263*	-.024
Go/No-Go Task (Baseline)	.062	-.190	.389**

Go/No-Go Task (Post-Intervention)	.195*	.055	.380**
Overall D-PFCA function at Time 2	.160	.037	.340**
Brief Cognitive Measure	.164	.278*	.040
Personality Variables			
BFI Extroversion (Baseline)	.247*	.103	.445***
BFI Extroversion (Post-Intervention)	.105	.015	.268*
BFI Extroversion (Change Score: Time 2 - Time 1)	-.261**	-.175	-.322**
Concluding Questionnaire Self-Reported Outcome Variables			
Self-Reported Emotional Stability	.227**	.078	.269*
Achievement Variables			
GPA at Time 1	-.591***	-.777***	-.399**

*** $p < .01$ (2-tailed); ** $p < .05$ (2-tailed); * $p < .10$ (2-tailed)

Correlations were explored only to see if they might provide any hints as to why differential gain in academic achievement occurred between the Goal and Control Groups. In general, an overarching explanation was not found for all of the variables in Table 10. Parts of the table can be explained, and parts cannot (some results are likely spurious). If one tried to keep an explanation as inclusive as possible, because both groups improved (the Goal Group significantly so), the small GPA gains for the Control Group appear to be related largely to personality variables (although there is a

relationship between overall D-PFCA function at Time 2 with the Control Group), and larger GPA gains for the Goal Group seem mostly related to cognitive variables. Furthermore, it appears that in all groups, students who had the lowest GPAs pre-intervention actually experienced the largest improvements in GPA overall. As with most interventions, those individuals who initially perform most poorly often stand to benefit most greatly (i.e., regression to the mean).

CHAPTER 4

Discussion

Summary and Discussion of Results

With regard to the primary research hypotheses of this study, several conclusions can be made. First and foremost, it was found that, although both the Control and Goal Groups demonstrated grade improvements across the course of the study, only the Goal Group improvements were statistically significant. Furthermore, although there were no baseline GPA differences between groups, post-intervention grades for the Goal Group were significantly higher than post-intervention grades for the Control Group. With regard to self-reported change outcomes as measured by the *Concluding Questionnaire*, it was expected that the Goal Group would feel better emotionally than the Control Group (e.g., less sad, less anxious, more satisfied with life, less stressed) as a result of their intervention. Results from the *Concluding Questionnaire* indicated that Goal Group participants indeed self-reported significantly greater improvements than Control Group participants in Decreased Negative Emotion (a cluster of items related to feeling more satisfied with life, and less stressed, anxious, and sad). Furthermore, when compared to Control Group students, they reported significantly higher Improved Concentration (a cluster of items related to finding it easier to concentrate and study) as a result of their intervention. Follow-up analyses suggested that these two findings were linked, whereby improved concentration as a result of the goal-setting intervention was related to a decrease in negative emotion.

A secondary research hypothesis, which in retrospect appears to have primary-level importance, related to retention rates, or student maintenance of full-time course

load status. It was expected that in line with predicted changes in mood, personality, and academic performance, the goal-setting program would have a differential effect on student retention and ability to maintain course credits. Inclusion criteria for the study required that each participant state their intent to maintain at least nine course credits per semester (and stay enrolled in University) for the duration of the study. When grade data was collected, it was discovered that a number of students in the Control Group had fallen below nine credits in the post-intervention semester. Analyses showed a significant difference between the numbers of Control Group students versus Goal Group students who dropped below a full-time course load in Winter 2006. In fact, no students in the Goal Group dropped below nine credits, compared to eight students in the Control Group. Maintaining a full-time course load is highly related to ultimate degree attainment. Braxton et al. (2004) noted that greater levels of commitment to the goal of university graduation are directly proportional to the likelihood that students will persist in university (cf. Tinto, 1975). Adelman (1999) demonstrated that the ratio of a university student's number of dropped, withdrawn, and repeated courses to their overall number of attempted courses had a substantial and negative influence on ultimate degree attainment. Adelman also reported that earning fewer than 20 credits in the first year of university had a strong negative impact on degree completion.

The retention literature (as reviewed in the Introduction), however, does not provide detailed insight into potential reasons for the specific effects of a personal goal-setting intervention on maintenance of course credits, especially when one's goals might not have anything to do with school. In the present study, a follow-up analysis of goal content explored whether the type of goals that Goal Group students set as their top-

ranked goals affected post-intervention grade outcomes. Specifically, the "top goal" was assessed with regard to whether it related to academic achievement or something else (e.g., self-improvement, interpersonal relationships). The analysis suggested that GPA improvement among Goal Group students in general was not influenced by the type of top goal formulated. This provides preliminary evidence for the idea that the *process* of setting important personal goals was more important to academic outcomes than the *content* of those goals. As discussed in the Introduction, previous research has shown that having self-rated "important" goals is highly correlated with positive affect (cf. Emmons & Diener, 1986), but it does not appear that any studies have demonstrated that setting personal life goals is related to academic achievement outcomes (especially when those goals are not necessarily directly focused on academic success). Therefore, the academic achievement findings from the present study are especially salient with regard to their contribution to the literature.

Secondary research hypotheses led to an exploration of whether the goal-setting intervention would differentially improve different specific aspects of mood, as assessed directly by a series of self-report questionnaires designed to directly tap specific mood constructs. In the end, these analyses suggested no group differences in mood change, with students in both groups reporting overall improvements in symptoms related to anxiety, depression, perceived stress, and satisfaction with life. Discrepancies between these results and results from the *Concluding Questionnaire*, which suggested group differences in mood, could be due to a variety of potential factors. For instance, the Concluding Questionnaire was given on the very last day of the study, and items (see Appendices E and F) asked students to report, in retrospect, the direct effects of their

intervention on their current emotional status, for example, "As a result of completing the written goal-setting process in October/November 2005, have you felt less sad or depressed?" In contrast, items from the specific mood constructs (e.g., the *Zung Self-Rating Depression Scale*; Zung, 1965; Zung et al., 1990) were administered on a monthly basis throughout the course of the study, and asked students to report specific mood symptoms over the previous week, unrelated to how their symptoms were specifically influenced by the intervention. Therefore, it is unclear whether potential specific changes in mood by group were related to the differences in post-intervention GPA, although it appears to be unlikely, at least insofar as they were measured by the tools used in this study.

It was also expected that the Goal Group would experience differential effects on aspects of cognition related to dorsolateral prefrontal cortex cognitive ability (D-PFCA), and that they would have higher post-intervention D-PFCA scores. It was sub-hypothesized that students in the Goal Group would have higher post-intervention scores on tasks related to working memory than Control Group participants. As discussed in the Results section, both groups manifested significant (and nearly equal) improvements in their D-PFCA scores. No significant group differences were manifested on tasks related to working memory (i.e., self-ordered pointing, randomization, recency discrimination) As this was the first time the D-PFCA was given pre- and post- in a research study, and test-retest statistics have not been calculated before, it is not clear whether the improvement in overall test scores reflected actual improvement in aspects of cognition or simply test-retest effects (despite the four-month interlude between test sessions and randomized nature of tasks given in the computer battery). Many of the tasks in the

battery rely on novelty, and this might have been lost in the second administration of the test, despite the lengthy time gap. In any case, goal setting did not appear to differentially affect D-PFCA improvement over the control intervention. Therefore, it was not possible with these data (and the measure used) to test the hypothesis that goal setting would lead to improvements in D-PFCA, which would then precipitate improvements in academic performance, especially given the possibility of test-retest effects. In other words, although differential improvement in academic performance was obtained in the Goal Group versus the Control Group (see Primary Analyses section), it is not possible to ascribe this improvement to changes in D-PFCA.

Another set of analyses was used to determine whether the goal-setting program (vs. the control program) would have a differential effect on dimensions of Big Five personality. It was specifically hypothesized that the Goal Group would experience greater improvements in levels of Conscientiousness and Emotional Stability over time than the Control Group. Group differences were not found in Conscientiousness change scores. The results indicated, however, that both groups demonstrated significant improvements in Emotional Stability over time (with no group differences). These results make sense in light of the above findings demonstrating that both groups similarly improved in general aspects of mood.

There are several possible reasons for the undifferentiated (by group) improvement over time in Emotional Stability, as well as in general symptoms of depression, anxiety, perceived stress, and satisfaction with life. One explanation might point to a potential placebo effect. This was a clinical intervention study, and all students who enrolled did so presumably because they felt as though they were struggling, and

they wanted help. Furthermore, all students were provided with an "intervention." It is widely assumed in the clinical world that when one decides to seek help for a problem, and receives a response, one will benefit in some way from that very decision to seek and receive help (even if the help given is not scientifically evidenced to effect change). It is impossible to conclude that the improvements experienced by the Control Group were true rather than perceived placebo effects, however, because a non-treatment control group was not included in the study (Ernst & Resch, 1995). Moerman and Jonas (2002) argued that the meaning that a person ascribes to all of the conditions surrounding a treatment (the "meaning response") has the power to substantially affect treatment outcomes. These authors noted that there are many factors which are inevitably involved in treatment, for instance, the manner with which a provider interacts with the individual seeking treatment (e.g., enthusiastic), his or her style (e.g., therapeutic or experimental), and the language used (e.g., in the voicing or wording of instructions). In the present study, the Investigator had frequent and equivalent amounts of email and phone contact with students in both conditions over a four-month period (e.g., to send weblinks or reminders to complete surveys, and to resolve technical problems), although she did not meet the students in person until the conclusion of the study. Students were told that there was no evidence that either of the tested interventions would have an effect on academic performance, but their positive reactions to the Investigator suggested that even her controlled and automated biweekly emails had some impact on the meaning they ascribed to their study participation. The very fact that an authoritative figure (whom they knew to be a doctoral school psychology student) was remotely monitoring their progress on a biweekly basis might have (speculatively) inspired a feeling of being cared for by a

professional. This alone could have led to increases in both mood and Emotional Stability. On the last day of the study, for instance, one female student from the Control Group approached the Investigator to say that the intervention she had received had been extremely helpful, and that she had made significant academic progress as a result of her participation in the study.

Another unexpected but interesting result from the Big Five data included a significant group by time interaction effect on Agreeableness. While the Goal Group collectively increased in Agreeableness over time, the Control Group collectively decreased in this personality trait. Austin and Vancouver (1996) suggested that Agreeableness, as a personality trait, seems highly related to interpersonal goals, which regulate one's interactions with others. John and Srivastava (1999) reviewed evidence that Agreeableness has been shown to predict performance in jobs requiring teamwork (cf. Barrick et al., 2001). As discussed in the Introduction, Agreeableness is associated in the personality literature with characteristics of trustfulness, cooperation, compliance, and empathy. Although it was not found to be specifically correlated with GPA-change scores in either group, it is possible that students in the Goal Group felt as though they were improving academically as a result of the intervention, and that this positively affected their levels of Agreeableness (vice versa for the Control Group). In line with this potential explanation, Goal Group students reported significantly greater levels of Improved Concentration as a result of the intervention than Control Group students (see *Concluding Questionnaire* findings in the Results section).

Original Contribution to Knowledge

The main objective of the present study, which was largely exploratory, was to

investigate whether an intensive goal-setting program for struggling students would have positive effects not only on academic achievement, but also on well-being (mood), personality (specifically Conscientiousness and Emotional Stability), and executive functioning (specifically working memory). This exploration was based on accumulating *a priori* evidence of the effectiveness of specific short-term-goal-based interventions (e.g., coping-skills goals, work-related goals, task-specific goals) on resulting mental and physical health (e.g., injury rehabilitation, weight loss, smoking cessation), and of narrative-based interventions (e.g., trauma narration, writing about significant life transitions) on specific executive functions (e.g., working memory), and physical and mental health. At the same time, there are few to no published studies examining the effects of the process of explicating one's general, short- and long-term important personal goals on general functioning. There are studies that have investigated the effects of setting specific academic goals on specific academic progress in specific academic programs, and studies that have looked at the effects of, for example, setting specific exercise goals in order to induce weight loss, but it does not appear that anyone has ever scientifically studied the effects of intensely, and narratively, structuring one's overall future personal pathways on achievement and mental health (though there are many speculative and pop psychology books on the subject). In the same vein, no one has ever attempted to enact such changes in a two- to three-hour one-time brief online intervention involving little to no contact with other human beings. This is exactly what was attempted in the exploratory study described above, and as described in the discussion of the results above, several original findings were obtained.

Limitations and Suggestions for Future Research

One of the main limitations of the present study had to do with the potential generalizability of results. Most students who are accepted into McGill University experience high academic success in high school (Dwyer, 2006, 2007), and although there are many students at McGill who experience subjectively perceived difficulty, they have all experienced success at some point in time. It can be a challenge to identify students with low GPAs in a population of previously successful students, especially with consideration for privacy laws and the shame often associated with poor academic performance. In the present study, there were a number of students ($n = 27$) who were recruited from academic probation (with cumulative GPAs, or cGPAs, of less than 2.0), and in the preliminary planning phases of the study, students on academic probation were supposed to be the main target of recruitment. The increasing stringency of privacy laws made recruiting more students on probation difficult, however. In order to find enough study participants to run analyses, inclusion criteria for cGPA had to be heightened to a maximum cGPA of 2.99. For many students at a highly selective university such as McGill, who were used to achieving "A" grades in high school or pre-university college, cGPAs of less than 3.0 are potentially truly indicative of academic difficulty. At other, less selective universities, a GPA between 2.00 and 2.99 might be considered to be reflective of academic success. This was part of the reason that recruited students were also asked to identify whether or not they perceived themselves as experiencing difficulty in school (regardless of GPA); a student with a 2.3 GPA who did not report that he or she was struggling would not be included in the study. At the same time, the interventions used in this study were still used with students who had been previously successful in

school. Furthermore, every student who was recruited into the study expressed concern about his or her current level of achievement in school, and was therefore probably more motivated than students not enrolled in the study who were doing poorly. It will be important for future research in this area to investigate the effectiveness of personal goal setting on the academic achievement of students from a variety of school-types, for example, a range of 4-year universities, 2-year universities, and post-secondary certificate programs (in a range of sizes and geographic locations), as well as with students experiencing a range of academic success.

Another related potential limitation of this study (or suggestion for future research) concerns sample size. For the present study, the sample of $N = 85$ students used in academic achievement analyses was large enough to demonstrate an effect of goal setting on grades and course retention. With larger numbers and greater resulting statistical power, however, more subtle effects might be detected (e.g., connections with personality, mood, or cognitive variables). Furthermore, future studies of this type might benefit from larger-scale recruitment, because greater numbers of study participants can facilitate more detailed analyses. If there had been greater funds and opportunity for recruitment in the present study, statistical analyses could have included, for example, an exploration of differences between students in different grade cohorts (years). Such an analysis might help to identify the grade-level (if any) in which goal setting has the greatest effects.

It would have also been ideal to recruit a "no-treatment" control group in examining the effects of intensive personal goal setting on academic achievement, mood, personality, and executive functioning. This would have aided in the determination of

whether specific results were influenced by the fact that students were given *any* intervention (and attention), and could have ruled out possible placebo effects. In the present study, it was decided that potential issues with validity and ethics posed by the recruitment and use of a non-treatment clinical control group were too problematic to warrant anything but a comparative design with a "control" treatment intervention (Basham, 1986). An ideal way to include a no-treatment control group in future studies might be to recruit students without discrimination for their academic status (in order to see the effects of the goal-setting program on a non-"clinical" sample). If all first-year students of a particular university were recruited to participate in a study like this, there would be fewer ethical issues in using a control group without an intervention component.

Furthermore, if resources were more substantial, future studies on the effects of goal setting might benefit from a longer follow-up period. In the present study, students were followed over the course of one academic year. It would have been interesting to see whether there continued to be grade and retention effects 2 or 3 years past the intervention. This kind of longitudinal follow-up (in future studies) could aid in allowing investigators to make practical recommendations for when "booster" goal-setting sessions might be helpful.

Finally, future investigations should continue to explore the reasons that grades and retention (and even personality) were differentially affected in students who went through an intensive narrative personal goal-setting program. Other types of mood measures could be used, as well as other cognitive tests.

Practical Applications for School and Educational Psychology

In many ways, the study outlined in this dissertation is a straightforward application of school or educational psychology. In this investigation, a clinical "treatment" intervention was tested on a group of struggling university students in order to see whether it had positive effects on academic success and mental health. The intervention used in this study could potentially be used preventatively by academic institutions with first-year university students to help them establish goals early on and increase their likelihood of academic success, or it could be used as a University-recommended brief treatment for students who have fallen into academic probation. According to Kuh et al. (2007), "Institutions that have established a sense of shared responsibility for student success are characterized by a high degree of respect and collaboration among community members and have made student success important to everyone" (p. 99). Factors like community respect and collaboration are important for developing and maintaining school climate, which has an obvious impact on a school's ability to retain students.

With regard to potential applications of this intervention to students in earlier stages of their education, there are also clear benefits, as grade school or high school success and completion is far more relevant and fundamental to the majority of youth than a university education. The program used in this study could easily be modified for a younger population; in fact, the version of the program used in this study (based on a version designed for older adults by Peterson & Mar, 2004) was specifically modified for a university-population sample and age group. Alternatively, even the evidence-based principles of goal setting incorporated throughout the program could theoretically be

applied separately, consecutively, or in stages (perhaps with different media formats) with younger children.

Indeed, the fact that this program is not, at its core, an "academic success program" is probably an asset. Personal, self-improvement, relational, and other nonacademic goals appeared in the present study to be as important to academic functioning as academic goals themselves. Along these lines, Richert (1991) argued that it is fundamental to develop self-concept in adolescence, and stated that the social, emotional, and ethical development of a child should be considered more important than academic achievement. Intensive and structured personal goal setting, even with the aid of a mentor, could certainly be seen as a means of ripening self-concept, self-efficacy, and self-regulation skills, all of which could be viewed as contributing to a child's positive social and emotional development and achievement capability. When children learn how to break down difficult goals into intermediate and manageable tasks, a sense of control and proficiency is triggered; this both bolsters further motivation and thwarts any burgeoning feelings of discouragement (Webb et al., 1982). In addition, when underachieving children establish goals, it is almost as if they are creating a new set of personal standards. According to Bandura (1977), "Perceived negative discrepancies between performance and standards create dissatisfactions that motivate corrective changes in behavior" (p. 193).

A fundamental lesson is that children must be given choices and required to make decisions while setting their own goals. Discipline and motivation must be shifted from dependence on teachers or parents to internal feelings and values as the prime basis for action. Parents and educators must remember that there is an important difference

between *their* goals for the child, and the child's personal goals. Internal emotional conflict and underachievement can result when parents and educators push youth to excel in areas that are not intrinsically motivating for the child, or when they encourage future plans that are out of line with the goals of their children (Reis, 1998). In school, the highest levels of productivity result when students self-select topics to investigate (Baum et al., 1995). The same reasoning should also apply outside of academic settings (e.g., career, hobbies, extracurricular activities, personal creative projects).

It is also the case that placing too much emphasis on academic performance can lead to perfectionistic tendencies, the setting of unrealistically high goals, and a debilitating emotional burden. Demanding goals and high pressure can often precipitate high levels of anxiety. According to Brunstein (1993), "High levels of goal commitment combined with negative appraisals of goal attainability may have detrimental effects on the development of subjective well-being" (p. 1068). When anxiety grows too intense, it can cause an individual to worry excessively and to be unable to concentrate effectively on the tasks at hand and mastery of subgoals, contributing to significant disruption in performance on complex tasks (Locke et al., 1981; Wine, 1971). Thus, in fostering "achievement" per se, parents and educators must address the difficult task of moderating the perceived importance of grades and test scores for a child (Grant, 1995), and instead place greater emphasis on encouraging the process of personal goal setting. When children are able to clearly specify intrinsically appealing short-term and long-term life goals, their levels of motivation, self-concept, self-efficacy, and subjective well-being should be enhanced (regardless of whether these specific goals are ever achieved). In turn, their cognitive processes are likely to operate more efficiently, and it can be

expected that they will perform more successfully on relevant tasks both in and out of school. It is imperative that children be encouraged and enabled to assume increasing responsibility for their own learning. They need to understand for themselves how an academic education can impact the attainment of their long-term goals.

Conclusion

The main objective of the present study was to investigate the effects of intensive personal goal setting on academic success. Secondary goals aimed to explore whether there were also effects on executive functioning, personality, and mood. The results yielded positive results that an easily administered, standardized, brief, at-home, and computerized goal-setting intervention can have a significant and differential impact on academic success in struggling university students. Although the control intervention tested in this study appeared to have positive impact on variables related to mood and cognition (in the same manner as the goal-setting intervention), it was also demonstrated that being in an intervention study alone (regardless of the intervention) was not enough to specifically affect academic achievement. Students appeared to need to plan and focus on their future in order for real changes to occur. The main limitations of the present study include potential restrictions on generalizability and the absence of a no-treatment control group. Findings and recommendations for future investigations were discussed within the current context of literature related to educational psychology and academic success. It is hoped that future studies will provide further insight into the reasons for and ways in which goal-setting impacted academic achievement, and will determine the specific moderators and mediators of that change.

> In the life of the spirit, academic achievement is not an end, or even a means, but a consequence of pursuing certain goals and enacting certain motivations. Love of learning, curiosity about the natural world, the pursuit of a vocation; the desire to create, improve the world, develop oneself, devise a philosophy of life, acquire virtue, and find truth--these are motivations and goals of the spirit.
>
> (Grant, 1995, p. 132)

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Appendix A

Ethics Approval Forms (Original and Amendment)

McGill

Faculty of Education – Ethics Review Board
McGill University
Faculty of Education
3700 McTavish; Room 230
Montreal H3A 1Y2

Tel: (514) 398-7039
Fax: (514) 398-1527
Ethics website: www.mcgill.ca/rgo/ethics/human

Faculty of Education – Review Ethics Board
Certificate of Ethical Acceptability of Research Involving Humans

REB File #: 548-0505

Project Title: ***Goal Setting: Effects on Executive Function and Academic Achievement***
Applicant's Name: Dominique Morisano **Department:** Ed. Psych.

Status: ~~Faculty~~ Ph Student **Supervisor's Name (if applicable): Bruce Shore**
Granting Agency and Title (if applicable): _____

Type of Review: Expedited ✓ Full _____

This project was reviewed by: Lyster/Starke-Meyerring

Approved by
R Lyster June 2/05
Signature/Date

Roy Lyster, Ph.D.
Chair, Education Ethics Review Board

Approval Period: June 2/05 **to** June 2/06

All research involving human subjects requires review on an annual basis. An Annual Report/Request for Renewal form should be submitted at least one month before the above expiry date. If a project has been completed or terminated for any reason before the expiry date, a Final Report form must be submitted. Should any modification or other unanticipated development occur before the next required review, the REB must be informed and any modification can't be initiated until approval is received. This project was reviewed and approved in accordance with the requirements of the McGill University Policy on the Ethical Conduct of Research Involving Human Subjects and with the Tri-Council Policy Statement on the Ethical Conduct for Research Involving Human Subjects.

6/2/05

McGill University

ETHICS REVIEW - AMENDMENT REQUEST FORM

This form can be used to submit any changes/updates to be made to your currently approved research project. Explain what these changes are, and attach any relevant documentation that has been revised. Significant changes that have ethical implications must be reviewed and approved by the REB before they can be implemented. This form is also to be used for indicating changes to funding and personnel.

REB File #:
Project Title: Goal Setting: Effects on Executive Function and Academic Achievement
Principal Investigator: Dominique Morisano
Department/Phone/Email: Educational & Counselling Psychology/514-398-4253/ nika.morisano@mail.mcgill.ca
Faculty Supervisor (for student PI): Bruce M. Shore and Robert O. Pihl (Department of Psychology)

Addition to Methodology: The Principal Investigator spoke with all interested potential participants by phone for 10-15 minutes before any materials were sent out. All participants were informed that there were at least two different "interventions" being tested in the study, and that they would be randomly assigned to one of these two intervention groups. Students were told that there were three possible outcomes to the study: (A) neither intervention would have an effect on academic performance or cognition; (B) both interventions would have an effect on academic performance or cognition; or (C) one intervention would have an effect on academic performance or cognition, and the other wouldn't. Students were told that if (C) was the outcome, and one intervention turned out to be significantly more effective than the other with regard to its effects on academic performance or cognition, they would be offered the "more successful" intervention in addition to receiving payment for their time in the study (if they had been in the group given the "less successful" intervention).

Principal Investigator Signature: Dominique Morisano Date: Feb. 10, 2006

Faculty Supervisor Signature: R.O. Pihl Date: Feb 10, 2006
(for student PI)

For Administrative Use **REB:** ___AGR ✓EDU ___REB-I ___REB-II

____ Expedited Review ____ Full Review

✓ This amendment request has been approved.

Signature of REB Chair/ designate: [signature] Date: Feb 14, 2006

Submit to Lynda McNeil, Research Ethics Officer, James Administration Bldg., rm 419, tel:398-6831fax:398-4644

(version January/02)

Appendix B

Retention Rates (12-credit Criteria)

Students who maintained at least twelve credits or more during the semester immediately following the intervention were compared to those students who took eleven credits or fewer (or dropped out completely). The cut-off point of twelve credits was determined by McGill University's criterion for what constitutes a "full-time" semester. In order to determine whether the proportion of students within each group differed with regard to maintenance of a full-time course load (or even maintaining enrolment through the end of the post-intervention semester), a Pearson Chi-Square analysis was conducted. The retention rate difference between groups was significant when all students were included in the analysis ($N = 101$), $\chi^2(1) = 5.95$, $p = .02$. Significantly more students in the control group than in the experimental group dropped below a "full-time" course load in Winter 2006. Four students in the experimental (goal) group (7.8%) dropped below twelve credits in the semester post-intervention, while 13 students in the control group (26%) dropped below twelve credits, with two withdrawing from all of their courses completely by the end of the semester.

A Pearson Chi-Square test was also conducted with a partial sample of 85 students (the same set of students used in before-after GPA analyses), in order to show that a similar general retention pattern applied across this group as well. Pre-intervention (Time 1) data were available for these 85 students on the number of credits taken during the GPA1 semester (semester immediately before the intervention semester with at least 9 credits--see Methods for details). There was no statistically significant difference between the number of credits in the pre-intervention semester taken by control-group

participants ($M = 13.21$, $SD = 1.68$) and experimental-group participants ($M = 13.88$, $SD = 1.91$), $t(83) = 1.69$, $p = .09$ (two-tailed), and the effect size was small-to-moderate, $d = .36$. The retention rate difference between groups was again significant when the partial sample was used ($n = 85$), $\chi^2(1) = 7.38$, $p = .01$. Four students in the experimental (goal) group (8.9%) dropped below twelve credits in the semester post-intervention, while 13 students in the control group (32.5%) dropped below twelve credits, with two withdrawing completely. Again, whether 12-credit or 9-credit criteria are used to illustrate retention rates (see Results section for 9-credit analyses), the resulting pattern is the same.

Appendix C

Goal Group Website Front Page

Welcome to our performance study

Main Menu

Please make sure that you have the username and password that you were given or emailed by Nika Morisano, the primary researcher.

We recommend dividing up your participation into three sessions. Take a break between each, or complete them on different days.

When you click on a blue hyperlink below, you will be taken to the appropriate questionnaire or task. Once you are finished, you will be returned to this page, and you can click a new questionnaire or task.

Session 1: Time required: 1.5 hours

1. NBA: Informed Consent
2. NBB: Demographics
3. NB0: BFI: COMPLETE
4. NB1: DIENER
5. NB2: PSS
6. NB3: DZUNG
7. NB4: IPIP-JPI
8. NB5: AZUNG

Session 2: Time required: 1-2 hours

1. ExamCorp Battery

Session 3: Time required: 2 - 2.5 hours

1. NE1: FA

Thank you very much for participating. If you have any questions, please contact Nika Morisano at mcgillstudy@gmail.com

Appendix D

Control Group Website Front Page

Welcome to our performance study

Main Menu

Please make sure that you have the username and password that you were given or emailed by Nika Morisano, the primary researcher.

We recommend dividing up your participation into three sessions. Take a break between each, or complete them on different days.

When you click on a blue hyperlink below, you will be taken to the appropriate questionnaire or task. Once you are finished, you will be returned to this page, and you can click a new questionnaire or task.

Session 1: Time required: 1.5 hours

1. NBCA: Informed Consent
2. NBCB: Demographics
3. NBC0: BFI: COMPLETE
4. NBC1: DIENER
5. NBC2: PSS
6. NBC3: DZUNG
7. NBC4: IPIP-JPI
8. NBC5: AZUNG

Session 2: Time required: 1-2 hours

1. ExamCorp Battery

Session 3: Time required: 2 hours

1. NC1: Writing Task
2. NC2: CEI/PGI/GRAT
3. NC3: MLQ/MF/INSP
4. NC4: Strong Interest Inventory

Thank you very much for participating. If you have any questions, please contact Nika Morisano at mcgillstudy@gmail.com

Appendix E
Concluding Questionnaire for Control Group

For each of the following questions, please put a tick mark on the line below it in a position (on the continuum) that corresponds with how you feel. Please try to answer accurately and honestly. Thanks very much!

1. Would you recommend the writing and career interest inventory exercises that you have gone through to someone else who is struggling academically?

   No _____ Yes

2. To what extent would you suggest that others who are struggling academically try the writing and career interest inventory exercises that you completed?

   Would Not Suggest _____ Would Strongly Suggest

3. How seriously did you take the writing and career interest inventory exercises?

   Not At All Seriously _____ Very Seriously

4. How seriously did you know take the associated tasks (for example, filling out follow-up surveys, completing the *ExamCorp Battery*)?

   Not At All Seriously _____ Very Seriously

5. To what extent did you take part in this experiment for the money you could earn?

   Completely Unimportant _____ Only Reason

6. To what extent did you take part in this experiment for the potential academic or cognitive gains?

   Completely Unimportant _____ Only Reason

7. How helpful did you find the writing and career interest inventory exercises to be?

   Not At All Helpful _____ Very Helpful

8. How would you rate the value of taking part in this study?

   Not At All Valuable _____ Very Valuable

Instructions: Now think back to when you first joined this study in Fall 2005, and try to answer honestly and thoughtfully about any changes you have experienced since becoming a participant in our study and completing the goal-setting process. Either put a tick mark on the continuum between Yes and No, or check the "Not Applicable" (N/A) box if it applies to you.

9. Since you completed the writing and career interest inventory exercises in Oct/Nov 2005, have you found it easier to study?

   No _____ Yes

10. Since you completed the writing and career interest inventory exercises in Oct/Nov 2005, have you found that you have been able to concentrate better?

    No _____ Yes

11. As a result of completing the writing and career interest inventory exercises in Oct/Nov 2005, do you think your grades have improved (or that they will improve)?

    No _____ Yes

12. As a result of completing the writing and career interest inventory exercises in Oct/Nov 2005, have you felt less emotionally stressed?

    No _____ Yes

13. As a result of completing the writing and career interest inventory exercises in Oct/Nov 2005, have you felt less anxious?

    No _____ Yes

14. As a result of completing the writing and career interest inventory exercises in Oct/Nov 2005, have you felt less sad or depressed?

    No _____ Yes

15. As a result of completing the writing and career interest inventory exercises in Oct/Nov 2005, have you felt more satisfied with your life in general?

    No _____ Yes

16. As a result of completing the writing and career interest inventory exercises in Oct/Nov 2005, have you been more conscientious about things that you need to do in general?

    No _____ Yes

Appendix F

Concluding Questionnaire for Goal Group

For each of the following questions, please put a tick mark on the line below it in a position (on the continuum) that corresponds with how you feel. Please try to answer accurately and honestly. Thanks very much!

1. Would you recommend the goal-setting process that you have gone through to someone else who is struggling academically?

   No _____ Yes

2. To what extent would you suggest that others who are struggling academically try the written goal-setting exercise that you completed?

   Would Not Suggest _____ Would Strongly Suggest

3. How seriously did you take the goal-setting process?

   Not At All Seriously _____ Very Seriously

4. How seriously did you take the associated tasks (for example, filling out follow-up surveys, completing the *ExamCorp Battery*)?

   Not At All Seriously _____ Very Seriously

5. To what extent did you take part in this experiment for the money you could earn?

   Completely Unimportant _____ Only Reason

6. To what extent did you take part in this experiment for the potential academic or cognitive gains?

   Completely Unimportant _____ Only Reason

7. How helpful did you find the goal-setting experience to be?

   Not At All Helpful _____ Very Helpful

8. How would you rate the value of taking part in this study?

   Not At All Valuable _____ Very Valuable

Instructions: Now think back to when you first joined this study in Fall 2005, and try to answer honestly and thoughtfully about any changes you have experienced since becoming a participant in our study and completing the goal-setting process. Either put a tick mark on the continuum between Yes and No, or check the "Not Applicable" (N/A) box if it applies to you.

9. Since you completed the written goal-setting process in October/November 2005, have you found it easier to study?

   No _____ Yes

10. Since you completed the written goal-setting process in October/November 2005, have you found that you have been able to concentrate better?

    No _____ Yes

11. As a result of completing the written goal-setting process in October/November 2005, do you think your grades have improved (or that they will improve)?

    No _____ Yes

12. As a result of completing the written goal-setting process in October/November 2005, have you felt less emotionally stressed?

    No _____ Yes

13. As a result of completing the written goal-setting process in October/November 2005, have you felt less anxious?

    No _____ Yes

14. As a result of completing the written goal-setting process in October/November 2005, have you felt less sad or depressed?

    No _____ Yes

15. As a result of completing the written goal-setting process in October/November 2005, have you felt more satisfied with your life in general?

    No _____ Yes

16. As a result of completing the written goal-setting process in October/November 2005, have you been more conscientious in general?

    No _____ Yes

Appendix G

Description of ExamCorp Battery: Background, Tasks, and Scoring

Reproduced directly from Higgins et al., 2007, pp. 301-302, with permission from the authors:

"Dorsolateral Prefrontal Cognitive Tasks

We defined D-PFCA as performance on a computerized battery of seven neuropsychological tasks. Originally derived from clinical neuropsychological studies (Milner & Petrides, 1984; Milner, Petrides, & Smith, 1985), these tasks have been associated as specifically as possible with dorsolateral prefrontal cortical function, as evidenced by a minimum of one well-designed clinical study of brain-damaged patients, lesion studies with nonhuman primates, and neuroimaging studies of non-brain-damaged people. Performance on these tasks has variously been associated with alcoholic propensity (Peterson, Finn, & Pihl, 1992), alcohol-related aggression (Lau, Pihl, & Peterson, 1995), physical aggressiveness in boys (Séguin, Nagin, Assaad, & Tremblay, 2004; Séguin, Pihl, Harden, Tremblay, & Boulerice, 1995), and school performance (Peterson, Pihl, Higgins, Séguin, & Tremblay, 2003). Administration of the battery, which includes the following tasks, requires approximately 90 min.

Conditional associative learning: Introduction. Petrides (1985b, 1987) designed two conditional associative tasks to demonstrate that the deficits seen in delayed response tasks in monkeys with frontal damage may reflect an inability to learn conditional behavioral rules (if Cue A, then Response X; else, if Cue B, Response Y) rather than a working memory deficit. In the rhesus monkey, periarcuate lesions (Area 8, Rostral Area 6), but not periprincipalis lesions, produce impairments on both spatial (Petrides, 1987)

and nonspatial (Petrides, 1982, 1985a) conditional associative tasks. In humans, unilateral surgical excisions (for the treatment of epilepsy) of the left or right frontal lobes produce impairments on both the spatial (Petrides, 1985b) and nonspatial (Petrides, 1985b, 1990) versions of this task. Using PET, Petrides, Alivisatos, Evans, and Meyer (1993) also found selective activation in Area 8 of the left frontal cortex during performance of the nonspatial version of this task. A symmetrically reinforced go/no-go task may also be conceptualized as a conditional task, with correct performance dependant on mastery of a conditional rule: If X, go; else, if Y, do not go (Petrides, 1987). As with the conditional associative tasks, monkeys with periarcuate lesions are impaired on this go/no-go task relative to monkeys with periprincipalis lesions and normal controls (Petrides, 1986, 1987).

1. Spatial conditional associative task. The participant is presented with five identical circles and five identical squares arranged in a fixed spatial array. The participant is instructed that each square is associated with exactly one circle. On each trial, a circle is highlighted, and the participant is required to click the square he or she believes might be associated with that circle. If the participant chooses the correct square, the word "Correct" appears on the screen, the trial is scored as correct, and the next trial begins. If the participant chooses an incorrect square, the word "Wrong" appears on the screen, the trial is scored as incorrect, and the participant is allowed to continue to guess until he chooses the correct square. Only when the participant clicks the correct square does the next trial begin. The task is terminated when the participant completes 10 consecutive correct trials or completes 100 trials, whichever comes first. The participant completes two different versions of this task (differing in the spatial arrangement of the

shapes) and receives a raw score equal to the total number of trials completed across both versions.

2. Nonspatial conditional associative task. This task is similar to the spatial version except that the spatial aspect has been removed. The participant is explicitly required to learn arbitrary associations between cue words and target words. There are five cue words and five target words. The participant is instructed that each cue word is associated with exactly one of the target words. On each trial, the participant is presented with a cue word (in the center of the screen) and all five target words (arranged in a circle around the cue word). The relative position of each of the target words varies randomly from trial to trial. The participant is instructed to click the target word he or she believes might be associated with the cue word. If the participant chooses the correct target word, the word "Correct" appears on the screen, the trial is scored as correct, and the next trial begins. If the participant chooses an incorrect target word, the word "Wrong" appears on the screen, the trial is scored as incorrect, and the participant is allowed to continue to guess until he or she selects the correct word. Only after clicking the correct word does the next trial begin. The task is terminated when the participant completes 10 consecutive correct trials or completes 100 trials, whichever comes first. The participant completes two different versions of this task (the first employs regular words, whereas the second uses nonwords [e.g., *egtao*]) and receives a raw score equal to the total number of trials completed across both versions.

3. Go/no-go. The participant is presented with four stimuli (letters) flashing sequentially, repeatedly, and in random order on the screen. Each appearance of a letter constitutes a trial. The letters are displayed for 2 s. The intertrial time is a Gaussian-

distributed random number with a mean of 600 ms and a standard deviation of 300 ms. Two of the letters are go stimuli, and two are no-go stimuli. The participant is told that he or she should click when certain letters appear and not click when others appear. Whenever the participant makes a correct response (clicking on a go trial or not clicking on a no-go trial), he or she is rewarded by the appearance of the word "Good" and by an increase in his or her score by 1 point (the score is displayed throughout the task). The task is terminated after 200 trials or after 20 consecutive correct trials. The raw (error) score is the number of trials completed.

Working memory: Introduction. Patients with unilateral left and right frontal lobe surgical excisions perform poorly on the self-ordered pointing task relative to brain-damaged and normal controls (Petrides & Milner, 1982; Wiegersma, van der Scheer, & Human, 1990). In monkeys, this deficit appears to be specific to mid-dorsolateral frontal cortex (Areas 9 and 46), rather than the more posterior dorsolateral cortex (Areas 6 and 8; Petrides, 1995b). PET has identified activation foci in Areas 46 and 9 in (normal) humans while performing this task (Petrides et al., 1993). Patients with frontal lobe lesions also appear impaired on an analogous verbal working memory task, the digit span randomization task (Wiegersma et al., 1990). Once again, PET has revealed bilateral activation in mid-dorsolateral frontal cortex, Areas 46 and 9 (Petrides, Alivisatos, Meyer, & Evans, 1993). Finally, frontal lobe damage also appears associated with poor performance on a recency discrimination task (Milner et al., 1985). When presented with a series of concrete representational drawings or abstract figures, for example, patients with unilateral right frontal lobe damage appear impaired relative to normal and brain-damaged controls. When words are used instead of pictures, both left and right frontal

damage is associated with poor performance.

Petrides (1989, 1995a, 1998, 2000) argued that all these tasks reflect the importance of the frontal cortex for working memory. According to his two-level hypothesis, ventrolateral frontal cortex interacts with temporal and parietal association areas and mediates encoding and retrieval of information in short-term and long-term memory. The mid-dorsolateral frontal cortex, on the other hand, is responsible for the simultaneous manipulation and monitoring of multiple pieces of information in working memory (Petrides, 1998). Areas 46 and 9 appear critically involved in this latter function, and performance on the self-ordered, randomization, and recency discrimination tasks reflects the activity of this middorsolateral memory system (Petrides, 1989).

4. Self-ordered pointing task. The participant is presented with 12 stimuli and instructed to click on each stimulus exactly once. There is no time limit. After each trial (or selection), the spatial location of each stimulus immediately changes, thus removing any spatial aspect of the task. The participant is allowed to make only 12 selections. The participant completes four version of the task, each using different classes of stimuli: abstract figure pictures, pictures of easily named objects, words, and nonwords (e.g., *xworl*). The raw score for this task is the number of distinct stimuli selected across all four versions (i.e., 48 - number of errors).

5. Randomization task. For each trial, the participant is asked to input a random sequence of letters for a given letter span (e.g., participants were asked to "randomize the letters from L to O," i.e., a four-letter span). The participant enters letters by using the computer monitor and the mouse. The monitor shows one of the letters from the letter span. If the participant moves the mouse (in any direction), the letter will change. As the

participant continues to move the mouse, new letters are displayed. While the mouse is moving, the display will cycle forward through all the letters in the span, beginning again at the first letter after the last letter has been displayed. To select a letter, the participant clicks the mouse button while the letter is on the screen. If the participant produces an acceptable sequence, he or she is asked to randomize a span one letter longer than the previous span. If the participant makes an error (omission or patterned sequence, e.g., L, M, N), he or she is given a second chance to randomize a span of the same length. Before beginning the task proper, the participant must successfully randomize 2 four-letter-span practice trials. After this, the participant begins the scored trials with a letter span of four. The task terminates when the participant fails to randomize a given length span two trials in a row or when he or she correctly completes all trials (span length 4–14). The raw score is the maximum length of span successfully randomized.

6. Recency discrimination task. On a typical trial, the participant is sequentially presented with a series of (either six or eight) familiar nouns. Each word appears for 800 ms and is followed by a delay of 100 ms before the next appears. After all the words in the sequence have been presented, the participant is shown two words from the sequence and asked to "click on the word that appeared most recently." The participant completes eight trials with six words and 14 trials with eight words. The raw score is the number of trials for which the participant correctly identified the more recent word.

Word fluency: Introduction. Both Milner and Benton (reviewed in Damasio & Anderson, 1993, p. 435) have demonstrated that patients with left (but not right) frontal lobe damage manifest impairment on Thurstone's Word Fluency Test without presenting with typical aphasia. Although patients with left frontal damage are impaired on a word

fluency task, both left and, more particularly, right frontal damage appears associated with deficits on a design fluency task (Milner & Petrides, 1984). PET studies have demonstrated increased activation in left dorsolateral prefrontal cortex in normal participants while performing a verbal fluency task (Frith, Friston, Liddle, & Frackowiak, 1991) and that the level of bilateral frontal lobe activity measured during a resting state scan is negatively correlated with the number of words produced (Boivin et al., 1992).

7. Word fluency task. The participant is instructed to enter as many words as possible beginning with *ST.* He or she is instructed not to use inflected forms and is given 5 min to complete the task. The participant enters words by clicking an on-screen keyboard using the mouse. The letters on this keyboard are arranged in alphabetical order, and letters appear on the screen as they are selected. The raw score is the number of valid words entered.

D-PFCA scoring. A sample of 444 participants was used to establish scaled scores for each task. The scaled scores were standardized normal scores (Anastasi & Urbina, 1997), determined by calculating a percentile rank for each participant (based on raw scores) and computing the *z*-score equivalent (based on the inverse probability function) of this percentile rank. This resulted in a raw score to (*z*-score equivalent) scale score mapping. In this standard sample of 444, the average intercorrelation among the dorsolateral prefrontal cognitive tasks (scaled scores) was .27. The internal consistency reliability coefficient, or coefficient, for these tests, when taken as a composite, was .72. An aggregate dorsolateral prefrontal cognitive performance score, D-PFCA, was calculated for each participant as the average of the scaled scores across the seven dorsolateral prefrontal cognitive tasks."

Appendix H

Informed Consent Form

NBCA: Informed Consent

Informed Consent Procedure

Please read over the following consent form carefully. It describes what you will be asked to do while serving as a participant in this study.

FOR QUESTIONS ABOUT THIS RESEARCH, CONTACT:

The Principle Investigator: Nika Morisano, M.A., Department of Educational and Counselling Psychology, Faculty of Education, 3700 McTavish, 514-398-4253 or mcgillstudy@gmail.com, or one of my faculty supervisors, Dr. Robert Pihl at robert.pihl@mcgill.ca or Dr. Bruce Shore at bruce.m.shore@mcgill.ca.

PURPOSE OF THE STUDY:

The study is designed to examine the relationship between personality and cognitive characteristics of university students, their grades, and interventions designed to improve academic performance.

PROCEDURES:

You will be asked to work through a series of web-based questionnaires and tasks over the next four months, in three stages:

Stage 1:

Stage 1 has three parts, each of which take between 1 and 2 hours. This is the most time-consuming part of the experiment, but you can do it at home or wherever you have access to a computer that is connected to the web.

It includes (1) demographic, personality and mood questionnaires, (2) a series of online cognitive tests and inventories, and (3) a writing exercise. These are to be completed by October 25.

Stage 2:

Beginning two weeks after October 25, you will be emailed a link to one or more brief questionnaires, which may include some you have already completed, every two weeks for the next three months. These questionnaires will take approximately 5-7 minutes to complete, and will need to be completed as soon as possible after you receive the link.

Stage 3:

You will be asked to repeat the cognitive tests after 3-4 months. After finishing this, you will be asked to attend a single lab session, complete a standardized test, and sign a release for your official university transcript.

The study should take about 10-12 hours of your time, spread out over 4 months (with the first 5 hours occurring within the first 2 weeks). When you complete all tasks and sign the release form that will allow us access to your official university transcript, you will receive $80 as compensation for your participation.

You may withdraw from the study at any time, by notifying the Principal Investigator (Nika Morisano). Withdrawing would have no effect on your status at your University.

CONFIDENTIALITY:

Your individual privacy will be maintained in all published and written data resulting from this study and all information will be kept confidential. You will be asked to provide your name, University Student ID Number, email address, and phone number. However, your questionnaire and test answers will be recorded using a username provided to you by the principal investigator, and will not be associated with your ID.

The completed measures and any academic record information obtained as a part of this study will be viewed by the Primary Investigator (Nika Morisano) and her advisors. Only Nika Morisano, as the Principle Investigator, will view this information before it is rendered anonymous no one else will have access to the identity of participants.

All materials will be held confidentially in a secure computer location.

RISKS:

There are no known risks to participating in this research.

BENEFITS:

This research has been designed to assess various means of improving student academic performance. However, the current interventions have not yet been scientifically validated, so there are no guarantees that they will work.

COSTS and COMPENSATION:

There is no cost to you for participation in this research. After your participation in the study is complete, you will receive compensation of $80.

VOLUNTEERING FOR THE STUDY:

Your participation is voluntary. Your refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled as a student of your University. You may withdraw from the study at any time by contacting the investigator. All data that can still be identifiably attributed to you will be withdrawn by the investigator and destroyed (e.g., your web survey responses and any emails will be deleted).

If you have any questions about your rights as a participant in a research project, you may contact (anonymously, if you wish) the Education Research Ethics Board, Faculty of Education, 3700 McTavish, McGill University, phone 514-398-7039.

PARTICIPANT STATEMENT

BY ENTERING MY NAME BELOW, I AM CONFIRMING THAT I HAVE READ THE EXPLANATION PROVIDED TO ME ABOVE AND AGREE TO PARTICIPATE. I UNDERSTAND THAT MY PARTICIPATION IN THIS STUDY IS STRICTLY VOLUNTARY. THE TYPING OF MY NAME IN THE BOX BELOW INDICATES THAT I AM AT LEAST SIXTEEN YEARS OF AGE AND I AM GIVING MY INFORMED CONSENT TO BE A PARTICIPANT IN THIS STUDY.

If you agree with above statement, please type your name in the box below and click "Done".

If you do not agree with the above statement, please click on the "Cancel" button.

Done Cancel

Appendix I

Demographics Questionnaire

NBCB: Demographics

Your Background Information

Please complete the following information by either checking off the appropriate box or filling in the box. Required information is starred * (you will not be able to complete the survey unless you answer these), but please try to give answers to all questions that apply to you.

1. Full Name (as it appears on University records)*

2. Current Email Address:*
Note: This will be used to send you reports or your results, questionnaires, and/or links to questionnaires that are necessary for completion of the study. Please enter an email address that you will check often.

3. Current Phone Number (please enter area code first):*

Phone:

Is it OK to leave a message at this number (yes or no)?

4. Sex:*

- Male
- Female

5. Race/Ethnicity:*

- African Origin/Black (Non Hispanic)
- European Origin/White/Caucasian (Non Hispanic)
- Asian/Pacific Islander
- Hispanic/Latino
- Native American or Canadian/Aboriginal/Alaska Native/First Nations/Inuit
- Other, please specify

6. Age:*

-- Please Select --

7. First Language:*

8. Other languages spoken fluently (if applicable):

9. Are you studying in English for the first time?*

- Yes
- No

10. Are you currently in academic "probationary" standing (yes or no)? If yes, is the number of classes you are allowed to take under restriction (and how many classes are you taking)?*

11. Number of prior semesters at university:*

-- Please Select --

12. In what year did you graduate from high school?*

-- Please Select --

13. What was your average grade in high school?*

-- Please Select --

14. If applicable, in what year did you graduate from Cégep?

-- None --

15. What was your overall CÔTE R?
(if you are a student from Quebec who attended Cégep)

-- None --

16. In deciding to go to university, how important to you was each of the following reasons?*
Select one answer for each possible reason.

	Not Important	Somewhat Important	Very Important
My parents wanted me to go to university			
I could not find a job			
Wanted to get away from home			
To be able to get a better job			
To gain a general education and appreciation of ideas			
There was nothing better to do			
To make me a more cultured person			
To be able to make more money			

To learn more about things that interest me	○	○	○
To prepare myself for graduate or professional school	○	○	○
A mentor/role model encouraged me to go	○	○	○
To get training for a specific career	○	○	○
To find my purpose in life	○	○	○

17. Where did you mostly grow up (i.e., what is your "home town")?*

Town/City:

State/Province:

Country:

18. Where did you live immediately before you came to university?

Town/City:

State/Province:

Country:

19. Where does your family, parent(s), or guardian(s) live now?

Town/City:

State/Province:

Country:

20. What is your best estimate of your parent(s)' or guardian(s)' total income last year? Consider income from all sources before taxes, and if the income is in another currency, please estimate the amount in Canadian dollars.*
Select one.

-- Please Select --

21. What is your date of birth?*

mm/dd/yyyy

22. What is your actual or intended major in your undergraduate studies?*
If you are undecided, please write "undecided."

23. What is your actual or intended Minor or specialization?
(if applicable)

24. Are you currently receiving tutoring in any course(s)?*
Please answer Yes or No in the first line. If Yes, please answer the two questions below.

Yes or No?

If yes, in what course(s)?

If yes, how many hours of tutoring do you receive per week (on average)?

25. Have you received tutoring in any subject in the last 6 months?*
Please answer Yes or No in the first line. If Yes, please answer the two questions below.

Yes or No?

If yes, in what course(s)?

If yes, how many hours of tutoring did you receive per week on average?

26. Are you currently enrolled in any intervention or workshop programs to help university students succeed academically (for example, study skills workshops)?*

Yes or No?

If yes, please name the program(s) and briefly describe.

Done Cancel

Appendix J

Goal Group Intervention: Goal-Setting Program

NE1: FA

Introduction

This program guides you through the process of future authoring:

- Forming goals for an ideal future
- Planning strategies for attaining these goals

Writing seriously and thoughtfully about your personal goals can help you organize and simplify your future. Constructing a well-defined future can help you decrease anxiety, depression, and fear, and make your life in the present more meaningful and satisfying. You are also more likely to attain your desired goals once you write them down.

Writing about goals directly improves:

1. **Mood.** People who have the opportunity to write seriously about issues that are important to them report better mental well-being than others.

2. **Physical health.** Individuals who spend time writing in detail about their ideal future visit the doctor less often in the following months than those who write about more trivial topics.

3. **Future performance and achievement.** Work groups who set specific, difficult written goals perform better than those who do not set goals or those who are simply told to "do their best."

Many aspects of our lives are interrelated, in ways that are not obvious. The setting of goals in one domain can therefore lead to better performance in other, unexpected domains. For example, trying to improve your social relations may also result in better career opportunities. By taking the time to think through the things you truly wish to do, you will improve your chances of reaching your goals.

Next Cancel

NE1: FA

General Instructions

The full program has 8 different steps. Please allow yourself at least ***two and a half*** **uninterrupted hours** to complete this program. It is best to complete this program in one sitting. You will need to concentrate and process what you are writing, so try to complete this task when you are feeling alert and relatively unrushed. Simply follow the on-screen instructions as you go along. Press the "Next" button to move onto the next screen. If you need to take a short break or two of 5-10 minutes to get up and walk around during the process, please feel free to do so, but leave the screen on and stay logged in in order to make sure that your results are saved.

You will be asked to write down your private thoughts and feelings. Please type them directly into the box provided. At times, you may be asked to write non-stop, without regard for grammar or spelling. At other times, you may be asked to revise what you have written.

This task is meant to benefit YOU personally. Everything you write will remain strictly confidential. The report you produce will summarize your personal goals and strategies. You will be emailed a copy of this report shortly after you complete the program.

NOTE ABOUT TIME: Some items will ask you to write for specified amounts of time. It will help you to have a clock nearby or to keep an eye on the clock on your computer screen. Please try your best to write for the amount of time specified (so, if it asks you to write for 1-2 minutes, please write continuously for at least 60 seconds).

Next Cancel

NE1: FA

Step 1: The Ideal Future

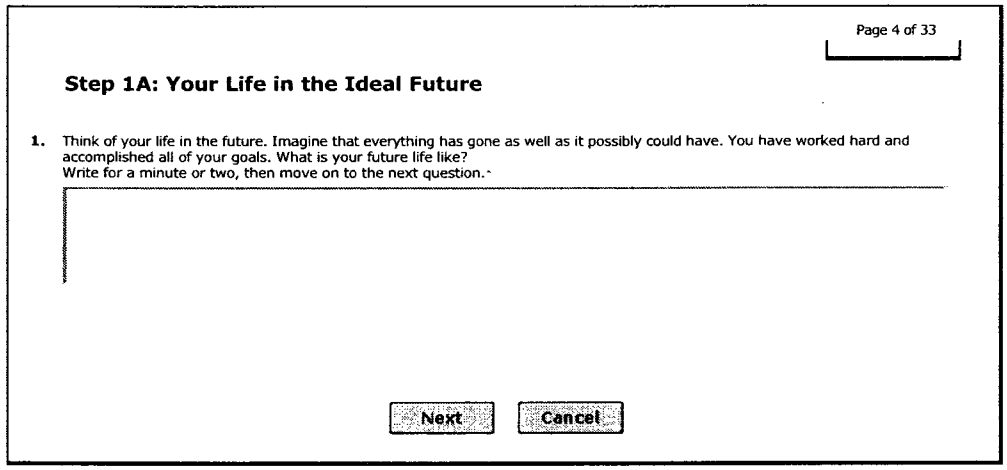
In the following pages, you will be asked a number of questions about your ideal future, and you will be required to think somewhat creatively. A red asterisk placed next to a question indicates that an answer is required for this question in order to move on to the next page. Please spend some time thinking about your answers to each question.

William James, the great American psychologist, once remarked that he did not know what he believed until he had written it down. When he didn't know what to write, he wrote anything, anything at all. Eventually, the ideas come together. Try it!

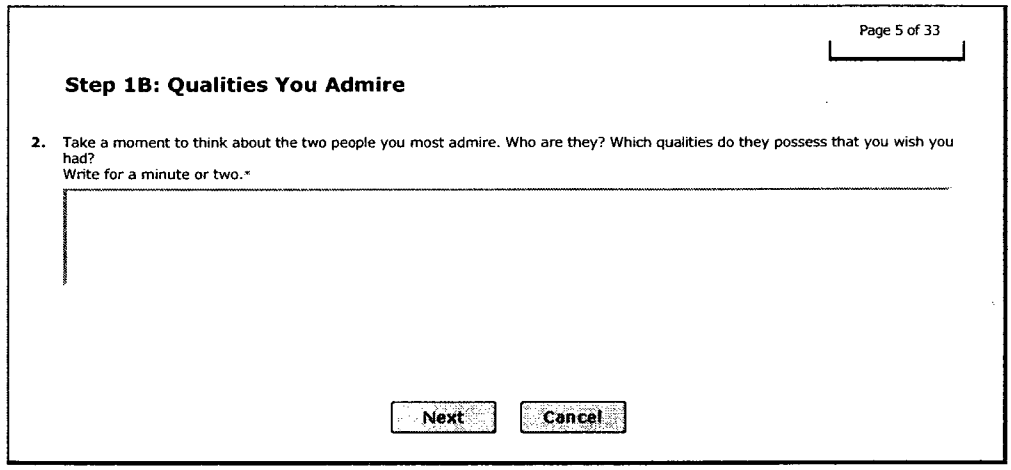
Brainstorm. Write whatever comes to mind. Don't worry about sentence construction, spelling, or grammar. there will be plenty of time to write polished sentences later. Avoid criticizing what you write. Premature criticism interferes with the creative process.

Next Cancel

NE1: FA



NE1: FA



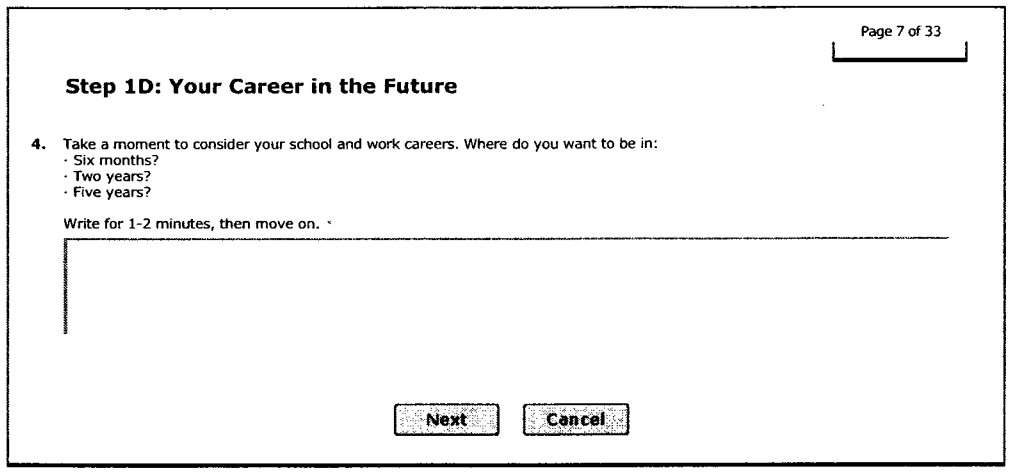
NE1: FA

Step 1C: A Thing You Could Do Better

3. If you could choose only one thing that you could do better, what would it be?
Write for a minute or two, then move on to the next question.

Next Cancel

NE1: FA



NE1: FA

Step 1E: Things to Learn About

5. What things would you like to learn more about, in the next:
- Six months?
- Two years?
- Five years?

Write for 1-2 minutes, then move on. *

Next Cancel

NE1: FA

Step 1F: Improve Your Habits

6. What habits would you like to improve?
- At school?
- At work (if applicable)?
- With friends and family?
- For your health?

Write for 1-2 minutes, then move on. *

Next Cancel

NE1: FA

Step 1G: The Ideal Future

7. Close your eyes and imagine your ideal future:

- Who do you want to be?
- What do you want to do?
- Where do you want to end up?
- How do you plan to achieve your goals?
- When will you put your plans into action?

Write about the ideal future that you have just imagined for 10 minutes. Write continuously and *try not to stop while you are writing*. Just write whatever comes to your mind about your ideal future. Don't worry about spelling or grammar you can worry about that later.

Dream while you write, and don't stop. Write until the 10 minutes have passed (keep an eye on the clock on your computer). Have fun.

Remember, you are writing only for yourself. Choose goals that you want to pursue for your own reasons, not because someone else thinks that you should. Include your deepest thoughts and feelings about all your personal goals.*

Next Cancel

NE1: FA

Step 2: Summarizing Your Goals

Now, take your general plans for the ideal future that you just wrote about and start to break them down in a more organized fashion. Describe the specific goals that will help you attain your ideal future. First give each goal a short descriptive label. Then, briefly describe and summarize each goal.

Your specific goals can be from a number of different domains.

· A personal goal might be "I would like to be healthier."
· A school goal might be "I would like to do better in my classes," or "I would like to find a major or classes that I am really interested in."
· A social goal might be "I would like to meet more people".

Your goal descriptions should be reasonably brief. Make sure that each goal description includes nothing but the most important information. Re-word, re-write and organize the relevant material from Step 1 for your goal summaries. Feel free to revise and edit.

Enter your goals one at a time. After entering the title and description for each goal, click "Next" to enter a new goal. A minimum of 7 goals is required, and you will be able to enter a maximum of 8 of your most important goals. When you are done entering your goals, keep clicking "Next" until you get to Step 4.

From Step 1:

Your Life in the Ideal Future. [Insert Student's Free-Write of His or Her Life in the Ideal Future HERE]
Qualities and People You Admire: [Insert Student's Free-Write of the Qualities He or She Admires HERE]
A Thing You Could do Better: [Insert Student's Free-Write of A Thing He or She Could Do Better HERE]
Your Career in the Future: [Insert Student's Free-Write of His or Her Ideal Career in the Future HERE]
Things to Learn About: [Insert Student's Free-Write of Things He or She Would Like To Learn About in *Six Months *Two Years *Five Years HERE]
Habits to Improve: [Insert Student's Free-Write of Habits He or She Would Like To Improve *At School *At Work *With Friends and Family *For Your Health HERE]
Ideal Future Freewrite: [Insert Student's 10-minute Free-Write About His or Her Ideal Future HERE]

8. Title of Goal 1: *

Sample Goal 1

9. Goal 1 Description: *

Sample Goal 1 Description

Next Cancel

NE1: FA

Step 2: Summarizing Your Goals (cont.)

From Step 1:

Your Life in the Ideal Future. [Insert Student's Free-Write of His or Her Life in the Ideal Future HERE]
Qualities and People You Admire: [Insert Student's Free-Write of the Qualities He or She Admires HERE]
A Thing You Could do Better: [Insert Student's Free-Write of A Thing He or She Could Do Better HERE]
Your Career in the Future: [Insert Student's Free-Write of His or Her Ideal Career in the Future HERE]
Things to Learn About: [Insert Student's Free-Write of Things He or She Would Like To Learn About in *Six Months *Two Years *Five Years HERE]
Habits to Improve: [Insert Student's Free-Write of Habits He or She Would Like To Improve *At School *At Work *With Friends and Family *For Your Health HERE]
Ideal Future Freewrite: [Insert Student's 10-minute Free-Write About His or Her Ideal Future HERE]

10. Title of Goal 2: *

Sample Goal 2

11. Goal 2 Description: *

Sample Goal 2 Description

Next Cancel

NE1: FA

Step 2: Summarizing Your Goals (cont.)

From Step 1:

Your Life in the Ideal Future. [Insert Student's Free-Write of His or Her Life in the Ideal Future HERE]
Qualities and People You Admire: [Insert Student's Free-Write of the Qualities He or She Admires HERE]
A Thing You Could do Better: [Insert Student's Free-Write of A Thing He or She Could Do Better HERE]
Your Career in the Future: [Insert Student's Free-Write of His or Her Ideal Career in the Future HERE]
Things to Learn About: [Insert Student's Free-Write of Things He or She Would Like To Learn About in *Six Months *Two Years *Five Years HERE]
Habits to Improve: [Insert Student's Free-Write of Habits He or She Would Like To Improve *At School *At Work *With Friends and Family *For Your Health HERE]
Ideal Future Freewrite: [Insert Student's 10-minute Free-Write About His or Her Ideal Future HERE]

12. Title of Goal 3: *

Sample Goal 3

13. Goal 3 Description: *

Sample Goal 3 Description

Next Cancel

NE1: FA

Step 2: Summarizing Your Goals (cont.)

From Step 1:

Your Life in the Ideal Future. [Insert Student's Free-Write of His or Her Life in the Ideal Future HERE]
Qualities and People You Admire: [Insert Student's Free-Write of the Qualities He or She Admires HERE]
A Thing You Could do Better: [Insert Student's Free-Write of A Thing He or She Could Do Better HERE]
Your Career in the Future: [Insert Student's Free-Write of His or Her Ideal Career in the Future HERE]
Things to Learn About: [Insert Student's Free-Write of Things He or She Would Like To Learn About in *Six Months *Two Years *Five Years HERE]
Habits to Improve: [Insert Student's Free-Write of Habits He or She Would Like To Improve *At School *At Work *With Friends and Family *For Your Health HERE]
Ideal Future Freewrite: [Insert Student's 10-minute Free-Write About His or Her Ideal Future HERE]

14. Title of Goal 4: *

Sample Goal 4

15. Goal 4 Description: *

Sample Goal 4 Description

Next Cancel

NE1: FA

Step 2: Summarizing Your Goals (cont.)

From Step 1:

Your Life in the Ideal Future. [Insert Student's Free-Write of His or Her Life in the Ideal Future HERE]
Qualities and People You Admire: [Insert Student's Free-Write of the Qualities He or She Admires HERE]
A Thing You Could do Better: [Insert Student's Free-Write of A Thing He or She Could Do Better HERE]
Your Career in the Future: [Insert Student's Free-Write of His or Her Ideal Career in the Future HERE]
Things to Learn About: [Insert Student's Free-Write of Things He or She Would Like To Learn About in *Six Months *Two Years *Five Years HERE]
Habits to Improve: [Insert Student's Free-Write of Habits He or She Would Like To Improve *At School *At Work *With Friends and Family *For Your Health HERE]
Ideal Future Freewrite: [Insert Student's 10-minute Free-Write About His or Her Ideal Future HERE]

16. Title of Goal 5: *

Sample Goal 5

17. Goal 5 Description: *

Sample Goal 5 Description

Next Cancel

NE1: FA

Step 2: Summarizing Your Goals (cont.)

From Step 1:

Your Life in the Ideal Future. [Insert Student's Free-Write of His or Her Life in the Ideal Future HERE]
Qualities and People You Admire: [Insert Student's Free-Write of the Qualities He or She Admires HERE]
A Thing You Could do Better: [Insert Student's Free-Write of A Thing He or She Could Do Better HERE]
Your Career in the Future: [Insert Student's Free-Write of His or Her Ideal Career in the Future HERE]
Things to Learn About: [Insert Student's Free-Write of Things He or She Would Like To Learn About in *Six Months *Two Years *Five Years HERE]
Habits to Improve: [Insert Student's Free-Write of Habits He or She Would Like To Improve *At School *At Work *With Friends and Family *For Your Health HERE]
Ideal Future Freewrite: [Insert Student's 10-minute Free-Write About His or Her Ideal Future HERE]

18. Title of Goal 6: *

Sample Goal 6

19. Goal 6 Description: *

Sample Goal 6 Description

Next Cancel

NE1: FA

Step 2: Summarizing Your Goals (cont.)

From Step 1:

Your Life in the Ideal Future. [Insert Student's Free-Write of His or Her Life in the Ideal Future HERE]
Qualities and People You Admire: [Insert Student's Free-Write of the Qualities He or She Admires HERE]
A Thing You Could do Better: [Insert Student's Free-Write of A Thing He or She Could Do Better HERE]
Your Career in the Future: [Insert Student's Free-Write of His or Her Ideal Career in the Future HERE]
Things to Learn About: [Insert Student's Free-Write of Things He or She Would Like To Learn About in *Six Months *Two Years *Five Years HERE]
Habits to Improve: [Insert Student's Free-Write of Habits He or She Would Like To Improve *At School *At Work *With Friends and Family *For Your Health HERE]
Ideal Future Freewrite: [Insert Student's 10-minute Free-Write About His or Her Ideal Future HERE]

20. Title of Goal 7: *

Sample Goal 7

21. Goal 7 Description: *

Sample Goal 7 Description

Next Cancel

NE1: FA

Step 2: Summarizing Your Goals (cont.)

From Step 1:

Your Life in the Ideal Future. [Insert Student's Free-Write of His or Her Life in the Ideal Future HERE]
Qualities and People You Admire: [Insert Student's Free-Write of the Qualities He or She Admires HERE]
A Thing You Could do Better: [Insert Student's Free-Write of A Thing He or She Could Do Better HERE]
Your Career in the Future: [Insert Student's Free-Write of His or Her Ideal Career in the Future HERE]
Things to Learn About: [Insert Student's Free-Write of Things He or She Would Like To Learn About in *Six Months *Two Years *Five Years HERE]
Habits to Improve: [Insert Student's Free-Write of Habits He or She Would Like To Improve *At School *At Work *With Friends and Family *For Your Health HERE]
Ideal Future Freewrite: [Insert Student's 10-minute Free-Write About His or Her Ideal Future HERE]

22. Title of Goal 8:
(if applicable. If not, please click on the "Next" button to move forward)

Sample Goal 8 (Optional)

23. Goal 8 Description:
(if applicable)

Sample Goal 8 Description (Optional)

Next Cancel

NE1: FA

Step 3: Organizing and Evaluating Your Goals

Now rank each goal in ***order of importance*** to you (1 being the most important and 8 being the least important). Please do not repeat rankings (that is, choose a position of importance for each goal that has not been filled by any other goal).

Please rank each of them according to how you really feel. There are no right or wrong answers.

Also, please only rank according to the number of goals you created. For example, if you had 7 goals, you should rank them 1 through 8 and leave Goal 8 unranked (blank). Thank you!

24. Goal 1: Sample Goal 1*
Rank this goal in importance (click 1 for your most important goal, 2 for your second most important goal, 3 for your third most important goal, etc.).

	1	2	3	4	5	6	7	8
Rank Order:	○	○	○	○	○	○	○	◉

25. Goal 2: Sample Goal 2*
Rank this goal in importance (1 = the most important goal).

	1	2	3	4	5	6	7	8
Rank Order:	○	○	○	○	○	○	◉	○

26. Goal 3: Sample Goal 3*
Rank this goal in importance (1 = the most important goal)

	1	2	3	4	5	6	7	8
Rank Order:	○	○	○	○	○	◉	○	○

27. Goal 4: Sample Goal 4, Sample Goal 4, Sample Goal 4*
Rank this goal in order of importance (1 = the most important goal)

	1	2	3	4	5	6	7	8
Rank Order:	○	○	○	○	◉	○	○	○

28. Goal 5: Sample Goal 5*
Rank this goal in order of importance (1 = the most important goal)

	1	2	3	4	5	6	7	8
Rank Order:	○	○	○	◉	○	○	○	○

29. Goal 6: Sample Goal 6*
Rank this goal in order of importance (1 = the most important goal)

	1	2	3	4	5	6	7	8
Rank Order:	○	○	◉	○	○	○	○	○

30. Goal 7: Sample Goal 7*
Rank this goal in order of importance (1 = the most important goal)

	1	2	3	4	5	6	7	8
Rank Order:	○	◉	○	○	○	○	○	○

31. Goal 8 (if applicable): Sample Goal 8 (Optional)
If applicable, please rank this goal in order of importance (1 = the most important goal)

	1	2	3	4	5	6	7	8
Rank Order:	◉	○	○	○	○	○	○	○

Next Cancel

NE1: FA

Step 3 (cont.) Evaluating Goal 1

It is important to consider how you think and feel about your goals. On the following pages, you will be asked a number of questions regarding each of your goals. You will only be able to view the title of each goal, and not the whole summary.

We would like you to actively remember the content of each specific goal. Before you answer each question, think about what you wrote when you described that goal in Step 2, using the title to help you remember.

Please indicate your response to each question by clicking on a number below it or, in some cases, by filling in the blank. There are no right or wrong answers. Simply respond according to how you really feel about the question. When you have finished evaluating your goals, please click ahead (with the "Next" button) until you reach Step 4.

32. Goal 1: Sample Goal 1*
(1=Not at all important, 7=Extremely Important)

	1	2	3	4	5	6	7
How important, overall, is this goal to you?	○	○	○	○	○	◉	○

33. Goal 1: Sample Goal 1*
Are you pursuing this goal because: (1=Not at all for this reason, 7=Completely for this reason)

	1	2	3	4	5	6	7
you truly believe that it's important?	○	○	○	◉	○	○	○
you would feel ashamed, guilty or anxious if you didn't?	○	○	○	○	◉	○	○
someone else wants you to achieve it?	○	○	◉	○	○	○	○
the situation you are in seems to demand it?	○	○	○	○	○	◉	○
it is enjoyable, stimulating or satisfying?	○	○	○	○	◉	○	○
it is part of a deeply felt personal dream?	○	○	○	○	○	◉	○

34. Goal 1: Sample Goal 1*
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely is it that you will EVER achieve this goal?	○	○	○	○	◉	○	○

35. Goal 1: Sample Goal 1*
I would like to achieve this goal within [____] months.
3

36. Goal 1: Sample Goal 1*
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely do you think it is that you will achieve this goal in the time you indicated?	○	○	○	○	◉	○	○

Next Cancel

NE1: FA

Step 3 (cont.) Evaluating Goal 2

37. Goal 2: Sample Goal 2*
(1=Not at all important, 7=Extremely Important)

	1	2	3	4	5	6	7
How important, overall, is this goal to you?	○	○	○	○	◉	○	○

38. Goal 2: Sample Goal 2*
Are you pursuing this goal because: (1=Not at all for this reason, 7=Completely for this reason)

	1	2	3	4	5	6	7
you truly believe that it's important?	○	○	○	◉	○	○	○
you would feel ashamed, guilty or anxious if you didn't?	○	○	◉	○	○	○	○
someone else wants you to achieve it?	○	◉	○	○	○	○	○
the situation you are in seems to demand it?	○	◉	○	○	○	○	○
it is enjoyable, stimulating or satisfying?	○	○	○	○	◉	○	○
it is part of a deeply felt personal dream?	○	○	○	○	○	○	◉

39. Goal 2: Sample Goal 2*
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely is it that you will EVER achieve this goal?	○	○	○	○	○	○	◉

40. Goal 2: Sample Goal 2*
I would like to achieve this goal within [____] months.

1

41. Goal 2: Sample Goal 2*
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely do you think it is that you will							

achieve this goal in the time you indicated?	○	○	○	○	○	◉	○

Next Cancel

NE1: FA

Step 3 (cont.) Evaluating Goal 3

42. Goal 3: Sample Goal 3*
(1=Not at all important, 7=Extremely Important)

	1	2	3	4	5	6	7
How important, overall, is this goal to you?	○	○	○	○	○	○	◉

43. Goal 3: Sample Goal 3*
Are you pursuing this goal because: (1=Not at all for this reason, 7=Completely for this reason)

	1	2	3	4	5	6	7
you truly believe that it's important?	○	○	○	○	○	○	◉
you would feel ashamed, guilty or anxious if you didn't?	○	○	○	○	○	○	◉
someone else wants you to achieve it?	◉	○	○	○	○	○	○
the situation you are in seems to demand it?	○	○	○	○	○	○	◉
it is enjoyable, stimulating or satisfying?	○	○	○	◉	○	○	○
it is part of a deeply felt personal dream?	○	○	○	○	○	○	◉

44. Goal 3: Sample Goal 3*
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely is it that you will EVER achieve this goal?	○	○	○	○	◉	○	○

45. Goal 3: Sample Goal 3*
I would like to achieve this goal within [____] months.

8

46. Goal 3: Sample Goal 3*
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely do you think it is that you will							

achieve this goal in the time you indicated?	○	○	○	○	○	◉	○

Next Cancel

NE1: FA

Step 3 (cont.) Evaluating Goal 4

47. Goal 4: Sample Goal 4, Sample Goal 4, Sample Goal 4*
(1=Not at all important, 7=Extremely Important)

	1	2	3	4	5	6	7
How important, overall, is this goal to you?	○	○	◉	○	○	○	○

48. Goal 4: Sample Goal 4, Sample Goal 4, Sample Goal 4*
Are you pursuing this goal because: (1=Not at all for this reason, 7=Completely for this reason)

	1	2	3	4	5	6	7
you truly believe that it's important?	○	○	◉	○	○	○	○
you would feel ashamed, guilty or anxious if you didn't?	○	○	○	○	◉	○	○
someone else wants you to achieve it?	○	○	○	○	○	◉	○
the situation you are in seems to demand it?	○	○	○	◉	○	○	○
it is enjoyable, stimulating or satisfying?	◉	○	○	○	○	○	○
it is part of a deeply felt personal dream?	◉	○	○	○	○	○	○

49. Goal 4: Sample Goal 4, Sample Goal 4, Sample Goal 4*
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely is it that you will EVER achieve this goal?	○	○	◉	○	○	○	○

50. Goal 4: Sample Goal 4, Sample Goal 4, Sample Goal 4*
I would like to achieve this goal within [____] months.

0.5

51. Goal 4: Sample Goal 4, Sample Goal 4, Sample Goal 4*
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely do you think it is that you will							

achieve this goal in the time you indicated?	○	○	○	◉	○	○	○

Next Cancel

NE1: FA

Step 3 (cont.) Evaluating Goal 5

52. Goal 5: Sample Goal 5*
(1=Not at all important, 7=Extremely Important)

	1	2	3	4	5	6	7
How important, overall, is this goal to you?	○	○	○	◉	○	○	○

53. Goal 5: Sample Goal 5*
Are you pursuing this goal because: (1=Not at all for this reason, 7=Completely for this reason)

	1	2	3	4	5	6	7
you truly believe that it's important?	○	○	○	◉	○	○	○
you would feel ashamed, guilty or anxious if you didn't?	○	○	○	○	○	○	◉
someone else wants you to achieve it?	○	○	○	○	○	○	◉
the situation you are in seems to demand it?	○	○	○	○	○	◉	○
it is enjoyable, stimulating or satisfying?	○	○	○	◉	○	○	○
it is part of a deeply felt personal dream?	○	◉	○	○	○	○	○

54. Goal 5: Sample Goal 5*
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely is it that you will EVER achieve this goal?	○	◉	○	○	○	○	○

55. Goal 5: Sample Goal 5*
I would like to achieve this goal within [____] months.

18

56. Goal 5: Sample Goal 5*
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely do you think it is that you will							

achieve this goal in the time you indicated?	○	○	○	◉	○	○	○

Next Cancel

NE1: FA

Step 3 (cont.) Evaluating Goal 6

57. Goal 6: Sample Goal 6*
(1=Not at all important, 7=Extremely Important)

	1	2	3	4	5	6	7
How important, overall, is this goal to you?	○	○	○	○	○	○	◉

58. Goal 6: Sample Goal 6*
Are you pursuing this goal because: (1=Not at all for this reason, 7=Completely for this reason)

	1	2	3	4	5	6	7
you truly believe that it's important?	○	○	○	○	○	○	◉
you would feel ashamed, guilty or anxious if you didn't?	○	○	○	○	○	○	◉
someone else wants you to achieve it?	○	○	○	○	○	○	◉
the situation you are in seems to demand it?	○	○	○	○	○	○	◉
it is enjoyable, stimulating or satisfying?	○	○	○	○	○	○	◉
it is part of a deeply felt personal dream?	○	○	○	○	○	○	◉

59. Goal 6: Sample Goal 6*
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely is it that you will EVER achieve this goal?	○	○	○	○	○	○	◉

60. Goal 6: Sample Goal 6*
I would like to achieve this goal within [____] months.

24

61. Goal 6: Sample Goal 6*
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely do you think it is that you will							

achieve this goal in the time you indicated?	○	○	○	○	○	○	◉

Next Cancel

NE1: FA

Step 3 (cont.) Evaluating Goal 7

62. Goal 7: Sample Goal 7*
(1=Not at all important, 7=Extremely Important)

	1	2	3	4	5	6	7
How important, overall, is this goal to you?	○	◉	○	○	○	○	○

63. Goal 7: Sample Goal 7*
Are you pursuing this goal because: (1=Not at all for this reason, 7=Completely for this reason)

	1	2	3	4	5	6	7
you truly believe that it's important?	○	◉	○	○	○	○	○
you would feel ashamed, guilty or anxious if you didn't?	○	◉	○	○	○	○	○
someone else wants you to achieve it?	○	◉	○	○	○	○	○
the situation you are in seems to demand it?	○	○	◉	○	○	○	○
it is enjoyable, stimulating or satisfying?	○	○	○	◉	○	○	○
it is part of a deeply felt personal dream?	○	◉	○	○	○	○	○

64. Goal 7: Sample Goal 7*
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely is it that you will EVER achieve this goal?	○	○	○	◉	○	○	○

65. Goal 7: Sample Goal 7*
I would like to achieve this goal within [____] months.

1

66. Goal 7: Sample Goal 7*
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely do you think it is that you will							

achieve this goal in the time you indicated?	○	○	○	○	◉	○	○

Next Cancel

NE1: FA

Step 3 (cont.) Evaluating Goal 8 (if applicable)

67. Goal 8: Sample Goal 8 (Optional) [If applicable, otherwise click on the "Next" button until you get to Step 4]
(1=Not at all important, 7=Extremely Important)

	1	2	3	4	5	6	7
How important, overall, is this goal to you?	○	○	○	○	○	◉	○

68. Goal 8: Sample Goal 8 (Optional)
Are you pursuing this goal because: (1=Not at all for this reason, 7=Completely for this reason)

	1	2	3	4	5	6	7
you truly believe that it's important?	○	○	○	○	○	◉	○
you would feel ashamed, guilty or anxious if you didn't?	○	○	○	○	◉	○	○
someone else wants you to achieve it?	◉	○	○	○	○	○	○
the situation you are in seems to demand it?	○	◉	○	○	○	○	○
it is enjoyable, stimulating or satisfying?	○	○	○	○	○	◉	○
it is part of a deeply felt personal dream?	○	○	○	○	○	◉	○

69. Goal 8: Sample Goal 8 (Optional)
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely is it that you will EVER achieve this goal?	○	○	◉	○	○	○	○

70. Goal 8: Sample Goal 8 (Optional)
I would like to achieve this goal within [____] months.

4

71. Goal 8: Sample Goal 8 (Optional)
(1=Not at all likely, 7=Extremely likely)

	1	2	3	4	5	6	7
How likely do you think it is that you will							

achieve this goal in the time you indicated?	○	○	○	○	○	○	◉

Next Cancel

NE1: FA

Step 4: The Impact of Goals

Goals can have an impact beyond the obvious. Our specific personal goals are connected to larger, more important life goals. These higher-order goals reflect our most important ideals. The specific goal of exercising more often, for example, is a specific element of the more important goal of being healthy. Achieving other specific goals, such as becoming more assertive, help us to move closer to our ideal self.

You will now be asked to write about what more globally important (and less obvious or concrete) things might be affected by your attainment of each of your specific goals.

Think hard about what it would mean to have achieved your stated specific goals.

- How would other parts of your personal life change?
- How might things be different for the people you know well?
- How would this affect the way that others see you?
- How would this affect the lives of the people around you?
- How would your goal-success change the way that you see yourself?
- What other impact on the world might your decisions have?
- How might your life be better?

Please write a short description of how attaining the indicated goal would change other aspects of your personal life. Once again, the goals will be identified by their titles. This means that you will have to think back again to the summaries you wrote, and consider them anew. You can write as much as you feel is appropriate for these descriptions.

Please write a short description of how attaining each goal would change additional important aspects of your life, and the lives of others.

72. Goal 1: Sample Goal 1*

[Insert description of how attaining Goal 1 would change important aspects of student's life HERE]

73. Goal 2: Sample Goal 2*

[Insert description of how attaining Goal 2 would change important aspects of student's life HERE]

74. Goal 3: Sample Goal 3*

[Insert description of how attaining Goal 3 would change important aspects of student's life HERE]

75. Goal 4: Sample Goal 4, Sample Goal 4, Sample Goal 4*

[Insert description of how attaining Goal 4 would change important aspects of student's life HERE]

76. Goal 5: Sample Goal 5*

[Insert description of how attaining Goal 5 would change important aspects of student's life HERE]

77. Goal 6: Sample Goal 6*

[Insert description of how attaining Goal 6 would change important aspects of student's life HERE]

78. Goal 7: Sample Goal 7*

[Insert description of how attaining Goal 7 would change important aspects of student's life HERE]

79. Goal 8: Sample Goal 8 (Optional) (if applicable)
If no goal title appears above, this is only because you have finished entering your goals. If you see this, please press "Next" and go on to the next step.

[Insert description of how attaining Goal 8 would change important aspects of student's life HERE]

Next Cancel

NE1: FA

Step 5: The Attainment of Your Goals

In the previous step, you thought about the broader personal and social impact of your goals and the consequences of their attainment. Now you will be asked to think in detail about how you will achieve your goals.

Goals are related to lesser, simpler sub-goals and behaviors, and they are also connected to more important abstract goals. These sub-goals are easier to achieve, but are still absolutely necessary to reach our greater aspirations. Sub-goals can thus be thought of as strategies for greater goal achievement. Thinking about what specific things need to be done in order to achieve your goals allows you to create practical strategies for realizing your dreams.

Please take some time to write about the concrete daily or weekly things you might do to further your goals. Take as much time as you need, and really consider what particular behaviors each goal is built upon.

· Do you need to spend more time reading and studying for your classes? Specify when, where, and how much.
· Should you spend more time planning your day?
· Do you need more freedom, or more discipline? Freedom to do what? Discipline for what purpose?

Specify when you are going to work on your goals. Specify how often. Specify where. Think hard about how you are going to implement your plans. Make your plans concrete. Once again, you will be presented with a goal (identified only by its title) and a text box. Write down all the strategies and sub-goals you can think of that are related to that greater goal.

Write down those concrete weekly or daily things you might do to further your goals.

80. Goal 1: Sample Goal 1*

[Insert student's description of concrete strategies and sub-goals that he or she will do to further Goal 1 HERE]

81. Goal 2: Sample Goal 2*

[Insert student's description of concrete strategies and sub-goals that he or she will do to further Goal 2 HERE]

82. Goal 3: Sample Goal 3*

[Insert student's description of concrete strategies and sub-goals that he or she will do to further Goal 3 HERE]

83. Goal 4: Sample Goal 4, Sample Goal 4, Sample Goal 4*

[Insert student's description of concrete strategies and sub-goals that he or she will do to further Goal 4 HERE]

84. Goal 5: Sample Goal 5*

[Insert student's description of concrete strategies and sub-goals that he or she will do to further Goal 5 HERE]

85. Goal 6: Sample Goal 6*

[Insert student's description of concrete strategies and sub-goals that he or she will do to further Goal 6 HERE]

86. Goal 7: Sample Goal 7*

[Insert student's description of concrete strategies and sub-goals that he or she will do to further Goal 7 HERE]

87. Goal 8: Sample Goal 8 (Optional) (if applicable)
If no goal title appears above, this is only because you have finished entering your goals. If you see this, please press "Next" and go on to the next step.

[Insert student's description of concrete strategies and sub-goals that he or she will do to further Goal 8 HERE]

Next Cancel

NE1: FA

Step 6: Identifying Possible Obstacles

At this point you will have to think about the obstacles that might face you while you are trying to reach your goals.

Thinking about achieving a goal is obviously easier than going out and getting it done. Many things related to the environment, the social world and yourself might stand in your way. It is useful to anticipate these difficulties, so that you can plan to overcome them.

Consider your goals, once again. Write down all the potential obstacles you can think up. Write down as many ways to overcome these obstacles as you can think of.

How might you interfere with your own plans? How can you ensure this won't happen? Sometimes change is threatening to people we know and love. Will the people you know help you, or stand in your way? How can you communicate with them, so that they will support you? There are also things about your situation that could prove troublesome. Think of how you will alter your situation to your own advantage.

Think of realistic and worst-case scenarios. What are your options? What are your alternative plans?

Potential Obstacles to Goals, and Ways to Overcome Them:

88. Goal 1: Sample Goal 1*

[Insert student's description of potential obstacles to Goal 1 and ways to overcome obstacles HERE]

89. Goal 2: Sample Goal 2*

[Insert student's description of potential obstacles to Goal 2 and ways to overcome obstacles HERE]

90. Goal 3: Sample Goal 3*

[Insert student's description of potential obstacles to Goal 3 and ways to overcome obstacles HERE]

91. Goal 4: Sample Goal 4, Sample Goal 4, Sample Goal 4*

[Insert student's description of potential obstacles to Goal 4 and ways to overcome obstacles HERE]

92. Goal 5: Sample Goal 5*

[Insert student's description of potential obstacles to Goal 5 and ways to overcome obstacles HERE]

93. Goal 6: Sample Goal 6*

[Insert student's description of potential obstacles to Goal 6 and ways to overcome obstacles HERE]

94. Goal 7: Sample Goal 7*

[Insert student's description of potential obstacles to Goal 7 and ways to overcome obstacles HERE]

95. Goal 8: Sample Goal 8 (Optional) (if applicable)

If no goal title appears above, this is only because you have finished entering your goals. If you see this, please press "Next" and go on to the next step.

[Insert student's description of potential obstacles to Goal 8 and ways to overcome obstacles HERE]

Next Cancel

NE1: FA

Step 7: Monitoring Your Progress

In this step, you will consider how to track your own progress toward your goals.

We need to know, concretely, whether or not we are progressing towards valued goals. Of course, this is not an easy process. When we want to complete very specific tasks, feedback on our performance is relatively easy to monitor. However, if our goals are less short-term, or more abstract, this becomes a little more difficult.

On the next few pages you will be asked to identify personal benchmarks that will allow you to evaluate your own performance.

· What sorts of things will you accept as evidence that you are progressing towards your stated goal?
· How often are you going to monitor your own behavior?
· How will things in your life have to change, measurably, for you to feel satisfied in your progress?
· How can you ensure that you are neither pushing yourself too hard, and ensuring failure, or being too easy on yourself, and risking boredom and cynicism?

Your benchmarks should be PERSONAL indicators of success. It doesn't matter what others might think defines progress towards your goal. Write down those accomplishments that would truly indicate positive movement on your part. Feel free to write as much as you feel is necessary.

Benchmarks:

96. Goal 1: Sample Goal 1*

[Insert student's descriptions of Goal 1 personal benchmarks HERE]

97. Goal 2: Sample Goal 2*

[Insert student's descriptions of Goal 2 personal benchmarks HERE]

98. Goal 3: Sample Goal 3*

[Insert student's descriptions of Goal 3 personal benchmarks HERE]

99. Goal 4: Sample Goal 4, Sample Goal 4, Sample Goal 4*

[Insert student's descriptions of Goal 4 personal benchmarks HERE]

100. Goal 5: Sample Goal 5*

[Insert student's descriptions of Goal 5 personal benchmarks HERE]

101. Goal 6: Sample Goal 6*

[Insert student's descriptions of Goal 6 personal benchmarks HERE]

102. Goal 7: Sample Goal 7*

[Insert student's descriptions of Goal 7 personal benchmarks HERE]

103. Goal 8: Sample Goal 8 (Optional) (if applicable)
If no goal title appears above, this is only because you have finished entering your goals. If you see this, please press "Next" and go on to the next step.

[Insert student's descriptions of Goal 8 personal benchmarks HERE]

Next Cancel

NE1: FA

Step 8: Evaluating Your Decisions

You've made it to the last step. Now you'll be asked to rate your commitment to each of your goals.

The process of goal setting and strategizing is important. It is also important to put these goals in a deeply personal context.

What are your priorities?

Once again, each of your goals will be identified by its title. Please rate the degree to which you are committed to achieving each goal, on a scale of 1 to 7 (where 1 = Not at all Committed, and 7 = Extremely Committed).

104. Goal 1: Sample Goal 1*

- ○ 1 - Not At All Committed
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ◉ 7 - Extremely Committed

105. Goal 2: Sample Goal 2*

- ○ 1 - Not At All Committed
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ◉ 6
- ○ 7 - Extremely Committed

106. Goal 3: Sample Goal 3*

- ○ 1 - Not At All Committed
- ○ 2
- ○ 3
- ○ 4
- ◉ 5
- ○ 6
- ○ 7 - Extremely Committed

107. Goal 4: Sample Goal 4, Sample Goal 4, Sample Goal 4*

- ○ 1 - Not At All Committed
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ◉ 6
- ○ 7 - Extremely Committed

108. Goal 5: Sample Goal 5*

- ○ 1 - Not At All Committed
- ○ 2
- ◉ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7 - Extremely Committed

109. Goal 6: Sample Goal 6*

- ○ 1 - Not At All Committed
- ◉ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7 - Extremely Committed

110. Goal 7: Sample Goal 7*

- ○ 1 - Not At All Committed
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ◉ 6
- ○ 7 - Extremely Committed

111. Goal 8: Sample Goal 8 (Optional) (if applicable)
If no goal title appears above, this is only because you have finished entering your goals. If you see this, please press "Next" and go on to the next step.

- ○ 1 - Not At All Committed

- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ◉ 7 - Extremely Committed

Next Cancel

NE1: FA

CONGRATULATIONS!

Congratulations! You have completed all 8 steps of the goal-setting process. Hopefully, you have defined your future in a manner that is concrete and attainable, as well as inspiring and fulfilling.

Future Steps

People often worry themselves unproductively by constantly revisiting their goals, instead of concentrating on their attainment. It is easy to undermine yourself, by always questioning your aims and intentions. Am I doing the right thing? Have I chosen the correct goals?

· Now that you have set goals, it is best to concentrate on a daily or weekly basis on ***implementing the strategies you have devised for their attainment***, instead of worrying about the goals themselves. It is just as important to stick to a plan as it is to make a plan.

· You will be receiving a biweekly email from us, in which you will be asked to fill out a very brief questionnaire related to your progress and plans. In this email, we will provide you with a copy of your goal summary report.

It will be very important for you to complete this questionnaire as soon as possible after you receive it every other week (it should take no more than 5-10 minutes). Researchers have found that individuals who revisit their goals and goal-setting tasks multiple times over a long-term period have a greater chance of experiencing health and productivity improvements.

On that note, good luck with your goals, and we will be in touch with a copy of your report!

Please press "Done" below before you close this window. Thanks!

Done Cancel

NE1: FA

Survey Completed

Thank you for taking the time to complete this program and good luck with your goals! A copy of your responses will be emailed to you shortly.

Close Continue

Appendix K

Control Group Intervention: Writing Task and Positive Psychology Questionnaires[9]

[9] The Newly Revised Strong Interest Inventory® (Strong Interest Inventory®, 2004) is not included here due to copyright restrictions.

NC1: Writing Task

Writing Section

This section asks you to think through and write about some positive experiences in your past. You will be asked to write down your thoughts and feelings about these experiences. Please type them directly into the box provided. Please write non-stop, without regard for grammar or spelling.

Please answer **3 of the following 6 questions** (your choice), and spend 10-15 minutes on each question. Please try to answer in a descriptive and objective way, writing seriously and thoughtfully, with minimum expression of your emotions.

This task is meant to benefit **YOU** personally. Everything you write will remain strictly confidential. The report you produce will summarize some of your most positive life experiences. You will have an opportunity to view this summary at the end of the program.

NOTE: These items will ask you to write for specified amounts of time. It will help you to have a clock nearby or to keep an eye on the clock on your computer screen.

1. Write about the best summer that you ever had. Write continuously for 10-15 minutes.

2. Write about the year that you most enjoyed in grade school. Was there a teacher or group of friends you particularly liked? An event or club that you enjoyed? Classes that were especially interesting? Write continuously for 10-15 minutes.

3. Write about the best job you ever had. Co-workers? Boss? Job itself? Duties? Write continuously for 10-15 minutes.

4. Write about someone that you admire most. What is it that you admire about them? Are there particular qualities in personality or behavior? Write continuously for 10-15 minutes.

5. Write about the best travel experience you ever had. Where did you go? What did you do? Does anything particular stand out in your mind about this experience? Write continuously for 10-15 minutes.

6. Write about an extra-curricular activity (e.g., hobby, organization, school club, sport) that you particulary enjoyed during your grade school, college, or university years. What was it about this activity that was particularly satisfying? Write continuously for 10-15 minutes.

Done Cancel

NC2: CEI/PGI/GRAT

Using the scale shown below, please respond to each of the following statements according to how you would usually describe yourself. There are no right or wrong answers.*

	1 Strongly Disagree	2 Disagree	3 Slightly Disagree	4 Neutral	5 Slightly Agree	6 Agree	7 Strongly Agree
I have so much in life to be thankful for.	○	○	○	○	○	○	○
If I had to list everything that I felt grateful for, it would be a very long list.	○	○	○	○	○	○	○
When I look at the world, I don't see much to be grateful for.	○	○	○	○	○	○	○
I am grateful to a wide variety of people.	○	○	○	○	○	○	○
As I get older I find myself more able to appreciate the people, events, and situations that have been part of my life history.	○	○	○	○	○	○	○
Long amounts of time can go by before I feel grateful to something or someone.	○	○	○	○	○	○	○

Please continue. Remember, there are no right or wrong answers.*

	1 Definitely Disagree	2 Mostly Disagree	3 Somewhat Disagree	4 Somewhat Agree	5 Mostly Agree	6 Definitely Agree
I know how to change specific things that I want to change in my life.	○	○	○	○	○	○
I have a good sense of where I am headed in my life.	○	○	○	○	○	○
If I want to change something in my life, I initiate the transition process.	○	○	○	○	○	○
I can choose the role that I want to have in a group.	○	○	○	○	○	○
I know what I need to do to get started toward reaching my goals.	○	○	○	○	○	○
I have a specific action plan to help me reach my goals.	○	○	○	○	○	○
I take charge of my life.	○	○	○	○	○	○

I know what my unique contribution to the world might be.	○	○	○	○	○	○	
I have a plan for making my life more balanced.	○	○	○	○	○	○	

Please continue. Remember to be honest and open in your responses.

	1 Strongly Disagree	2 Disagree	3 Slightly Disagree	4 Neither Agree Nor Disagree	5 Slightly Agree	6 Agree	7 Strongly Agree
I would describe myself as someone who actively seeks as much information as I can in a new situation.	○	○	○	○	○	○	○
When I am participating in an activity, I tend to get so involved that I lose track of time.	○	○	○	○	○	○	○
I frequently find myself looking for new opportunities to grow as a person (e.g., information, people, resources).	○	○	○	○	○	○	○
I am *not* the type of person who probes deeply into new situations or things.	○	○	○	○	○	○	○
When I am actively interested in something, it takes a great deal to interrupt me.	○	○	○	○	○	○	○
My friends would describe me as someone who is "extremely intense" when in the middle of doing something.	○	○	○	○	○	○	○
Everywhere I go, I am out looking for new things or experiences.	○	○	○	○	○	○	○
I know how to change specific things that I want to change in my life.	○	○	○	○	○	○	○
I have a good sense of where I am headed in my life.	○	○	○	○	○	○	○
If I want to change something in my life, I initiate the transition process.	○	○	○	○	○	○	○
I can choose the role that I want to have in a group.	○	○	○	○	○	○	○
I know what I need to do to get started toward reaching my goals.	○	○	○	○	○	○	○
I have a specific action plan to help me reach my goals.	○	○	○	○	○	○	○

I take charge of my life.	○	○	○	○	○	○	○
I know what my unique contribution to the world might be.	○	○	○	○	○	○	○
I have a plan for making my life more balanced.	○	○	○	○	○	○	○
I have so much in life to be thankful for.	○	○	○	○	○	○	○
If I had to list everything that I felt grateful for, it would be a very long list.	○	○	○	○	○	○	○
When I look at the world, I don't see much to be grateful for.	○	○	○	○	○	○	○
I am grateful to a wide variety of people.	○	○	○	○	○	○	○
As I get older I find myself more able to appreciate the people, events, and situations that have been part of my life history.	○	○	○	○	○	○	○
Long amounts of time can go by before I feel grateful to something or someone.	○	○	○	○	○	○	○

Done Cancel

NC3: MLQ/MF/INSP

Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.*

	1 Almost Always	2 Very Frequently	3 Somewhat Frequently	4 Somewhat Infrequently	5 Very Infrequently	6 Almost Never
I could be experiencing some emotion and not be conscious of it until some time later.	○	○	○	○	○	○
I break or spill things because of carelessness, not paying attention, or thinking of something else.	○	○	○	○	○	○
I find it difficult to stay focused on what's happening in the present.	○	○	○	○	○	○
I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.	○	○	○	○	○	○
I tend not to notice feelings of physical tension or discomfort until they really grab my attention.	○	○	○	○	○	○
I forget a person's name almost as soon as I've been told it for the first time.	○	○	○	○	○	○
It seems I am "running on automatic," without much awareness of what I'm doing.	○	○	○	○	○	○
I rush through activities without being really attentive to them.	○	○	○	○	○	○
I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.	○	○	○	○	○	○
I do jobs or tasks automatically, without being aware of what I'm doing.	○	○	○	○	○	○
I find myself listening to someone with one ear, doing something else at the same time.	○	○	○	○	○	○
I drive places on 'automatic pilot' and then wonder why I went there.	○	○	○	○	○	○
I find myself preoccupied with the future or the past.	○	○	○	○	○	○

I find myself doing things without paying attention.							
I snack without being aware that I'm eating.							

Please take a moment to think about what makes your life and existence feel important and significant to you. Please respond to the following statements as truthfully and accurately as you can, and also please remember that these are very subjective questions and that there are no right or wrong answers. Please answer according to the scale below.*

	Absolutely Untrue 1	Mostly Untrue 2	Somewhat Untrue 3	Can't Say True or False 4	Somewhat True 5	Mostly True 6	Absolutely True 7
I understand my life's meaning.							
I am looking for something that makes my life feel meaningful.							
I am always looking to find my life's purpose.							
My life has a clear sense of purpose.							
I have a good sense of what makes my life meaningful.							
I have discovered a satisfying life purpose.							
I am always searching for something that makes my life feel significant.							
I am seeking a purpose or mission for my life.							
My life has no clear purpose.							
I am searching for meaning in my life.							

Below are 4 statements, each followed by 2 questions. The questions concern how often and how deeply/strongly you experience what is described in the statement. Please answer both questions after each statement by checking the number (between 1 and 7) that corresponds best with how you feel.

I experience inspiration.

How often does this happen?*

- 1 - never
- 2
- 3
- 4
- 5

- 6
- 7 - very often

How deeply or strongly (in general)?*

- 1 - not at all
- 2
- 3
- 4
- 5
- 6
- 7 - very deeply or strongly

Something I encounter or experience inspires me.

How often does this happen?*

- 1 - never
- 2
- 3
- 4
- 5
- 6
- 7 - very often

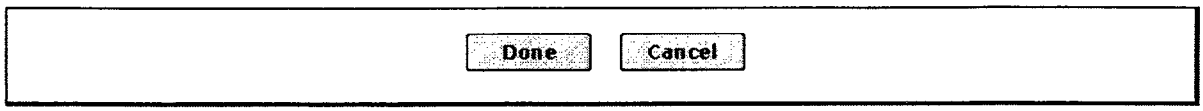
How deeply or strongly (in general)?*

- 1 - not at all
- 2
- 3
- 4
- 5
- 6
- 7 - very deeply or strongly

I am inspired to do something.

How often does this happen?*

- 1 - never



Appendix L

Follow-Up Survey for Goal Group

NE2: Follow-up

1. Have you been physically sick or ill in the past week?*
   - ○ Yes
   - ○ No

2. Have you visited the doctor or Health Services in the past week?*
   - ○ Yes
   - ○ No

3. Have you read through the goals that you wrote about at any time in the past week?*
   - ○ Yes
   - ○ No

4. Have you thought about any of the goals that you wrote about at any time in the past week?*
   - ○ Yes
   - ○ No

5. Have you thought about *your plans* for reaching any of these goals in the past week?*
   - ○ Yes
   - ○ No

6. Have you made any progress towards any of your goals in the past week?*
   NOTE: If it helps, you can refer to the "benchmarks" that you wrote for each goal to help you define what constitutes progress.
   - ○ Yes
   - ○ No

Done Cancel

Appendix M

Follow-Up Survey for Control Group

NC5: Follow-up

1. Have you been physically sick or ill in the past week?*
   - Yes
   - No

2. Have you visited the doctor or Health Services in the past week?*
   - Yes
   - No

3. Have you read through your responses for Session III's Writing Task at any time in the past week?*
   - Yes
   - No

4. Have you read through your Strong Interest Inventory report at any time in the past week?*
   - Yes
   - No

5. Have you thought about what you wrote in Session III's Writing Task at any time in the past week?*
   - Yes
   - No
   - Not applicable. I haven't read through my Session III Writing Task responses yet.

6. Have you thought about your results from the Strong Interest Inventory at any time in the past week?*
   - Yes
   - No
   - Not applicable. I haven't read through my Strong Interest Inventory results yet.

Done Cancel

Appendix N

Alternate Grade Point Average (GPA) Analyses

The reduced sample of students with both pre- and post-intervention grades (N = 83), minus two students who withdrew mid-term from their courses, was used for this alternate set of GPA analyses. The first and primary research question explored whether the one-time goal-setting intervention (Fall 2005) would differentially improve grades a semester later in the goal group (n = 45) as compared to the effect of the control intervention on grades in the control group (n = 38). No baseline group differences were found between GPA1 for the control group (M = 2.26, SD = .73) and GPA1 for the experimental group (M =2.25, SD = .93), $t(81) = .05$, $p = .96$ (two-tailed), $d = .01$ (zero-order effect). Distribution of the overall GPA difference scores (GPA2 minus GPA1) was assumed to be normal, and tests of skewness and kurtosis were within acceptable limits for the reduced student sample.

Initially, a one-way repeated measures analysis of variance (ANOVA) was conducted to test for differences between groups on the dependent variable GPA (pre- and post-intervention). There was a significant main effect of time, $F(1, 81) = 20.69$, $p < .001$, $\eta^2 = .20$ (large effect), but no significant interaction of group and time, $F(1, 81) = 2.25$, $p = .14$, $\eta^2 = .03$ (small effect).

As a follow-up to the ANOVA, planned comparison t-tests were used to determine the nature of the improvement within each group. Over time, both the control and experimental groups demonstrated grade improvements. Paired-sample t-tests were used to determine the significance of the improvement within each group. In the experimental (goal) group, GPA2 (M = 2.91, SD = .65) was significantly higher than the

baseline GPA1 ($M = 2.25$, $SD = .93$), $t(44) = 4.39$, $p < .001$ (two-tailed), and the effect size was moderate-to-large, $d = .65$. In the control group, there were also significant differences between baseline GPA1 ($M = 2.26$, $SD = .73$) and post-intervention GPA2 ($M = 2.59$, $SD = .92$), $t(37) = 2.12$, $p = .04$ (two-tailed), although the effect size was small-to-moderate, $d = 0.40$.

A planned comparison of GPA2 (post-intervention) was also run between groups. GPA2 for the experimental (goal) group ($M = 2.91$, $SD = .65$) was marginally greater than GPA2 for the control group ($M = 2.59$, $SD = .92$), $t(81) = 1.83$, $p = 0.071$ (two-tailed), and the effect size was small-to-moderate, $d = .40$ (see Figure 11 for a comparison of group changes in mean GPA over time). The same pattern of results is illustrated in the participants when the two mid-semester drop-outs were included, although the effect is somewhat diminished here. This is expected, as we have theoretically excluded two of the lowest performing students in the control group with these alternate analyses.

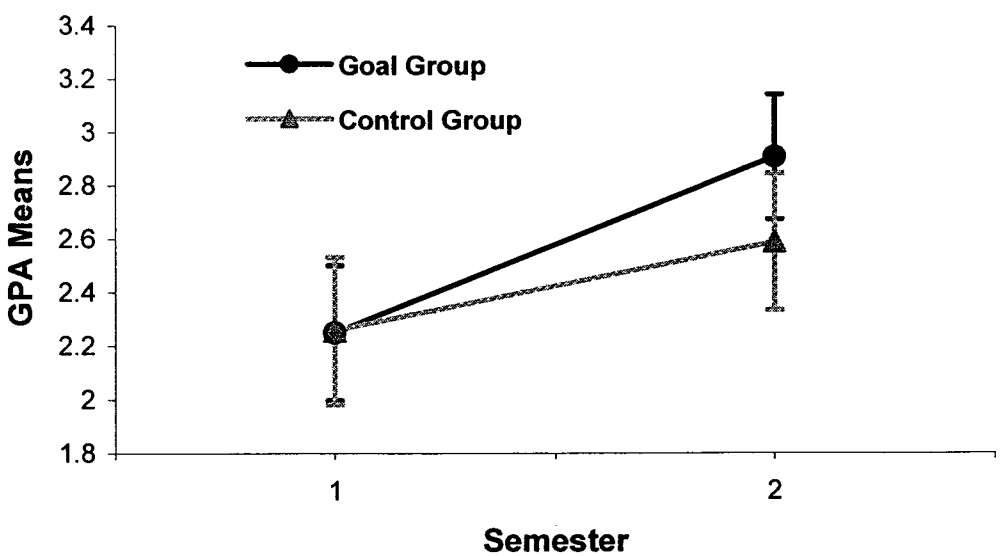


Figure 11. Group differences in GPA change post-intervention (with two drop-outs excluded). Error bars show 95% confidence intervals for each group at each time point.