

College and University Students with Disabilities: “Modifiable” Personal and School Related Factors Pertinent to Grades and Graduation

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Abstract

We examined aspects of the experiences of postsecondary students with various disabilities that facilitate higher grades and stronger intention to graduate. Specifically, we focused on experiences that could be modified by the student, the community, or the school. Self-reports of 611 junior/community college and university students with various disabilities show that the best predictors of intention to graduate were the absence of social alienation on campus, strong course self-efficacy, and school environment related facilitators (e.g., good schedule, positive attitudes of professors) as well as personal situation facilitators, such as having friends and high levels of personal motivation. In addition, students registered for campus disability-related services were more likely to intend to graduate as were full-time students. Intention to graduate and grades were only weakly related. Grades were best predicted by course self-efficacy. Stronger social self-efficacy and more personal situation and school environment-related facilitators were also related to better grades. Results also show that junior/community colleges are more “friendly” to students with disabilities than are universities (i.e., students feel less alienated and experience more school environment related facilitators). Recommendations are made based on the findings on aspects that can be modified to facilitate academic success.

Keywords: Students with disabilities, college, university, academic persistence, graduation, grades, academic performance

Most studies of academic success have excluded students with disabilities. This is important, since recent large scale North American studies found that as many as 14% of junior/community college students (Ministry of Training, Colleges & Universities, 2012), 11% of undergraduates, and 8% of graduate students have a disability (Snyder & Dillow, 2012). These students must cope not only with the usual challenges but also with personal and school aspects related to their disabilities in order to succeed (Adams & Proctor, 2010).

In addition, while many studies of academic success examined demographic and pre-entry characteristics such as age and high school grades – aspects that cannot be changed - few have looked at aspects that can be altered by the school or by the students, their families or communities. Our goal here is to assess “modifiable” aspects that facilitate graduation and academic performance. Our definition of modifiable follows Dutta, Schiro-Geist, and Kundu, (2009), and includes aspects such as accessibility, paid employment, level of motivation, study habits, course load, attitudes of professors and students, opportunity to participate in school extracurricular activities, financial situation, making friends at college, and managing time effectively.

Graduation

Few studies have investigated graduation among students with disabilities. The literature shows that high school grades and college grade point average (GPA) (Jorgensen, Fichten, & Havel, 2009; Mamiseishvili & Koch 2011), family income, and time spent studying are related to persistence in a sample of students with various disabilities, along with facilitating personal conditions (e.g., good health, financial situation, family support)(Jorgensen, Fichten, & Havel, 2011). DaDeppo (2009) used the 18-item Academic and Social Integration Scales of Milem and Berger’s (1997) Freshman Year Survey. She found that social inclusion (e.g., Since coming to the university I have developed a close, personal relationship with at least one faculty member) and, to a lesser extent, academic inclusion (e.g., My academic experience at this university has had a strong positive influence on my intellectual growth and interest in ideas) were associated with intention to persist among students with learning disabilities (LD). Similarly, Mamiseishvili and Koch (2011), using different measures, also reported that academic and social inclusion were related to persistence. When examining postsecondary students with LD who had graduated, Vogel, Hruby, and Adelman (1993) found that these students were significantly older and had received tutoring during their schooling. Consistent with these findings, Troiano, Liefeld, and Trachten-

berg (2010) found that use of LD related supports was linked to the likelihood of graduation; similarly Mamiseishvili and Koch (2011) reported that receiving accommodations was related to persistence in a sample of students with diverse disabilities. Troiano et al. (2010) also found that full-time students who lived on campus were more likely to persist, and in contradiction to Vogel et al. (1993), that it was younger rather than older students with diverse disabilities who were more likely to graduate. Several studies found that the attrition rate of males was higher than that of females (Jorgensen, Fichten, & Havel, 2009; Mamiseishvili, & Koch, 2011; National Center for Education Statistics, 2010; O’Neil, Markward, & French, 2012; Troiano et al., 2010; Wessel, Jones, Markle, & Westfall, 2009).

It should be noted that these studies used different methods (e.g., concepts studied, school records, self-report); diverse means of recruiting participants (e.g., freshman survey, office for students with disabilities, convenience sample); and various ways of defining disability (self-report, documentation) and outcome (e.g., persistence from one semester to the next, intention to graduate, graduation). In addition, some studies focused exclusively on students with a certain type of disability while others included all students with disabilities. The differences in approach and design used by different researchers makes drawing conclusions difficult.

Grades

In the nondisabled literature, self-efficacy beliefs seem especially important predictors of GPA (Chemers, Hu, & Garcia, 2001). Self-efficacy expectations (i.e., confidence that one can successfully execute a task or a behavior necessary to reach a desired result) (Bandura, 1977) can influence whether or not one engages in a task. In the literature on self-efficacy related to diverse aspects of academic performance, a variety of measures have been used. These evaluate, for example, confidence in being able to write papers, submit assignments on time, participate in class discussions, and study effectively for exams. Not only have successful behavioral outcomes been shown to increase self-efficacy expectations, but strong self-efficacy beliefs have been shown to precede and to predict successful behavior in various areas (Libman et al., 1985; Zajacova, Lynch, & Espenshade, 2005).

In the disability and GPA literature a variety of measures have been used. For example, Butler (2012) used Owen and Froman’s (1988) College Academic Self-Efficacy Scale (included in Butler, 2012: e.g., confidence in taking well-organized notes during a lecture). Lombardi, Murray, and Gerdes (2012) used Solberg et al.’s 1998 Course Self-Efficacy measure

(e.g., confidence in being able to research a term paper) and Exner (2010) used the self-efficacy subscale of the Motivated Strategies for Learning Questionnaire (included in Exner, 2010).

As in the case of graduation, in the disability-related literature on academic performance, too, factors associated with grades have shown widely discrepant results. For example, DaDeppo (2009) found that for university students with LD, background characteristics were minimally related to GPA and that academic and social inclusion were unrelated to GPA. Butler (2012) found that for students with LD, self-reported GPA was related to being older and to being enrolled in a 4-year university rather than a 2-year junior/community college. She also found that GPA was related to academic self-efficacy, as did Lombardi et al. (2012). However, Exner (2010) failed to find any relationship between GPA and academic self-efficacy among students with LD. Exner also failed to find significant links between GPA and effort or self-awareness among students with LD. While Troiano et al. (2010) found that the use of LD-related supports was related to GPA, Lombardi et al. (2012) reported that GPA was unrelated to using accommodations. Lombardi et al. (2012) also failed to find any links between grades and financial stress or peer or family support. A study by Murray and Wren (2003) on university students with LD showed that full scale IQ and some subscales of the Study Habits and Attitudes Measure were related to GPA. In terms of gender difference in academic performance, DaDeppo (2009) found that among university students with LD, being female was related to higher GPA. However, Lombardi et al. (2012) showed, in a university sample of students with a variety of disabilities, that GPA was unrelated to gender.

The inconsistent results may be due to the methodological issues noted for studies of graduation. In addition, grades are measured in diverse ways in various studies, although letter grades and some form of standardized score, such as a GPA, are most commonly reported. Nevertheless, some schools do not use GPAs and grading systems are not equivalent. To overcome such difficulties, self-reports of academic performance have been used. For example, Statistics Canada (2008), which administers the Canadian Census, used a question asking respondents to rank themselves against the rest of their graduating class in their field of study in their Graduates Survey.

The Present Study

The goal of this investigation was to explore “modifiable” aspects that characterize successful students

with disabilities. “Modifiable” variables (e.g., college services, services for students with disabilities, school social climate, self-efficacy) are those that may be altered by the school, by parents, professors, community members, or the students themselves (Dutta et al., 2009). We examined two aspects of success in a sample of junior/community college and university students: intention to graduate (measured by a questionnaire) and grades (self-reports). Demographic and status variables (e.g., age, disability, gender) are included but are used mainly to describe the sample.

Hypotheses

We predicted the following modifiable aspects would be related to stronger intention to graduate:

- higher grade,
- strong personal and academic facilitators,
- good academic and social inclusion at school (i.e., high course and social self-efficacy, low campus alienation),
- fewer hours worked during the academic year (based on findings on nondisabled students; see Metcalf, 2003),
- registration for campus disability related services, and
- being enrolled full-time.

Among “non-modifiable” aspects we predicted:

- Being female would be associated with intention to graduate.
- Consistent with findings on nondisabled students (ACT, 2006), we predicted that students who were more advanced in their program of study would be more likely to intend to graduate than those just beginning (greater effort already invested).

As for grades, we predicted that among modifiable variables the following would be related to better academic performance:

- stronger intention to graduate,
- greater course and social self-efficacy,
- more facilitating personal and school related conditions,
- being enrolled in one’s first choice program, and
- working fewer hours during the academic term.

Among non-modifiable variables, we expected:

- being female, and
- being older to be related to better performance.

Method

Participants

A convenience sample of 611 postsecondary students with various disabilities who were enrolled in a certificate, diploma, or degree program in Canada participated. There were 415 females and 194 males (two did not indicate); this gender imbalance is consistent with others' studies (e.g., Adams & Proctor, 2010, Snyder & Dillow, 2012). Of these, 213 attended a junior/community college and 391 attended a university (five did not indicate). Participants were enrolled in 98 different Canadian universities and junior/community colleges in nine of Canada's 10 provinces. Eighty-seven percent were registered with their school for disability related services and 84% were enrolled in their first choice program. Consistent with others' reports (Newman, Wagner, Cameto, & Knokey, 2009), most participants (83%) were full-time students. Approximately half ($n = 309$) of the sample did not work during the school year. Among university students, 286 were pursuing a bachelor's degree and 81 were pursuing a graduate degree; the rest were pursuing other credentials (e.g., certificate). Mean age of participants was 29 ($SD = 9$, $Mdn = 25$, mode = 22, range = 19 to 66). University students ($M = 31$, $SD = 10$) were significantly older than junior/community college students ($M = 25$, $SD = 8$), $t(603) = 7.53$, $p < .001$.

Table 1 shows that the most common disability/impairment of students was a psychological/psychiatric disability, followed by a learning disability (LD), attention deficit hyperactivity disorder (ADHD), and a chronic medical/health problem. Two-hundred and seventy-one students reported more than one disability/impairment, with LD plus ADHD being most common, followed by ADHD plus psychological disability, chronic health problems plus psychological disability, and mobility impairment plus limitation in the use of hands/arms.

Measures

To evaluate test-retest reliability, all measures were administered twice, with a five-week interval (range 3-16 weeks, $M = 5$, $Mdn = 5$). Results for all measures show very high test-retest correlations, with most r scores for all samples at .80 or above.

Demographic questions. These include questions related to gender, age, and parental education. We also provided a list of 14 disabilities/impairments (see Table

1) and asked participants to self-identify as many as applied. We separated psychological/psychiatric disability from LD and from ADHD because these latter two are typically treated as separate entities in the literature due to their impact on academic work.

School related questions. Closed-ended questions asked about full- or part-time status, registration for campus disability-related services, qualifications/credentials pursued or abandoned (e.g., bachelor's degree, college diploma), type of school (college or university), whether the participant was/had been enrolled in their first choice program, the number of hours employed during the academic year while studying, whether they had taken a leave of absence, and the percentage of their program that they had completed. These questions have been used in previous studies (Fichten, Asuncion, Nguyen, Budd, & Amsel, 2010).

Grades. As in other investigations, we used self-reported grades rather than GPAs from school records (e.g., Butler, 2012; Sachs & Schreuer, 2011; Statistics Canada, 2008); this permits research to be carried out across different schools and locations. We asked participants to describe themselves as an A, B, C, or a D or less student (participants could answer, "I don't know"). This correlated highly, $r(496) = .73$, $p < .001$, with scores asking participants to rank themselves against the rest of the students in their program of study: in the top, middle, or bottom third. Because more participants answered, "I don't know" to the ranking question, we used the A, B, C, or D question in data analyses.

College Experience Questionnaire (CEQ). This measure inquires about aspects that facilitate or act as barriers to academic success (1 = much harder to 6 = much easier). Two subscales inquire about the participant's Personal Situation (financial situation, having a paid employment, family situation, having friends, level of personal motivation, study habits, previous education experiences, health, impact of their disability) and School Environment (level of difficulty of courses, course load, course schedule, attitudes of professors, attitudes of non-teaching staff, attitudes of students, availability of computers on campus, training on computer technologies on campus, availability of course materials, opportunity to participate in school extracurricular activities, willingness of professors to adapt courses to my needs, accessibility of building facilities, accessibility of school physical education courses, availability of disability related services at the school). Higher scores indicate more facilitating conditions. Good psychometric properties were reported by the CEQ's authors (Fichten, Jorgensen, Havel, & Barile, 2006, 2010). Scores have also been shown to be related to the quality of academic supports that students

Table 1

Disabilities of Students and Age, Grade, and Intention to Graduate

Type of disability / impairment	Number of participants reporting each disability / impairment	Median Age	Mean Intention to Graduate	Mean Grade ¹
Psychological / psychiatric disability	189	26	5.24	1.85
Learning disability (LD)	181	24	5.54	2.04
Attention deficit hyperactivity disorder (ADHD)	174	24	5.48	2.14
Chronic medical / health problem	113	29	5.50	1.68
Limitation in the use of hands / arms	58	29	5.50	1.68
Hearing impairment	56	26	5.58	1.82
Low vision	49	27	5.71	1.77
Mobility impairment: use of a cane / crutches / walkers	44	32	5.34	1.81
Neurological impairment	43	26	5.57	1.81
Mobility impairment: wheelchair / scooter user	38	27	5.61	1.92
Speech / communication impairment	24	26	5.27	2.30
Totally blind	17	30	5.87	1.59
Pervasive developmental disorder (e.g. Asperger's)	15	23	5.25	2.00
Deaf	12	28	5.82	1.50
Total disabilities/impairments	1013	25		

Note: 611 students reported a total of 1013 disabilities/impairments. 271 of the 611 students reported more than one disability/impairment. Participants could check all disabilities that applied. The median age of the 273 students with multiple disabilities/impairments was 26 years. Their mean Intention to Graduate score was 5.42, their mean Grade was 1.95, and their mean Rank was 1.83.

¹ Grade: A=1, B=2, C=3, D=4

with learning disabilities and ADHD report receiving (Wolforth & Roberts, 2009). In addition, scores on both subscales were related to academic satisfaction of students both with and without disabilities and the CEQ Personal subscale was related to academic retention of junior/community students with disabilities (Jorgensen et al., 2011). Higher scores indicate facilitating conditions (i.e., made academic life easier) and lower scores indicate barriers (i.e., made academic life harder).

Self-Efficacy Questionnaire. This widely-used measure by Solberg, et al. (1998) evaluates, on a 10-point scale (0 to 9), how confident respondents are that they could successfully enact various school related behaviors. We used two subscales: Course Self-Efficacy (7 items – take good class notes, research a term paper, write a course paper, do well on your exams, manage your time effectively, keep up to date with your school work, understand your textbooks) and Social Self-Efficacy (6 items – participate in class discussions, ask a question in class, talk to your professors/instructors, ask a professor/instructor a question outside of class, talk with academic and support (e.g., advising) staff, make new friends at college). Higher scores indicate greater self-efficacy. The measure has good psychometric properties (Barry & Finney, 2009).

Campus Climate Social Alienation. We used only the 4-item Social Alienation subscale of this 6-point Likert scaled measure (Strongly Disagree – Strongly Agree) (I find myself lonely and lost on this campus, my disability prevents me from having more contact with my professors, I do not have much communication with nondisabled students, I communicate well with nondisabled students and faculty (reverse scored)). Higher scores indicate greater alienation. The measure's authors report good psychometric properties (Wiseman, Emry, & Morgan, 1988).

Intention to Graduate. We adapted the 5-item scale from Davis, Ajzen, Saunders, and Williams (2002) to postsecondary education. It uses 6-point Likert scale ratings (strongly disagree to strongly agree). Items are as follows: I intend to complete my program of studies; I will try to complete my program of studies; I expect to complete my program of studies; I am determined to complete my program of studies; All things considered, it is possible that I might not complete my program of study (reverse scored). The mean is calculated, with higher scores indicating greater likelihood of graduation. Our findings indicate good reliability and validity for the measure (Fichten et al., 2014) and a mean score on Intention to Graduate of 5.50, with a

median of 5.80. Given graduation rates and the lack of normality in the distribution, the median is the most appropriate score to divide participants into those who Intend to Graduate and those who do not. Therefore, Intention to Graduate was defined by a score ≥ 5.80 and not intending to graduate as a score < 5.80 .

Procedure

In the spring 2010 semester we sent invitations to all current and former postsecondary students with disabilities who had participated in our previous research and who indicated that we may contact them for future studies. We also emailed announcements to discussion lists focusing on Canadian postsecondary education and to project partners (mainly student and campus disability service provider groups). Current postsecondary students with all types of disabilities who were enrolled in a diploma or degree program and were aged 18 or over were sought to help identify environmental, financial, personal, and other factors that facilitate or pose barriers to students with disabilities pursuing a junior/community college or university education in Canada. Based on pre-testing we indicated that it would take approximately 20 minutes to complete the online questionnaire and that we were offering a \$20 honorarium.

Individuals who indicated their interest were directed to a website where they read the information and consent form approved by Dawson College's Human Research Ethics Committee. Participants clicked on the "continue" button to signal their agreement. This brought them to the online questionnaire. The final screen requested permission to contact the individual for future studies and invited participants to provide contact information for the honorarium. Virtually all participants completed this information.

Four weeks later, those who indicated that we may contact them for future studies were emailed and asked to complete the same questionnaire again (to allow calculation of test-retest reliability). They were informed that doing so would qualify them for an additional \$20 honorarium. Prior to data analysis, the data set was thoroughly scrutinized to ensure the integrity of responses.

Results

Sample Characteristics

Table 1 presents information for each disability group on age, grade, and Intention to Graduate. The most common disabilities/impairments reported were psychological/psychiatric disability, LD, ADHD, chronic medical/health problem, and limitation in the

use of hands/arms. It is important to note that almost half of the sample ($n = 271$) reported more than one disability/impairment. Table 1 shows that students who were totally blind and those who were Deaf had the best scores on all three variables. When Intention to Graduate was evaluated, several groups scored above the mean, suggesting stronger intention to graduate. In rank order these are: students with low vision, who used a wheelchair or a scooter, had a hearing impairment/were hard of hearing, had a neurological impairment and an LD. As for better grades, the rank order is: chronic medical /health problem, limitation in the use of hands or arms, low vision, mobility impairment (crutch, cane), neurological, and hearing impairment. Students with psychological/psychiatric impairments, ADHD, pervasive developmental disorders such as Asperger's, and speech / communication disorder scored in the bottom half of grades.

Intention to Graduate

To evaluate the relationship of gender, school type, and Intention to Graduate on modifiable variables we first performed a 3-way multivariate analysis of variance (MANOVA) on the variables of interest. All three main effects were significant, Intention to Graduate $F(13, 469) = 4.64, p < .001$, school type (college vs. university), $F(13, 469) = 6.84, p < .001$, and gender, $F(13, 469) = 3.51, p < .001$, although none of the interactions were significant. A series of analysis of variance comparisons (ANOVAs) followed; results, means and standard deviations are available in Table 2 for only those variables where at least one main effect was significant.

Demographics. ANOVA results for demographic variables, presented in Table 2, show only that university students are older than college students and that students who intend to graduate have fewer disabilities than those who do not. The comparisons on mother's ($M = 13.46$ years, $SD = 3.63$) and on father's education ($M = 13.15, SD = 3.84$) were not significant.

Grades. Table 2 shows that those who intend to graduate had higher grades than those who do not. University students reported higher grades than college students. Males and females did not differ.

College Experience Questionnaire (CEQ). ANOVA results and means in Table 2 show that those who intend to graduate experienced more facilitating conditions, both on their personal situation as well as on their school environment. In addition, the circumstances of males were more facilitating than those of females on both measures. Colleges were seen as being more facilitating than universities on School Environment.

Self-Efficacy Questionnaire (SEQ). Table 2 shows that those who intend to graduate had stronger academic and social self-efficacy beliefs than those who do not and that females had greater self-efficacy than males.

School-related aspects. Table 2 shows that students who intend to graduate feel less alienated on the Campus Climate Social Alienation scale than those who do not and that college students feel less alienated than university students. Students in universities report working more hours per week than college students. Percent of program completed by students who intended and those who did not intend to graduate did not differ significantly.

Other variables. Students who had registered for disability-related services were more likely to indicate that they would graduate than those who had not registered, $X^2(1, 606) = 4.71, p < .05$, and full-time students were more likely to intend to graduate than part-time students $X^2(1, 596) = 5.43, p < .05$. The same is true for students who had not been on a leave of absence, $X^2(1, 603) = 8.31, p < .05$, as well as for those who were enrolled in their first choice program compared to those who were not, $X^2(1, 607) = 8.60, p < .001$. There was no significant difference between males and females, college and university students, or university students pursuing a bachelor's degree and those pursuing a graduate degree.

Predicting Intention to Graduate. To examine predictors of Intention to Graduate "modifiable" variables were entered into a stepwise regression analysis. These include: employment hours per week, CEQ Personal Situation, CEQ School Environment, Course Self-Efficacy, Social Self-Efficacy, Campus Climate Social Alienation, registration for disability-related services, and full- or part-time student status. The results show that the best predictors of Intention to Graduate were Campus Climate Social Alienation, Course Self-Efficacy, and CEQ Personal Situation, with all three variables adding significantly to the prediction. These variables, while significant, accounted for a small proportion of the variance (10%) in Intention to Graduate, $R^2 = .10, F(3, 591) = 21.61, p < .001$. Campus Climate Social Alienation entered first and accounted for 7% of the variance, Course Self-Efficacy entered the equation second, it accounted for an additional 2% of the variance, and CEQ Personal Situation entered third and accounted for an additional 1% of the variability.

Due to shared variance, several variables of interest that were correlated with Intention to Graduate did not add significantly to the model. Correlations with Intention to Graduate are presented in Table 3, which shows that Social Self-Efficacy was also closely related to Intention to Graduate.

Grades

To evaluate the effect of gender, school type, and grades on modifiable variables we first performed a 3-way MANOVA. Since only 11 students indicated their grade as being a D or less, tests were carried out on only three levels of Grade: A, B, and C. All three main effects were significant: grade, $F(24, 918) = 3.96, p < .001$; gender, $F(12, 458) = 2.45, p < .001$; school type (college vs. university), $F(12, 458) = 4.14, p < .001$. Only the grade main effects and the interactions with grade are of interest, since all gender and school type main effects can be seen in Table 2.

Demographics. ANOVA results in Table 4 show only that parental education was highest for students with "A"s. The grade main effects for age and for number of disabilities were not significant, although there was a trend for older age to be related to better grade.

Intention to Graduate. The main effect for this variable was significant, with Table 4 and the Tukey hsd test showing that a grade of C was related to lower scores on Intention to Graduate.

College Experience Questionnaire (CEQ). ANOVA results and means in Table 4 show that those with higher grades had more personal situation as well as school environment related facilitating factors.

Self-Efficacy Questionnaire (SEQ). The main effects for both course and social self-efficacy were significant, again showing that those with higher grades had stronger self-efficacy in both domains scores than those with lower grades.

School-related aspects. None of the main effects on school related aspects (i.e., employment hours per week, percent of program completed, Campus Climate Social Alienation) were significant.

Other variables. Among school related nominal variables, the only significant findings were that students in their first choice program were more likely to have better grades than those not in their first choice program, $X^2(3, 587) = 13.57, p < .001$, and that university students were more likely to have better grades than college students, $X^2(3, 584) = 33.34, p < .001$. The remaining variables showed no significant differences on grades: gender, registration for disability related services, full-time vs. part-time student status, and having been on a leave of absence.

Predicting Grades. We also examined predictors of grades using stepwise regression. The variables used to predict Intention to Graduate were included. The predicted variable was grade (A and B vs. C and D). The results show that a single predictor, course self-efficacy, was entered in to the equation. This variable accounted for a relatively small proportion of the variance (12%) in grade, $R^2 = .12, F(1, 572) = 77.25, p < .001$, Standardized $\beta = -.345$.

Table 2

Students' Intention to Graduate: Means and ANOVA Results

	Intends to Graduate				Does Not Intend to Graduate				Test results ANOVA main effects
	College		University		College		University		
	Female	Male	Female	Male	Female	Male	Female	Male	
Demographics									
Age									
Mean	23.34	25.71	29.38	31.56	27.68	24.13	30.76	32.72	Intention to Graduate $F(1,592) = 2.56, p = .110$ School Type $F(1, 592) = 50.71, p < .001$ Gender $F(1,592) = 0.80, p = .373$
SD	5.00	8.34	8.91	11.54	10.77	6.00	9.06	10.23	
Number of Disabilities									
Mean	1.53	1.52	1.61	1.54	1.89	1.48	1.84	1.78	Intention to Graduate $F(1,594) = 6.03, p < .05$ School Type $F(1, 594) = 1.11, p = .293$ Gender $F(1,594) = 2.71, p = .100$
SD	0.83	0.80	0.88	0.79	1.00	0.72	1.03	0.86	
Academic Performance									
¹ Grade: A, B, C, D or less student									
Mean	2.09	2.00	1.72	1.68	2.12	2.46	1.85	2.00	Intention to Graduate $F(1,572) = 12.25, p < .001$ School Type $F(1, 572) = 28.06, p < .001$ Gender $F(1,572) = 1.91, p = .168$
SD	0.74	0.59	0.70	0.60	0.76	0.74	0.76	0.72	
College Experience Questionnaire (CEQ)									
² Personal Scale									
Mean	3.96	3.81	3.64	3.85	3.22	3.69	3.23	3.41	Intention to Graduate $F(1,594) = 24.48, p < .001$ School Type $F(1, 594) = 2.61, p = .107$ Gender $F(1,594) = 4.35, p < .05$
SD	0.86	1.08	0.95	1.00	0.90	0.93	0.95	0.80	
² School Scale									
Mean	4.26	4.31	3.85	4.07	3.81	4.26	3.61	3.77	Intention to Graduate $F(1,594) = 10.76, p < .001$ School Type $F(1, 594) = 18.20, p < .001$ Gender $F(1,594) = 7.94, p < .01$
SD	0.82	1.03	0.80	1.00	0.78	0.68	0.87	0.87	
Self-Efficacy Questionnaire (SEQ)									
² Course Self-Efficacy									
Mean	6.80	6.38	6.62	6.61	5.90	5.19	5.90	5.78	Intention to Graduate $F(1,594) = 42.53, p < .001$ School Type $F(1, 594) = 1.29, p = .257$ Gender $F(1,594) = 5.01, p < .05$
SD	2.21	1.49	1.46	1.70	1.54	1.51	1.68	1.53	
² Social Self-Efficacy									
Mean	6.80	7.34	6.66	7.24	5.82	6.06	6.00	6.41	Intention to Graduate $F(1,594) = 31.68, p < .001$ School Type $F(1, 594) = 0.19, p = .660$ Gender $F(1,594) = 6.92, p < .01$
SD	1.71	1.51	1.75	1.60	2.13	1.84	1.88	2.16	
School related aspects									
Employment Hours per Week									
Mean	6.40	7.40	8.85	7.60	7.51	5.55	10.39	9.41	Intention to Graduate $F(1,594) = 0.39, p = .533$ School Type $F(1, 594) = 5.02, p < .05$ Gender $F(1,594) = 0.58, p = .446$
SD	7.99	11.11	11.26	11.86	10.97	10.64	13.03	12.90	
¹ Campus Climate Social Alienation									
Mean	1.95	2.12	2.36	2.37	3.00	2.42	3.00	3.07	Intention to Graduate $F(1,594) = 38.96, p < .001$ School Type $F(1, 594) = 9.10, p < .01$ Gender $F(1,594) = 0.59, p = .443$
SD	0.96	1.31	1.08	1.22	1.29	1.13	1.28	1.21	

¹ The lower the better

² The higher the better

Due to shared variance, several variables of interest that were correlated with grade did not add significantly to the model. Correlations in Table 3 show that social self-efficacy was also closely related to grades.

Relationships Among Variables

Pearson product-moment correlation coefficients in Table 3 show that Intention to Graduate was significantly, although not closely, related to grade. Table 3 also shows the relationships among variables. Of interest are the findings that younger age, fewer disabilities, and more facilitating school environment (CEQ) were related to the predictors of Intention to Graduate and of grade.

Discussion

Sample Characteristics

The results show that almost half of the participants had more than one disability/impairment, with a psychological/psychiatric disability, an LD, ADHD and a chronic health/medical condition being most common. It should be noted, however, that psychological/psychiatric disability was, most of the time, coupled with another disability/impairment and that LD and ADHD were often paired.

Not surprisingly, university students were older than junior/community college students and, as is commonly noted in the literature (e.g., O'Neill et al., 2012), both groups were older than what one would expect in nondisabled samples.

Summary of Key Findings

Table 5 summarizes the findings on both modifiable and non-modifiable aspects and shows the findings for both intention to graduate as well as academic performance. It should be noted that in the case of weak associations between variables, different types of analyses (e.g., correlation, ANOVA) resulted in slightly different results. This is to be expected since we used simple correlations and since the ANOVAs were 3-way and nonorthogonal. In Table 5 we present a summary of the most consistent findings.

Intention to graduate. Our results show that intention to graduate was best predicted by social alienation on campus, course self-efficacy, and personal situation facilitators. These three variables, however, predicted only 10% of the variability in scores. It should also be noted that social self-efficacy was also closely related to intention to graduate. Modest regression coefficients are common when predicting academic persistence (e.g., Murray & Wren, 2003), and this was the case in the present study as well.

We expected campus social alienation to be negatively related to intention to graduate. We confirmed this hypothesis and found that alienation was the most important predictor of intention to graduate. We also expected that students who intended to graduate would have higher course and social self-efficacy scores. This hypothesis, too, was confirmed.

Strong personal and school-related facilitators were also expected to be related to intention to graduate. Consistent with the prediction, the results show that both personal facilitators (e.g., good financial situation, good family situation, having friends, high level of personal motivation, good study habits, good previous education experiences) as well as school related facilitators (e.g., acceptable course load, good schedule, positive attitudes of professors, non-teaching staff and students, availability of computers on campus, accessibility of building facilities) were related to intention to graduate.

Campus access/disability-related support services are typically seen by students with disabilities as the most important facilitator of their academic experience (Fichten et al., 2006). Thus, it was not surprising to find that students intending to graduate were more likely to have registered for campus disability related services than those who did not intend to graduate.

We had not expected enrolment in one's first choice program to be related to intention to graduate. Yet, the results show that this was, indeed, the case. Contrary to our hypothesis, we found that the number of hours worked during the academic year was not related to intention to graduate. This may be due to students whose health or disabilities interfere with the possibility of working, as the results confirm the hypothesis that being a part-time student as well as having been on a leave of absence are related to poor intention to graduate.

Few of the "non-modifiable" variables were related to intention to graduate. A notable exception was number of disabilities: the results show that students with more disabilities/impairments were less likely to intend to graduate. In fact, in previous investigations, students with disabilities who dropped out of postsecondary education cited their health and the impact of their disability as reasons for quitting (Jorgensen, Fichten, & Havel, 2009; Fichten et al., 2014). This may explain the present finding that, as expected, full-time student status was related to intention to graduate along with not having been on a leave of absence. It is possible that students whose disability/impairment was more intrusive took a semester off or registered as a part-time student. Of course, determining why students with disabilities take a leave of absence and why they register on a part-time basis are empirical questions that should

be addressed in future research. None of the remaining “non-modifiable” variables were related to intention to graduate: age, school type, or parental education. Even though we had expected females to be more likely to plan to graduate, this was not the case.

Intention to graduate and academic performance were weakly related. In fact, the findings show only that students with a grade of C were less likely to plan to graduate than those with As or Bs, who did not differ from each other. Moreover, correlations between intention to graduate and grades, although significant, were very low.

We expected that women would be more likely to graduate. This hypothesis was not confirmed. Based on findings on nondisabled students (ACT, 2006), we also predicted that students who were more advanced in their program of study would be more likely to intend to graduate than those just beginning. This hypothesis was also not confirmed, perhaps because students with disabilities abandon their studies primarily because of disability and health related issues (Fichten et al., 2014; Jorgensen, Fichten, & Havel, 2009).

Grades

The picture was somewhat different from intention to graduate when grades were examined. First, as expected, grade was predicted by a single variable: course self-efficacy; this predicted only 12% of the variability in scores. Of course, since the findings are correlational, the possibility that stronger self-efficacy is engendered by higher grades, rather than the reverse, or that some third variable is operating cannot be ruled out. It should be noted, however, that course self-efficacy may serve as a proxy for a host of different social processes linked to grades. The findings indicate that these include personal situation and school environment facilitators, social self-efficacy, and campus climate social alienation, which are all correlated with course self-efficacy.

Among other “modifiable” aspects, we expected that students with better grades would have higher social self-efficacy scores. This hypothesis was confirmed. We also predicted that strong personal situation and school environment-related facilitators would be related to academic performance. This prediction, too, was upheld. As expected, students enrolled in their first choice academic program had higher grades than those who were not. This is logical, as postsecondary grades are usually related to high school grades, which are likely to influence acceptance into one’s first choice of program.

It is also important to note the variables that were not related to academic performance, even though these

were important for intention to graduate: social alienation on campus, whether one was a full or part-time student, and whether one had taken a leave of absence.

Similarly, registration for disability-related access/support services was also unrelated to academic performance. Findings concerning the role of accommodations for academic performance are inconsistent (Lombardi et al., 2012; Troiano et al., 2010). In part, discrepancies in findings may be due to the samples studied, as there may be important differences between those students who do - and those who do not - register for disability-related services. This is a fundamental question that deserves more research attention, including a look at how specific accommodations may affect grades.

As in the case of intention to graduate, contrary to our prediction, hours spent in employment during the term was unrelated to academic performance. This is not consistent with findings in the literature on nondisabled students (Bozick, 2007). Nevertheless, there was a trend in the expected direction. Perhaps this finding is related to the large number (slightly over half) of students in our sample who did not work during the academic year. Given the importance of work experience during the undergraduate years for finding employment after graduation, it would be interesting for future research to study which students, with which disabilities/impairments are likely to work during the academic year.

Among “non-modifiable” aspects, university students had better grades than junior/community college students. Whether this is due to academically weaker students enrolling in junior/community college rather than in a university or to differences in grading practices deserves further research attention.

The highest grades were related to higher parental education. Number of disabilities was not related to academic performance. As was the case for intention to graduate, percent of program completed was unrelated to academic performance. While we expected females to have higher grades than males, this was not the case. Similarly, although we expected older age to be related to better grades, the findings on age were not significant.

School Type: Differences Between Junior/Community Colleges and Universities

Among “modifiable” aspects, the results show that junior/community colleges are more “friendly” to students with disabilities than are universities. For example, alienation on campus and school environment related facilitators were both worse in universities than in junior/community colleges. These differences favoring

Table 3
Correlations Among Variables

	¹ Grade	² Intention to Graduate	Paternal Education	Maternal Education	Employment (hr/wk)	² CEQ Personal Situation	² CEQ School Environment	Course Self-Efficacy	Social Self-Efficacy	¹ Campus Climate Social Alienation	Age	% of Program Completed	Number of Disabilities
¹ Grade	1												
² Intention to Graduate	-.136***	1											
Paternal Education	-.084	.040	1										
Maternal Education	.683***	.683***	1										
Employment (hr/wk)	.007	.003	.003	1									
² CEQ Personal Situation	.191***	.137***	.005	.137***	1								
² CEQ School Environment	.237***	.147***	.032	.031	.015	1							
Course Self-Efficacy	.231***	.240***	.061	.004	.023	.443***	1						
Social Self-Efficacy	.240***	.307***	.017	.031	.054	.353***	.460***	1					
¹ Campus Climate Social	-.208***	-.268***	-.055	-.058	-.040	-.375***	-.321***	-.599***	1				
Age	.052	-.113**	.041	.048	.041	.209***	.209***	.209***	.209***	1			
% of Program Completed	-.125**	.066	-.039	-.025	.030	-.251***	-.230***	.041	.041	.074	1		
Number of Disabilities	.094*	-.125**	-.004	.012	-.021	-.215***	-.125**	-.044	-.044	.164***	.191***	1	

¹ The lower the better.

² The higher the better.

*** p < .001

** p < .01

* p < .05

Table 4

Grades: Means and ANOVA Results

Grade	A	B	C	ANOVA Grade main effect and Tukey hsd test
Demographics				
Age				
Mean	29.98	28.87	25.80	Grade F (2,558) = 2.80, $p < .10$
SD	9.62	9.72	7.44	
Paternal Education				
Mean	13.67	12.99	13.03	Grade F (2,542) = 3.25, $p < .05$
SD	3.95	3.88	3.46	
Maternal Education				
Mean	13.96	13.10	13.72	Grade F (2,546) = 5.08, $p < .01$
SD	3.09	4.01	3.28	Tukey: A > B
² Intention to Graduate				
Mean	5.58	5.58	5.33	Grade F (2,557) = 6.92, $p < .001$
SD	0.68	0.61	0.94	Tukey: A = B > C
College Experience Questionnaire (CEQ)				
² Personal Scale				
Mean	3.70	3.64	3.40	Grade F (2,558) = 5.33, $p < .01$
SD	0.94	0.98	0.94	Tukey: A > C
² School Scale				
Mean	4.00	4.10	3.81	Grade F (2,558) = 3.70, $p < .05$
SD	0.89	0.88	0.90	
Self-Efficacy Questionnaire (SEQ)				
² Course Self-Efficacy				
Mean	6.98	6.36	5.36	Grade F (2,558) = 34.83, $p < .001$
SD	1.36	1.39	1.51	Tukey: A > B > C
² Social Self-Efficacy				
Mean	6.94	6.68	5.88	Grade F (2,558) = 15.17, $p < .001$
SD	1.66	1.84	1.79	Tukey: A > C
School Related Aspects				
Employment Hours per Week				
Mean	7.18	8.73	9.27	Grade F (2,559) = 2.39, $p < .10$
SD	10.93	11.70	11.48	
Percent Program Completed				
Mean	51%	54%	58%	Grade F (2,485) = 2.56, $p < .10$
SD	26%	25%	26%	

¹ The lower the better.² The higher the better.

Table 5

Synthesis of Findings on Grades and Intention to Graduate

	Variable: ¹ Intention to Graduate		¹ Grade	
	Significant Findings: Yes	No	Yes	No
Demographics				
Number of Disabilities	X			X
Mother's Education		X	X	
Father's Education		X	X	
School Type		X	X	
Gender		X		X
Age		X		X
Percent of Program Completed		X		X
College Experience Questionnaire (CEQ)				
Personal Scale	X		X	
School Scale	X		X	
Self-Efficacy Questionnaire (SEQ)				
Course Self-Efficacy	X		X	
Social Self-Efficacy	X		X	
School related aspects				
First Choice Program	X		X	
Employment Hours per Week		X		X
Campus Climate Social Alienation	X			X
Registration for Campus Disability Services	X			X
Full / Part-Time Student	X			X
Leave of Absence	X			X
Grade	X		n/a	n/a
Intention to Graduate	n/a	n/a	X	

¹ X indicates significant findings. n/a indicates not applicable.

colleges, however, did not translate into superior grades or stronger intention to graduate. In fact, university students reported higher grades than junior/community college students, even though they spent more time in paid employment during the academic year.

Gender Differences

The findings show that females reported greater course and social self-efficacy than males. We predicted that being female would be related to both intention to graduate and academic performance. These hypotheses were not confirmed, perhaps because males experienced more facilitating personal situations as well as school related environments than females. The literature that shows that females are less likely to drop out than males is typically based on data provided by the school (Jorgensen, Fichten, & Havel, 2009; Mamiseishvili, & Koch, 2011; National Center for Education Statistics, 2010; O'Neil et al., 2012; Wessel et al., 2009). Our findings, on the other hand, are based on responses of volunteers, who often have different profiles from those who do not volunteer (Jorgensen & Fichten, 2007; Woosley, 2005).

Other Findings of Interest

Social and course self-efficacy, personal situation, and school environment related facilitators, and campus social alienation were all closely related to each other, suggesting the possibility that improvements in any one of these areas may result in improvements in the other realms. This is potentially important since several of these variables are associated with intention to graduate and some, also, with academic performance. In the future, research links among these variables and possible causal relationships should be explored in more detail.

Limitations

Our sample consisted of volunteers. Thus, they are neither a random sample nor fully representative of the population studied. Volunteer effects, self-selection biases, recruitment through e-mail discussion lists, and the low proportion of individuals who had not registered for disability related services set limitations on the generalizability of the results. Moreover, of necessity, students self-reported their grades as well as their disabilities/impairments; of course, it would not have been possible to carry out this research in any other way, since students were enrolled in 98 different schools across Canada.

Recommendations Based on Our Findings

Evaluation of individual items on measures showing significant findings suggest the following. Making friends, increasing one's level of personal motivation, and improving one's study habits may improve grades and also improve the chance of graduation. This is also true of improved financial situations, which could be accomplished through more generous bursary and scholarship programs (CEQ Personal Situation). Findings on the Course Self-Efficacy Scale suggest that enhancing one's belief that one can effectively research a term paper, do well on exams, manage time effectively, take good class notes, keep up-to-date with school work, and understand the material in textbooks may improve academic performance and increase the likelihood of graduation. The school's learning/academic skills center can be helpful in assisting students with many of these. In addition, schools can provide workshops on effective studying, paper writing, and time management skills. Findings on the CEQ School Environment measure suggest that campus IT departments can help by ensuring that information on campus web sites is accessible and by providing adequate assistive technologies in the diverse computer labs on campus. Training on computer technologies both on and off campus, and ensuring the availability of course materials (alternate formats) can also facilitate success. Moreover, students may wish to enroll for the minimum course load that allows them to remain full-time students and ensure that their course schedule suits their needs.

Opportunities to participate in school extracurricular activities (can require resources, such as an interpreter after class times, rooms with wheelchair access, etc.) may enhance both academic performance and graduation rates. Willingness of professors to adapt course materials and evaluation to the student's needs, willingness of non-teaching staff to respect students' needs and concerns are also likely to help. This would likely be addressed best through specific and focused training workshops that teach students to self-advocate and help promote social skills related to effective relationships with professors and peers. Furthermore, ensuring the accessibility of building facilities and providing needed disability related services on campus may also facilitate success.

Aspects of social self-efficacy suggest that students may need to build confidence that they can participate in class discussions, ask questions in class, talk to their professors and ask them questions outside of class, talk with academic and support staff, and make new friends at school. While many of these aspects involve

self-advocacy (Getzel & Thoma, 2008), others relate to social skills, social self-confidence and shyness. Professors can make it easier for students to approach them and students can seek out the school's counseling department or the campus office responsible for supporting students with disabilities, which often offers workshops to help students with such issues.

An especially important aspect is related to the Campus Climate Social Alienation Scale. Scores on this measure were shown to be especially important in predicting intention to graduate. Items on this scale relate to feeling excluded at college. Schools may take steps to ensure that students do not experience conditions that exclude students with disabilities. For example, access coordinators and faculty need to ensure that a disability does not prevent students from having needed contact with their professors, and that course activities encourage interaction between students with and without disabilities. Holding workshops for those who run extra-curricular clubs and associations to help promote the inclusion of students with disabilities in campus life are also likely to be helpful in mitigating social alienation. Encouraging students with disabilities to get involved in campus life outside of the classroom is also likely to help alleviate alienation. Opportunities to participate in school extracurricular activities may enhance both academic performance and graduation rates. Of course, this may need resources from the school, such as an interpreter after class times, rooms with wheelchair access, etc.

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