

*Looking
Inside the
Black Box:
The Value
Added by
Career and
Technical
Student
Organizations
to Students'
High School
Experience*

National Research Center for
Career and Technical Education

UNIVERSITY OF MINNESOTA

**Looking Inside the Black Box:
The Value Added by Career and Technical Student Organizations
to Students' High School Experience**

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Abstract

In addition to hands-on learning in classrooms and work-related activities such as co-op, many CTE programs offer a career-focused student organization, known as a Career and Technical Student Organization, or CTSO. CTSOs have been touted as developing such characteristics as leadership and employability skills in students; however, there is little research definitively showing the benefits of participation in CTSOs. In this study, we hypothesized that CTSOs provide a variety of experiences that either directly or indirectly affect three important outcomes of secondary education: achievement, transition to postsecondary education and training, and employability. A pre-test/post-test comparison study of high school students in CTE classes that included a CTSO, CTE classes without a CTSO, and general non-CTE classes such as English and social studies was conducted over the course of one academic year. Findings showed that, on a variety of measures, CTSO students began the school year with similar or higher scores than the other groups of students and did not change (gain or lose) as much as did the other groups over the course of the year. With the exception of college aspirations—where students in the general classrooms reported the highest levels—the scores of the CTSO students remained higher than those of students in the other two groups on all measures. A positive association between amount of CTSO participation and academic motivation, academic engagement, grades, career self-efficacy, college aspirations, and employability skills was also found. Finally, of the four specific organizational elements of CTSOs (leadership, community service, competitions, and professional development), competitions were found to have the most positive effects. The potential benefit of CTSO participation to a larger and more heterogeneous group of students is discussed.

Table of Contents

Abstract	iii
Introduction	1
Overview of Career and Technical Student Organizations	2
The Problem of the Study	2
Purpose	3
Organizational Elements of CTSOs	4
Leadership Development	4
Competitive Events	4
Professional Development	5
Community Service	5
Isolating the CTSO Experience	5
Extracurricular Activities	6
Volunteering	6
Part-Time Work	6
Student Variables	7
Academic Motivation	8
Engagement in School	8
Civic Engagement	10
Employability Skills	10
Career Self-Efficacy	11
Grades	11
College Aspirations	11
Research Questions	12
Methods/Procedures	14
Design	14
Sample	15
Measures/Instrumentation	15
Results	17
Descriptives	17
Hierarchical Linear Models	20
Research Question #1	20
Research Question #2	26
Research Question #3	27
Summary of Findings	29
Limitations	30
Discussion and Implications	30
Suggestions for Further Research	32
Conclusion	33
References	35
Appendix A: Career and Technical Student Organizations in America	47
Appendix B: Survey Questions and Scale Reliabilities	49
Appendix C: Degree of Participation in CTSO	55

Introduction

Even in the era of *No Child Left Behind*, the dropout rate in American high schools hovers around 30%, on average, and for certain minority groups it is as high as 45% (Swanson, 2004). Research on high school dropouts shows that lack of engagement with school, both socially and academically, and lack of personal relationships with adults are among the top reasons for student dropout (Anderman & Freeman, 2004; Arroyo, Rhoad, & Drew, 1999; Eccles & Gootman, 2002; National Research Council, 2004; Somers & Piliawsky, 2004). Efforts at reducing the dropout rate have included early interventions, mentoring, alternative schooling, after-school programs, and individualized instruction (Arroyo et al., 1999; National Research Council, 2004; Smink & Schargel, 2004).

Extracurricular activities seem especially beneficial to students at-risk for dropout. A study by Mahoney, Cairns, and Farmer (2003) found that consistent extracurricular participation in adolescence was linked to higher educational status in young adulthood, which was in turn linked to interpersonal competence. Mahoney and Cairns (1997) found that those who participated in extracurricular activities had lower rates of high school dropout, and both Camp (1990; Camp, Jackson, Buser, & Baldwin, 2000) and Guest and Schneider (2003) found that students' academic achievement is enhanced by participation in extracurricular activities.

Recent research has shown that career and technical education (CTE), which is co-curricular rather than extra-curricular, can also play a role in keeping youth in school (e.g., Plank, 2001; Plank, DeLuca, & Estacion, 2005). CTE courses can help students stay engaged in school by exposing them to skills that are directly applicable in the "real world" (Berns & Erickson, 2001; Bransford, Brown, & Cocking, 2000; Stone & Alfeld, 2004). More than 95% of high school students participate in some form of CTE, including coursework, work-based learning (WBL), and career pathways (Levesque, 2003). Despite "vocational" education's traditional stigma, it has recently been shown that academic skills can be enhanced in CTE content courses (Stone, Alfeld, Pearson, Lewis, & Jensen, 2006). Indeed, offering more CTE courses and more rigorous CTE courses are two ways that schools can provide more authentic instruction, which has been recommended as a strategy for enhancing student learning (Newmann & Wehlage, 1995). Recent studies have found that CTE students are taking more math and science and higher levels of math and science than their general track counterparts (Silverberg, Warner, Fong, & Goodwin, 2004; Stone & Aliaga, 2003), and that students who take a certain ratio (3:4) of CTE to academic courses have a lower likelihood of dropout (Plank, 2001; Plank et al., 2005).

Many CTE programs also include a student organization (Scott & Sarkees-Wircenski, 2004) targeted toward more intense involvement in a particular field (e.g., business and marketing, health). Career and Technical Student Organizations (CTSOs) help students explore career paths, prepare youth to become productive citizens, and assume leadership roles in their communities (Reese, 2003). However, there has not been as much research conducted on the effects of CTSOs, compared to academic or out-of-school activities, on young people's development. This project seeks to better understand whether and how high school students benefit from participating in Career and Technical Student Organizations.

Overview of Career and Technical Student Organizations

Eight CTSOs are currently recognized at the secondary level by the U.S. Department of Education (see Appendix A), serving over 1.5 million students in a variety of programs (Cahill & Brady, 1996), such as agriculture, skilled trades, business, health, and information technology (IT). Formerly referred to as vocational student organizations (VSOs), CTSOs have been a part of CTE since the passage of the Smith-Hughes Act of 1917. Over the course of the last 90 years, CTSOs have developed numerous activities—such as skills contests, community service, and leadership development—to improve the members' leadership skills, career and technical knowledge and skills, personal characteristics, and employability skills. CTSOs are generally comprised of chapters at the local level with chapter advisors and sponsors, with administrative and financial assistance from state departments of education (Gordon, 2003). The national offices listed in Appendix A provide policy and curriculum development assistance to the state and local units.

CTSOs exist within CTE high school programs and are facilitated by a teacher-advisor. Through chapter activities such as running for office, officer training, competitions, and service learning, CTSOs provide students with individual and cooperative activities designed to expand leadership and job-related skills in their field (Gordon, 2003). Students learn skills related to specific occupations and develop their technical literacy through exposure to the general concepts of their chosen field. Some of the positive experiences identified by CTSO members include teamwork, decision-making, competition, leadership, community awareness, career awareness, and personal and social development (Brown, 2002; Collins, 1977; Gordon, 2003; Stagg & Stuller, 1999; Talbert, Larke, & Jones, 1999).

The Problem of the Study

Many elements of CTSOs are thought to have positive effects on students (Brown, 2002). However, little research exists to support the claims of these organizations of benefit to their members (Lankard, 1996; Zirkle & Connors, 2003). In a published address to the National Center for Research in Vocational Education (NCRVE) in 1983, Edwin Miller (President of the Future Business Leaders of America) was asked if he knew of any studies that had evaluated the effects of CTSOs. He responded by stating,

Unfortunately, there have not been any, to my knowledge. I have seen a few dissertations addressing the topic, but I frankly feel that they have fallen short. If there are such evaluations and anybody knows about them, I would certainly welcome them . . . (Miller, 1983, p. 7)

Over 20 years later, the research remains scant. An article in *The Agricultural Education Magazine* (“Through Rose Colored Glasses,” 1999) states, “We assert that the FFA [Future Farmers of America] develops premier leadership, personal growth, and career success. But does it really? Just because we say it does, doesn't necessarily mean it really does” (p. 27).¹ After citing several studies, the author concludes “there is virtually no solid evidence to

1 Future Farmers of America is now known as FFA.

work-based learning activities (cooperative education, job shadowing, mentoring, school-based enterprise, and internship/apprenticeship). All of these CTE-related activities are thought to help students form career identities and give them the professional and work skills they need to launch their careers. Because all CTE programs offer these, whether or not they offer a CTSO, we focus on the benefits provided by the distinctive organizational elements present in CTSOs. The following sections describe these elements more fully.

Organizational Elements of CTSOs

Leadership Development

Within CTSOs, there are many opportunities for students' leadership development, including becoming an officer at the local, regional, or national level. This particular element of CTSOs has been the subject of several studies. Clark (1978) found that leadership ability of students increased with participation in the DECA organization. Other researchers found similar results when they investigated the Future Homemakers of America (FHA, now FCCLA) (White, 1982), Vocational Industrial Clubs of America (VICA, now SkillsUSA) (Smith, 1982 in Wingenbach & Kahler, 1997), and the Future Business Leaders of America (FBLA) (Spicer, 1982). Specifically, Townsend and Carter (1983) found that FFA participation was positively correlated with leadership traits of 12th grade agricultural education students in Iowa.

In a study of past FFA participation regarding community leadership development, Brannon, Holley, and Key (1989) found that former FFA members had an impact on the development and success of community leaders. Dormody and SeEVERS (1994) found that three variables—achievement expectancy, participation in FFA leadership activities, and gender—were significant in predicting the leadership life skill development of members. A follow-up study by Wingenbach and Kahler (1997) supported these findings by concluding that positive relationships existed between youth leadership life skill development scores and FFA leadership activities and membership.

Competitive Events

Competitive events serve to test both technical and non-technical job-related competencies. Many of these events integrate academic knowledge into industry-developed problem scenarios. Preparation for the competitive events provides hands-on experience in different trade, technical, and leadership fields; develops job-related technical skills and competencies; offers recognition to participants; and serves to ensure business and industry involvement in career and technical education programs. In fact, contests are often run with the help of industry, trade associations, and labor organizations, and test competencies are set and judged by industry representatives.

Blakely et al. (1993), in a study of the perceived value of FFA contests by students and adults, found that “Students felt learning objectives were important outcomes of contests and awards. Teamwork and responsibility were the highest rated items among all variables which

explained the value of contests and awards” (p. 357). The results showed that students listed teamwork, responsibility for a project, learning an area of knowledge, competing with others, talking in front of people, learning a specific skill, and learning to win in descending order. The researchers also concluded that “a majority of all groups (76.2%) rated cooperation as being more important than competition” (p. 358).

Professional Development

It is generally assumed that both the content of the CTE program and the skills and experiences acquired in the CTSO contribute to professional development (the acquisition of knowledge and competencies that will be useful for future work in the profession). Most CTSOs provide structured professional development activities for their members, including guest speakers, workshops, and conferences. DECA members become involved in school-based enterprise projects, which are “effective educational tools in helping to prepare students for the transition from school to work or college. For many students, they provide the first work experience; for others, they provide an opportunity to build management, supervision, and leadership skills” (DECA, n.d.). SkillsUSA offers a special Professional Development Program (PDP), which, in conjunction with business and industry, teaches employability skills, including the ability to communicate, work on a team, resolve conflicts, confront ethical dilemmas, and manage one’s time (SkillsUSA, n.d.). SkillsUSA states that “use of the PDP encourages local business involvement in the training of tomorrow’s entry-level workers” (SkillsUSA, n.d.). Other CTSOs also use real-world business examples from industry so that students can put their classroom skills to use and learn the professional skills that employers want. There has been little research on this aspect of CTSOs; however, one study found that SkillsUSA members’ perceptions of their level of personal/professional development increased as their participation in SkillsUSA increased (Gordon, Yocke, & Bess, 1995).

Community Service

Finally, most CTSOs engage in some form of community involvement, such as volunteering in community service activities. This commitment is illustrated by the Family, Career and Community Leaders of America (FCCLA), which implements an annual Outreach Project that has a national focus and includes other partners, including America’s Promise and ConnectAmerica (FCCLA, 2003). Similarly, one of DECA’s competitive events requires individual chapters to engage in a community service project. Collins (1977) surveyed CTSO state directors, advisors, and members and concluded that “a very substantial majority of all students surveyed considered vocational student organizations as providing them with substantial benefits, aid[ing] them in their development toward being well rounded members of society” (p. 77). This element of the CTSO experience has largely been ignored in research studies and much of the evidence presented is anecdotal.

Isolating the CTSO Experience

Because other non-school activities can also provide the benefits that CTSOs claim, it is

important to measure and control for these variables in any analysis of the impact of CTSOs. The most popular non-school activities are extracurricular activities, volunteering, and part-time work (Mahoney, Larson, Eccles, & Lord, 2005).

Extracurricular Activities

Extracurricular activities include sports, theater, band, and various clubs. Although both are structured activities with adult leaders, regular meetings, and skill-building activities—characteristics which have been related to positive adjustment in adolescents (Persson, Kerr, & Stattin, 2007)—extracurricular activities differ from CTSOs in that they occur outside of and separate from the school day and students' regular classes. In the introduction of this report, several studies finding links between extracurricular activities and positive academic outcomes were reviewed. Research also shows that extracurricular activities often have a positive effect on adolescents' leadership and teamwork/cooperation skills. In addition, they help youth to “socialize with peers and adults, set and achieve goals, compete fairly, recover from defeat, and resolve disputes peaceably” (Darling, Caldwell, & Smith, 2005).

Eccles and Barber (1999) found that students who participated in academic clubs or in school-involvement activities (e.g., pep club, student government) in 10th grade had higher grade point averages at the end of high school and were more likely to be enrolled in college at age 21. Dubas and Snider (1993) argued that community-based youth programs like 4-H and scouting develop leadership skills and connect youth to resource-bearing adults in the community. Because extracurricular activities have similar benefits as are thought to be produced by CTSOs, it is important to take them into account in examining the effects of CTSOs on high school students. This is also the case with volunteering and work experiences.

Volunteering

Recent research on volunteering suggests a relationship between participation in service and the development of social responsibility (Hamilton & Fenzel, 1988), leadership (Camino & Zeldin, 2002), intrinsic work values (Flanagan, 2004; Johnson, Beebe, Mortimer, & Snyder, 1998), personal awareness, social skills, learning skills, career interest, and character (Stott & Jackson, 2005). Volunteering to help others also helps students develop insights and perspectives other than those with which they are familiar (Sherrod, Flanagan, & Youniss, 2002) and helps them to feel more involved and efficacious as citizens (Stoneman, 2002). Volunteer programs for youth are related to positive social and academic outcomes, particularly lower rates of school failure, suspension, and dropout, as well as improved grades, self-concept, and attitudes toward society (Moore & Allen, 1996).

Part-Time Work

Forty-three percent of high school students work for pay more than 10 hours per week, and those enrolled primarily in vocational courses are twice as likely as others to work more than

20 hours per week (High School Survey of Student Engagement, 2005). Researchers continue to debate the value of part-time work for teenagers. Some have found that work is negatively related to grades and participation in student activities (Marsh & Kleitman, 2005; Steinberg & Cauffman, 1995). Stone and Mortimer (1998), in an extensive review of research, found that the workplace is an important context for adolescent development but that adolescent work cannot be considered a zero-sum game with respect to any other single use of time. Young people who work highly intensively—more than 20 hours per week—achieve significantly less postsecondary education than those who devote less time to work during high school (Stone & Mortimer, 1998).

Other research shows that part-time jobs are related to interpersonal competencies (Larsen, Hansen, & Moneta, 2006). A recent book on the topic concluded that

high school students who work even as much as half time are better off in many ways than students who don't have jobs at all. Having part-time jobs can increase confidence, foster time management skills, promote vocational exploration, and enhance subsequent academic success. The wider social circle of adults that teens meet through their jobs can also buffer strains at home, and some of what young people learn on the jobs—not the least responsibility and confidence—gives them an advantage in later work life (Mortimer, 2003, p. i).

Because of the benefits they provide, both extracurricular activity participation and number of hours per week spent volunteering and working need to be controlled for in any analysis to determine the unique effect of CTSOs on high school students' academic outcomes.

Student Variables

In the previous sections, we described the four organizational elements of CTSOs that make them unique. We then reviewed the research on other activities that might also contribute to positive outcomes for high school students. The following is a discussion of the specific student variables that we hypothesized would be affected by participation in a CTSO.

As mentioned in the introduction, there is much anecdotal evidence linking student involvement in CTSOs with positive civic, educational, and work outcomes. However, research on exactly how this occurs is virtually nonexistent. One might speculate that experiences within the CTSO—such as leadership, professional development, competitive events, and community service—affect certain student attitudes and behaviors that then lead the student to make beneficial choices about their future. While research evidence on the links between educational context, student-level psychosocial variables, and achievement abound (e.g., Eccles et al., 1983; Graham & Weiner, 1996; National Survey of Student Engagement, 2006; Pintrich & Maehr, 2004), there is little research on CTSOs as a context for either the proximal variables in high school or their eventual affect on more distal variables such as postsecondary enrollment or employability. This study seeks to uncover the linkages between participation in a CTSO and the proximal level variables (academic motivation, academic engagement, and civic engagement), with some attention to indicators of future outcomes (career self-efficacy, grades, college aspirations, and employability

skills). Here we will review the research on the variables we chose to examine in this study.

Academic Motivation

Achievement motivation is predictor of educational persistence (Wigfield & Eccles, 2002). According to Eccles et al. (1983), motivation is comprised of two main components: an individual's assessment of their value for a task and their belief about their competence in that task. When both value and expectancy for success at a task are high, the individual is likely to be motivated to pursue it. In addition, students' use of metacognitive strategies such as planning, monitoring, and regulating activities have been found to predict successful learning (Pintrich, Smith, Garcia, & McKeachie, 1991). While the aforementioned aspects of *cognition* have been shown to affect motivation, researchers are now also including elements of the instructional *context* in their study of motivation (Perry, Turner, & Meyer, 2006). In particular, contexts that motivate students to learn are those (1) that offer interesting, challenging, and meaningful tasks and activities; (2) in which teachers help students develop effective learning and problem-solving strategies, foster an environment that rewards effort without punishing mistakes, and provide feedback about progress; and (3) in which both teachers and peers support learning and have mutual respect for each other (see Perry et al., 2006). From a review of the promotional materials for CTSOs, it seems likely that these organizations offer such beneficial contexts for learning. In this study, we measure student motivation as a function of CTSO participation and as a predictor of achievement outcomes.

Engagement in School

The National Association of Secondary School Principals, in the report *Breaking Ranks II* (NASSP, 2004), suggests that to engage students, teachers must use their interests to evoke thoughtful work that fosters learning and leads to success. Research shows that some kinds of school projects can promote individual motivation and lead to skill achievement. While there is nothing on CTSOs specifically in *Breaking Ranks II*, NASSP's guidelines for engaging youth and fostering achievement include providing opportunities to use school learning to improve both their own lives and other lives in their communities. By doing community service projects, CTSO participants may be able to build community partnerships, learn the value of lifelong involvement, serve the needs of others, and practice leadership skills. Due to their co-curricular nature, CTSOs offer students the opportunity to apply knowledge and skills from their academic lessons directly to real-world situations. This type of task or activity is exactly what Newmann, Secada, and Wehlage (1995) describe in their guidelines for authentic learning. When students identify a real need in their community that they can help solve, they develop personal commitment to the project.²

Finn (1998), in a document entitled *Instructional Practice and Student Behavior*, describes his model of student engagement, with its two central components, *participation* and *identification*:

2 Thanks to Ann Garrison, a student of Al Phelps at the University of Wisconsin-Madison, for contributing to this section.

Participation, the behavioral component, includes basic behaviors such as the student's acquiescence to school and class rules, arriving at school and class on time, attending to the teacher, and responding to teacher-initiated directions and questions. . . .

Identification, the affective component, refers to the student's feelings of belonging in the school setting (sometimes called school membership) and valuing the outcomes that school will provide, for example, access to post-school opportunities. To the extent that it has been studied, the relationship of specific engagement behaviors with academic performance is strong and consistent across populations defined by background characteristics and grade level (see Finn, 1989 and Finn, 1993 for summaries). These studies also have shown that positive engagement behaviors explain why some students perform well in school in spite of the adversities they face as members of high-risk populations; that is, they are "academically resilient".

A feeling of belonging in school is necessary for motivation (Anderman & Freeman, 2004), and not feeling like one belongs is one of the critical factors leading to disengagement and dropout (Ianni & Orr, 1996). Rossi and Montgomery (1994) describe what happens when there is a lack of engagement:

Researchers increasingly conceptualize poor educational performance as the outcome of a process of *disengagement* that may begin as early as a child's entry into school (Finn, 1989; Kelly, 1989; Merchant, 1987; Natriello, 1984; Rumberger, 1987). According to this model, students who do not identify, participate, and succeed in school activities become increasingly at risk of academic failure and dropout. In order to improve student achievement and persistence, the model suggests that the school climate must foster "investment" behavior—schools must encourage student involvement in academic and extracurricular activities by stimulating their interest, increasing their personal resources (e.g., remediating skill deficiencies), and rewarding their efforts.

Researchers measure engagement in a learning task in a number of ways. From a sociological point of view, engagement might be seen from a broader perspective, such as retention and graduation (Finn, 1989; Mahoney & Cairns, 1997; National Research Council, 2004; Plank, 2001; Stone & Aliaga, 2003). From an educational psychology point of view, engagement is more subjective or personal. A comprehensive review of the classroom engagement literature concluded that peer learning communities, authentic instruction, and classrooms that support autonomy (among other factors) can facilitate students' academic engagement (Fredricks, Blumenfeld, & Paris, 2004). According to the developers of the National Study of Student Engagement (NSSE, 2004, 2005, 2006), the time and energy students devote to educationally purposeful activities is the single best predictor of their learning and personal development. Their most recent report (NSSE, 2006) found that, for college students, participation in collaborative learning, educational activities outside the classroom, and interaction with faculty members is associated with higher grades, satisfaction, and retention. For our research on CTSOs, we used the high school level version of NSSE (HSSSE) to measure the extent to which students engage in educational practices associated with high levels of learning and development.

Civic Engagement

While there has been a revival of the research on civic engagement in recent years, there is not yet a single definition of it in the literature. Other terms used include *citizenship*, *service learning*, *political attitudes*, *patriotism*, *community service*, *social responsibility*, and *volunteering*. We have already used some of these terms above. However it is defined and measured, scholars agree that it is an important element of development into a responsible adult (Sherrod et al., 2002) because it involves doing and thinking about things beyond oneself.

In a review of research articles on service learning, Billig (2002) demonstrated that it produces measurable increases in students' academic achievement, personal and social development, civic responsibility, and career awareness. For example, in a study of over 1100 racially and economically diverse middle school students, Scales, Benson, Leffert, and Blyth (2000) found that service learning coursework positively affected students' academic achievement and social responsibility in comparison to a control group. Stoneman (2002) found that young people feel more efficacious and involved when they participate in community affairs, and Camino and Zeldin (2002) documented the importance of responsibility and leadership that community service can provide. One study demonstrated that curriculum designed to promote active civic engagement resulted in greater commitments to Participatory Citizenship, Justice-Oriented Citizenship, and Interest in Service when compared to a control group (Kahne, Chi, & Middaugh, 2002). Recently, Stott and Jackson (2005) found that students who engaged in service learning reported improvement in personal awareness, social skills, learning skills, career interest, and character education. Youniss, McLellan, and Yates (1997) additionally found that high school students who participated in high school or community service projects were uniformly more likely to vote and join various community organizations 15 or more years later than adults who were non-participants during high school. Promoting "good citizenship" is one of the goals of CTSOs (National Coordinating Council for Vocational Student Organizations [NCCVSO], 1990).

Employability Skills

Employability skills include workplace basics such as knowing how to learn; reading, writing, and computation; communicating effectively; creative thinking and problem-solving; personal management; group effectiveness; and influencing others (NCCVSO, 1990). Employers report that employees who have a better understanding of workplace skills are more prepared for changes in workplace requirements (Wills, 1995). Industry-based skill standards became a critical component of educational reform in the 1990s in response to the growing need for an educational system that meets the needs of learners, workers, and employers; facilitates transitions from school to work; and strengthens the economic position of the United States (Bailey & Merritt, 1995).

The National Skill Standards Board (NSSB) was established by Congress in 1994 to promote the development of a national system of voluntary industry-based skill standards (Bailey & Merritt, 1995). These skills were identified by industry in full partnership with labor, civil rights, and community-based organizations. They are based on high performance work and are

portable across industry sectors. The NSSB was replaced in 2003 by the National Skill Standards Board Institute, a privately funded group, which continues to carry on many of the functions related to the broad mission of the NSSB.

None of the limited number of research studies on CTSOs have addressed the role of CTSO participation in developing workplace competencies identified in the report of the Secretary's Commission on Achieving Necessary Skills (SCANS) (U.S. Department of Labor, 1992). While some CTSOs, such as FFA and SkillsUSA, have activities that incorporate SCANS skills, a comprehensive examination of this topic is lacking in the research literature. Though it is widely agreed that students, as future workers, will need strong personal and social competencies (Thompson & Henley, 2000), good measures of such skills are lacking.

Career Self-Efficacy

Self-efficacy is a person's belief in his/her competency to perform well. It has been empirically linked to persistence and achievement behaviors (Bandura, 1986, 1989; Schunk, 1989, 1991). Self-efficacy beliefs are expectations for performance (Graham & Weiner, 1996) and are usually measured using scales that focus on specific situations and tasks (Betz & Hackett, 2006). Individuals with high self-efficacy have been shown to exert more effort in the face of difficulty and to persist longer (Pintrich & Schunk, 1996). Self-efficacy for finding and pursuing a career pathway for oneself is a valued outcome of high school CTE (ACTE, 2007). Through various activities in a career-related domain, CTSOs may help students develop skills and confidence for successful and satisfactory job-seeking.

Grades

Grades in school are one of the most important indicators of student success and potential for further achievement. Colleges rely on high school student applicants' grade point averages (GPAs) to predict their ability to complete postsecondary education, and employers use applicants' GPAs to judge their likely success on the job. If CTSOs foster students' motivation and engagement in school as we hypothesize, then their grades should be positively affected.

College Aspirations

Decades of prior research has shown that family background factors play the largest role in determining educational attainment (Blau & Duncan, 1978; Erikson & Goldthorpe, 1993; Sewell, Haller, & Ohlendorf, 1970). However, the cycle of social class, tracking, and educational attainment is not set in stone and some sociologists even suggest that it has become less rigid in recent years (see Breen & Jonsson, 2005 for a review). Aside from demographic background factors, student psychosocial and behavioral variables have also been shown to affect educational achievement and future plans. Researchers have demonstrated that college aspirations are shaped by forces in students' family, peer, and school environments through various mechanisms such as self-efficacy and motivation (see, for example, Bandura, 1989; Dika, 2003; Eccles et al., 1983;

Eccles, 1993; Johnson, 2002). Although extracurricular activities have not been found to affect grades or college aspirations (Hunt, 2005), experience in a career-oriented activity such as a CTSO may influence an individual's educational goals.

In sum, we hypothesize that participation in a CTSO will affect students' achievement motivation, academic engagement, civic engagement, career self-efficacy, employability skills, grades, and college aspirations. Though we do not measure more distal outcomes, the variables that we do measure have been shown in other research to be linked to success in postsecondary education and employment (see Figure 1 for our theoretical model).

Research Questions

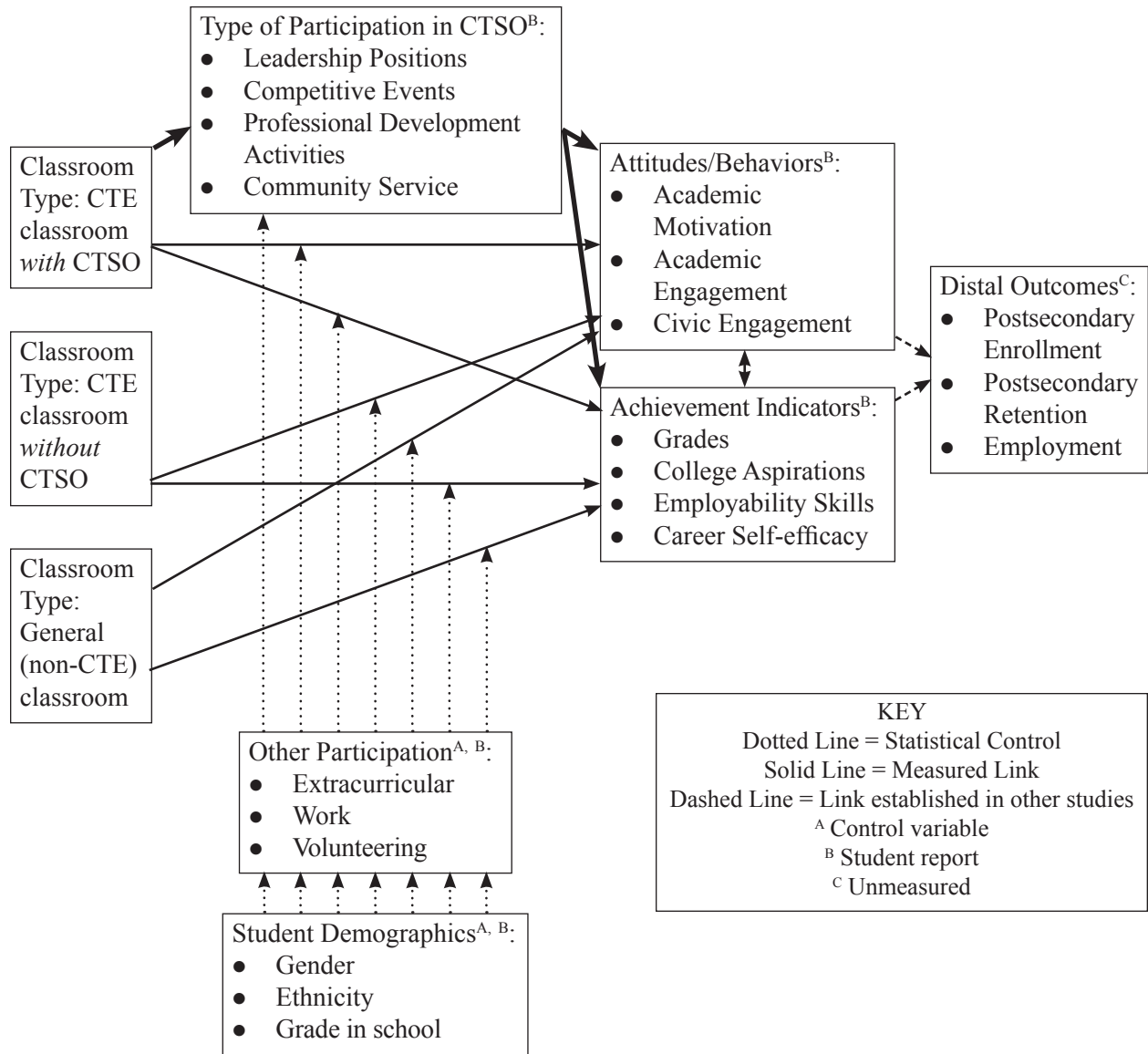
This study is designed to look into the “black box” of CTSOs and empirically test the many assumptions and claims about their value. We focus on the links between participation in a CTSO and hypothesized psychosocial (motivation, academic engagement, civic engagement) and achievement (career self-efficacy, grades, employability skills, college aspirations) outcomes; the latter set of variables may indicate potential post-school success. Our theoretical model (see Figure 1) posits that CTSO membership will positively affect these outcomes, even while holding potential confounding variables constant (as explained earlier, volunteering, part-time work, and extracurricular participation are likely to effect the same outcomes).

We ask: “To what extent do CTSOs affect important aspects of the high school experience (above and beyond stand-alone CTE programs)?” Specifically, three specific research questions are of interest:

- 1) Is CTSO membership over one academic year associated with an increase in positive outcomes compared to non-CTSO students (CTE-without-CTSO and general classes)?
- 2) Is the degree of involvement in the activities of a CTSO over one academic year associated with increases in CTSO students' positive outcomes?
- 3) Which organizational elements of CTSOs (leadership, professional development, community service, and/or competitive activities) are associated with increases in CTSO students' positive outcomes?

Our analyses will follow the order of these questions. Based on the findings from our literature review, including the anecdotal claims made by CTSOs and their members, we expect to find support for our hypotheses that students who participate in CTE-with-CTSO will have higher levels of motivation, academic and civic engagement, career self-efficacy, employability skills, grades, and college aspirations compared both (a) with students in CTE classes without a CTSO component and (b) with non-CTE students.

Figure 1. *Theoretical model of the effect of CTSOs on high school students*



Methods/Procedures

Design

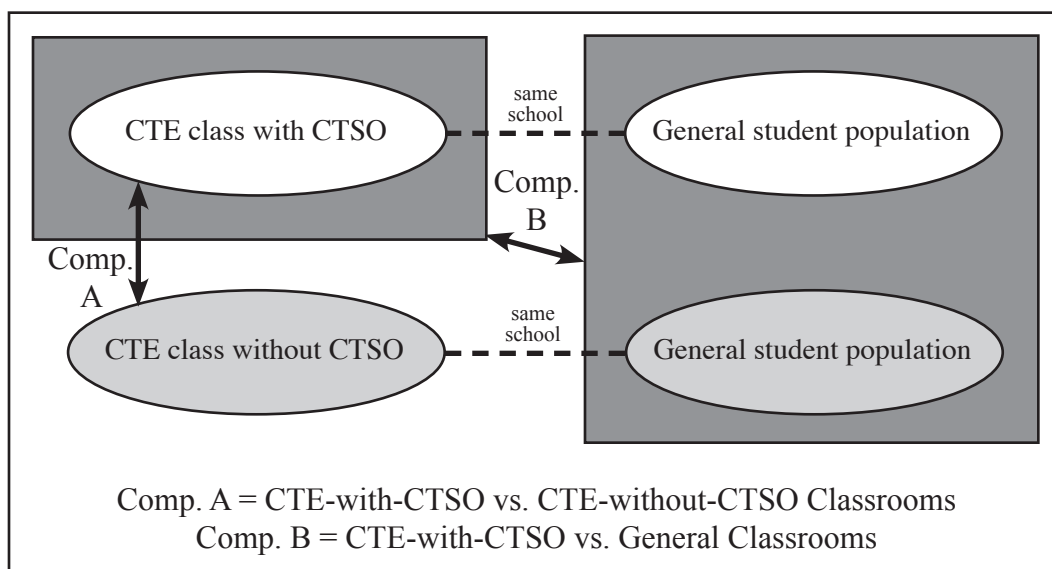
Our design was a four-group, cross-sectional, pre-test/post-test design for one academic year (2004-2005). Group [1] was comprised of CTE students in an active CTSO. Group [2] included students in a CTE program without a CTSO. Groups [3] and [4] were non-CTE students from each of the schools from which the first two groups were drawn and functioned as “controls” or “counterfactuals,” as shown in Table 1 below.

Table 1. *Sample design*

	CTE Classrooms		Non-CTE Classrooms
CTSO schools	[1] With CTSO (n = 27 classrooms)	→	[3] General Students (n = 27 classrooms)
Non-CTSO schools	[2] Without CTSO (n = 22 classrooms)	→	[4] General Students (n = 22 classrooms)

For analytical purposes, however, we used only three groups to make two comparisons, as depicted in Figure 2: (Comp. A) CTE-with-CTSO classrooms compared to CTE-without-CTSO classrooms and (Comp. B) CTE-with-CTSO classrooms compared to all general classrooms. The two groups of general comparison classrooms were aggregated to ensure that this counterfactual group was as representative of students in the general population as possible. Thus, we refer to the three groups used for analysis as CTSO, CTE, and general.

Figure 2. *Quasi-experimental design comparisons*



Sample

We recruited the Group 1 schools with the help of national organizations of CTSOs. Group 2 schools were recruited with the help of state directors of CTE in each of the states in which we conducted the study: California, Georgia, Illinois, Kentucky, Minnesota, Missouri, Ohio, Oklahoma, Tennessee, and Texas. We made sure that those CTE classrooms without a CTSO did not have a CTSO at their school at all so that the voluntary nature of CTSO membership did not confound the results. Groups 3 and 4 were recruited through the Groups 1 and 2 teachers, respectively, and consisted of non-CTE classrooms. Each of the eight CTSOs was studied in at least 2 states. We were able to recruit 27 CTE-with-CTSO classrooms (hereafter referred to as “CTSO”) and 22 CTE-without-CTSO classrooms (hereafter referred to as “CTE”). The “general” classroom controls for each of the types of CTE classrooms (with and without a CTSO) were recruited as follows:

CTE and CTSO teachers were asked to find (1) another teacher in their school who taught a non-CTE course such as English or social studies who would also agree to take part in the study as a comparison classroom, and (2) someone in the school such as a counselor to act as a “liaison”—a neutral third party who would administer the surveys in both the CTE (with and without a CTSO) and general classrooms. Comparison classrooms were primarily academic subjects but not necessarily high-level ones; the important criterion was that they were not a CTE class.³

Liaisons' responsibilities included distributing and collecting consent forms from students (parents were sent consent forms to return only if they did *not* want their child to participate in the survey); assigning ID numbers to students; keeping a confidential master key between fall and spring; ensuring that students used the same ID on their fall and spring surveys; and returning all of the materials to the researchers. In return for their cooperation, each liaison was sent their preference of either a \$50 check or Wal-Mart gift card after each survey administration (once in the fall and once in the spring); teachers (CTE, CTSO, and general) were each given their preference of a \$25 check or Wal-Mart gift card; and participating students were each given a \$5 Wal-Mart gift card for each administration of the survey.⁴

Measures/Instrumentation

Surveys were administered in the fall of 2004 and spring of 2005. Identical questions were asked to each group at each time point. General and CTE student surveys were similar, asking about the class they were in while taking the survey. The CTSO student survey asked additional questions about CTSO activities. Further, because there were eight different CTSOs, the wording of the CTSO-specific questions differed slightly due to different terminology for activities in each of the organizations. It should be noted that the surveys contained more

3 All students were asked not to take the survey again if they had taken it in another class, so that the samples were independent.

4 Due to school regulations, we could not compensate all students with cash. Wal-Mart was chosen because it was the most ubiquitous chain across all of our research sites that offered the most individual choice of compensation (as opposed to a food-only chain such as McDonald's).

constructs than were examined for this report; some because no association was found between them and any of the other variables, and some that will be used in future analyses and reporting. All survey items relate directly to the theoretical model (Figure 1), and all scale items and reliabilities can be found in Appendix B.

The student questionnaire was developed using items and scales from various sources. All measures were used with the permission of the authors.

Items regarding level (e.g., local, regional, national) and type (e.g., elected leader, committee member) of participation in CTSO activities, as well as participation in other activities (e.g., sports, 4-H), were taken from Connors and Swan's (2001) Youth Participation in Leadership Activities Questionnaire.

Items for the employability scales were adapted from the Youth Experience Survey (YES 2.0) (Hansen & Larson, 2002). The YES was designed to survey high school aged youth about their experiences in organized youth activities (e.g., 4-H) within six domains of development (Hansen, Larson, & Dworkin, 2003). For the present study, items from the YES were selected to focus on students' *employability* experiences in a CTSO classroom. The selected items came from four of the six domains: initiative (6 items), prosocial norms (3 items), teamwork and social skills (5 items), and cognitive skills (4 items).

The academic engagement scale was adapted from and in collaboration with the High School Survey of Student Engagement (HSSSE; Indiana University); as mentioned earlier, it is based on the college version, the National Survey of Student Engagement (NSSE). The academic motivation scale is the college student version (as opposed to the elementary school version) of the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich et al. (1991). The civic engagement scale is adapted from the Civic Responsibility Survey developed at the Service-Learning Research and Development Center, University of California at Berkeley (Furco, Muller, & Ammon, 1998). The self-esteem scale is the ASDQII developed by Marsh (1999).

Students' college aspirations were measured by asking the students how far they expect to go in school; responses could range from "less than high school" to "doctoral degree" (c.f. Mortimer, 2003; National Center for Education Statistics, n.d.). Grades were students' self reports of what grades they receive (e.g., mostly A's, A's and B's, mostly B's, etc.). The career self-efficacy scale is that of Betz, Klein, and Taylor (1996).

Extracurricular participation is the sum of the possible extracurricular activities that students could participate in (e.g., athletics, scouting, chess club). Volunteer and part-time work hours were measured by asking students how much time they spend in each type of activity. For CTSO participants, activities in each of the four hypothesized organizational elements (leadership, competitions, professional development, and community service) in which students could participate were summed across levels (local, regional, national) at which they participated. For example, a student's leadership score could range from 0 (no participation at

any level) to 25 (participation in all possible leadership activities at all levels).⁵ See Appendix C.

Surveys were developed in the spring of 2004 and piloted at DECA's spring conference. Feedback from student focus groups after pilot testing an early survey draft suggested eliminating scale items that students found repetitive and redundant. Shortened surveys were again piloted, this time at SkillsUSA's summer 2004 conference, and scale reliabilities were acceptable (alphas > .80; see Appendix B).

Results

Of the 2485 students who took the fall 2004 survey, 1797 of these participated again in the spring 2005 survey. Thus, there was a 72% retention rate. Students who took the survey in both the fall and spring did not differ from those who only took the survey at one time point on demographics or on key measures. Nevertheless, we limited our analyses for this report to those students who had participated in both fall and spring in order to get an accurate measure of the effects of a full academic year.

Descriptives

Although the demographic questions were optional, most students responded to them so that we have a good picture of the participant characteristics in each of the three groups. Table 2 shows that the sample comprised mostly juniors and seniors across all three groups. Sample sizes may vary across analyses due to missing data.

Table 2. *Grade in school*

	Percents (Spring)			
	Freshman	Sophomore	Junior	Senior
General class (<i>n</i> = 832)	8.2	19.4	36.5	35.5
CTE class (<i>n</i> = 322)	19.6	14.0	28.3	37.6
CTSO class (<i>n</i> = 631)	8.1	12.0	34.7	43.7

Table 3 shows that there were more females than males in the general and CTSO classrooms, whereas there were slightly more males than females in the CTE classrooms.

Table 3. *Gender*

	Percents (Spring)	
	Female	Male
General class (<i>n</i> = 832)	54.0	45.1
CTE class (<i>n</i> = 322)	46.3	51.9
CTSO class (<i>n</i> = 631)	52.3	46.3

⁵ The maximum for each of the four organizational elements (leadership, competitions, etc.) varied; see Table 10.

Table 4 shows that our sample was primarily white across all three types of classrooms, though the general classrooms were slightly more diverse. It is interesting that the CTSO classrooms had fewer African American students but more Asian American students compared to CTE classrooms that did not have a CTSO.

Table 4. *Ethnicity*

	Percents (Spring)					
	White/ Caucasian	African American	Hispanic	Asian/ Pacific Islander	Indian/ Alaska Native	Other
General class (<i>n</i> = 805)	87.2	3.0	2.4	3.7	1.5	2.2
CTE class (<i>n</i> = 321)	90.3	5.0	3.1	0.3	0.6	0.6
CTSO class (<i>n</i> = 620)	90.3	1.8	1.0	2.4	1.8	2.7

Table 5 suggests that CTE and CTSO students earn more As and fewer Bs than do general students. General students report receiving more Ds.

Table 5. *Grades (self-report)*

	Percents (Spring)								
	Mostly A's	A's and B's	Mostly B's	B's and C's	Mostly C's	C's and D's	Mostly D's	D's and F's	Mostly F's
General class (<i>n</i> = 799)	3.5	28.0	29.0	13.0	14.8	5.6	4.6	0.4	1.0
CTE class (<i>n</i> = 318)	17.6	32.9	8.8	24.8	8.5	6.0	0.0	0.3	1.3
CTSO class (<i>n</i> = 605)	16.9	35.4	11.6	20.5	6.6	7.1	0.5	1.0	.3

Table 6 suggests that students in general classes more often aspire to professional, medical, and doctoral degrees than do CTE or CTSO students; however, the latter two groups more often aspire to technical college degrees when compared with general students.

Table 6. *College aspirations*

	Percents (Spring)								
	Less than high school	High School Diploma	Technical College	Community College	4-Year College	Master's Degree	Professional Degree	Medical Degree	Ph.D.
General class (<i>n</i> = 820)	0.0	1.5	3.9	7.4	8.3	27.1	20.4	9.4	22.1
CTE class (<i>n</i> = 309)	0.6	2.9	7.4	7.8	33.3	26.2	6.1	5.8	9.7
CTSO class (<i>n</i> = 598)	0.8	4.3	6.9	7.9	28.3	28.6	6.4	5.7	11.2

Table 7 shows that CTSO students reported volunteering the most hours per week, followed by CTE students and then by general students.

Table 7. *Volunteer hours per week*

	Percents (Spring)				
	0	1-2	3-5	6-10	> 10
General class (<i>n</i> = 832)	35.7	38.4	17.3	5.6	3.0
CTE class (<i>n</i> = 322)	45.3	32.9	13.0	4.3	4.3
CTSO class (<i>n</i> = 631)	19.2	56.1	13.5	4.4	6.8

Table 8 shows that CTE and CTSO students both work more hours per week than do general students.

Table 8. *Work hours per week*

	Percents (Spring)				
	0	1-5	6-10	11-20	> 20
General class (<i>n</i> = 832)	21.8	29.3	19.5	19.8	9.6
CTE class (<i>n</i> = 322)	34.2	19.0	9.6	18.3	18.9
CTSO class (<i>n</i> = 631)	16.6	40.0	7.1	16.5	19.8

Table 9 shows means on each of the measured characteristics in both the fall and the spring, by group. CTSO students are slightly higher on all measures.

Table 9. *Characteristics*

	Means (Fall)							Scale
	Means	General class		CTE class		CTSO class		
		Fall	Spring	Fall	Spring	Fall	Spring	
Academic Engagement	2.53	2.54	2.49	2.52	2.62	2.62	1-4	
Academic Motivation	3.68	3.42	3.69	3.43	3.72	3.51	1-5	
Civic Engagement	3.89	3.92	3.72	3.87	3.97	3.95	1-5	
Career Self-Efficacy	3.90	3.89	3.88	3.69	3.93	3.89	1-5	
Employability Skills	2.38	2.47	1.84	1.80	2.43	2.48	1-4	

Finally, Table 10 shows mean levels of participation in extracurricular activities by group. Responses were averaged across fall and spring reports since sports vary by season. CTSO students reported the highest participation in extracurriculars, followed by general students and CTE students. Table 10 also shows average levels of CTSO students' participation in each of the four organizational elements (CTE and general students were not asked these questions). It should be noted that the range of responses varied quite a bit across the types of activities (the maximum ranged from three types of community service participation to six types of leadership and professional development participation).

Table 10. *Participation*

	Means			Min.-Max. Reported
	General class	CTE class	CTSO class	
# Extracurriculars (Average fall and spring)	5.18	4.72	6.34	0-50
# Leadership Activities (Spring)	N/A	N/A	.94	0-6
# Competitive Activities (Spring)	N/A	N/A	.72	0-5
# Professional Development Activities (Spring)	N/A	N/A	.60	0-6
# Community Service Activities (Spring)	N/A	N/A	.28	0-3

Hierarchical Linear Models

Our analyses testing our theoretical model will follow the order of the research questions. As was explained earlier, we hold potential confounding variables (volunteering, part-time work, and extracurricular participation) constant in the statistical models. In addition, to eliminate other possible confounds and examine the experience for the average high school student, we also control for gender, race/ethnicity, and grade in school.

Research Question #1

Hierarchical Linear Modeling (HLM; Bryk & Raudenbush, 1992) software was used because of the nested nature of the data: students within classrooms. The first analysis (Table 11a) shows the results for academic motivation, academic engagement, civic engagement, college aspirations, grades, career self-efficacy, and employability skills (i.e., results of seven separate models shown in one table). The first model (first set of results in rows in Table 11a) includes only the controls for gender (female/male), ethnicity (white/non-white), grade in school, extracurricular involvement, hours spent volunteering, and hours spent working per week. The second model (second set of rows in Table 11a, labeled Model 2) includes these control variables and *adds group membership* (CTE-with-CTSO/CTE-without-CTSO) to detect whether this makes a difference above and beyond the controls, as hypothesized.

Table 11a. *Comparison of CTSO and CTE participation on student outcomes*

	Academic Motivation		Academic Engagement		Civic Engagement		GPA		Career Self-Efficacy		College Aspirations		Employability Skills	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>

Model 1 (Controls)														
Intercept	1.72***	0.261	1.02***	0.203	1.26***	0.247	1.95***	0.384	1.482***	0.259	3.14***	0.583	0.323	0.328
Slope	0.45***	0.072	0.54***	0.081	0.58***	0.067	0.62***	0.048	0.551***	0.071	0.39***	0.096	0.548**	0.166
Model 2 (Group)														
Intercept	0.604 [†]	0.303	0.4945*	0.228	0.850*	0.337	0.140	0.444	1.165**	0.328	0.786	0.661	1.042**	0.333
Slope (1 = CTSO, 0 = CTE)	-0.161 [†]	0.086	-0.202*	0.094	-0.226*	0.085	-0.046	0.060	-0.299**	0.086	-0.170	0.120	-0.254	0.178
Control Variables														
Female	0.089*	0.035	0.069*	0.031	0.149*	0.058	0.348**	0.088	0.110**	0.043	0.053	0.090	0.086	0.062
White	-0.003	0.042	-0.024	0.043	-0.043	0.084	-0.038	0.140	-0.033	0.066	-0.093	0.176	-0.153	0.095
Grade	0.001	0.017	0.018	0.015	0.001	0.033	0.117**	0.042	0.017	0.019	-0.051	0.072	-0.010	0.046
Extracurricular Involvement	-0.000	0.008	0.003	0.006	0.022**	0.007	0.032**	0.009	0.008*	0.004	0.052**	0.015	0.020**	0.007
Volunteering Weekly Hours	0.047**	0.014	0.044	0.018	0.112**	0.031	0.052	0.042	0.046*	0.020	0.084	0.061	0.119**	0.020
Job Weekly Hours	-0.019	0.011	0.006	0.012	-0.024	0.026	0.008	0.032	0.028 [†]	0.016	0.014	0.041	0.021	0.019

Model 1 [†] variance	0.220		0.207		0.712		1.538		0.314		2.032		0.308	
Model 2 variance	0.221		0.207		0.710		1.538		0.316		2.031		0.305	

[†] Model 1 intercept is fall predicting spring with all control variables; in Model 2 the membership predictor was added to Model 1.
[†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Results show that students in a CTSO started out with higher motivation (indicated by a significantly positive intercept in Model 2) and gained slightly less (indicated by a negative slope) compared with CTE students. The pattern was the same, though more highly significant, for academic engagement, civic engagement, career self-efficacy, and employability skills (except that the group difference in gain was not significant for employability skills⁶). There were no differences between groups in either GPA or college aspirations at the start of the study, and no significant change over the year.

Table 11b replicates the previous set of analyses but uses CTSO vs. general (non-CTE) classroom as the group membership variable. This comparison (again, in Model 2) shows that being in a CTSO is associated with higher career self-efficacy at the start of the year and significantly less gain over the course of the year compared with general students (i.e., though both groups increased, CTSO students increased less than CTE students). In addition, although they started out at the same level, CTSO students' aspirations increased less than did general students' over the course of the year. The pattern was the same, though less significant, for civic engagement. Other differences were not statistically significant.

6 Likely due to an unusually low *N* for CTE students on the employability skills scale (there was a page missing in some of the surveys sent to this group).

Table 11b. Comparison of CTSO and general education on student outcomes

	Academic Motivation		Academic Engagement		Civic Engagement		GPA		Career Self-Efficacy		College Aspirations		Employability Skills	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>

Model 1 (Controls)														
Intercept	2.30***	0.171	1.24***	0.126	1.54***	0.191	2.31***	0.423	1.687***	0.192	3.86***	0.312	1.16***	0.108
Slope	0.29***	0.045	0.40***	0.054	0.49***	0.053	0.59***	0.060	0.509***	0.049	0.46***	0.050	0.40***	0.051
Model 2 (Group)														
Intercept	0.011	0.250	0.187	0.181	0.465	0.309	0.079	0.634	0.934**	0.292	0.200	0.501	0.104	0.213
Slope (1 = CTSO, 0 = GEN)	0.013	0.068	-0.073	0.074	-0.141 [†]	0.075	-0.008	0.091	-0.245**	0.074	-0.25**	0.088	-0.095	0.086
Control Variables														
Female	0.042 [†]	0.025	0.023	0.027	0.047	0.041	0.169**	0.064	-0.023	0.031	0.136 [†]	0.078	0.016	0.035
White	-0.003	0.037	-0.002	0.033	-0.026	0.069	-0.064	0.097	-0.030	0.044	-0.42**	0.131	-0.067	0.041
Grade	-0.003	0.018	0.011	0.015	0.004	0.030	0.046	0.045	0.012	0.017	-0.023	0.064	-0.015	0.020
Extracurricular Involvement	-0.002	0.003	0.009 [†]	0.006	0.023**	0.006	0.022**	0.008	0.009**	0.003	0.052**	0.012	0.022**	0.004
Volunteering Weekly Hours	0.037**	0.013	0.086**	0.015	0.152**	0.024	0.027	0.032	0.065**	0.015	0.120**	0.043	0.097**	0.014
Job Weekly Hours	-0.005	0.010	0.023*	0.010	-0.005	0.021	0.025	0.025	0.029*	0.013	0.010	0.036	0.047**	0.015

Model 1 [†] variance	0.183		0.200		0.646		1.173		0.270		1.882		0.250	
Model 2 variance	0.183		0.200		0.646		1.172		0.270		1.892		0.249	

[†] Model 1 intercept is fall predicting spring with all control variables; Model 2 the membership predictor was added to Model 1
[†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Thus, the answer to the first research question is that membership in a CTE-with-CTSO is associated with higher levels of many of the outcome variables of interest at the start of the year (fall survey), which may account for why this group gains less than students in the other groups over the course of the academic year. See Figures 3-9 for graphic representations of these patterns. It should be kept in mind that because possible confounding variables (e.g., participation in extracurricular activities) were controlled, the effects we found can be uniquely attributed to participation in a CTSO.

Figure 3. *Academic motivation*

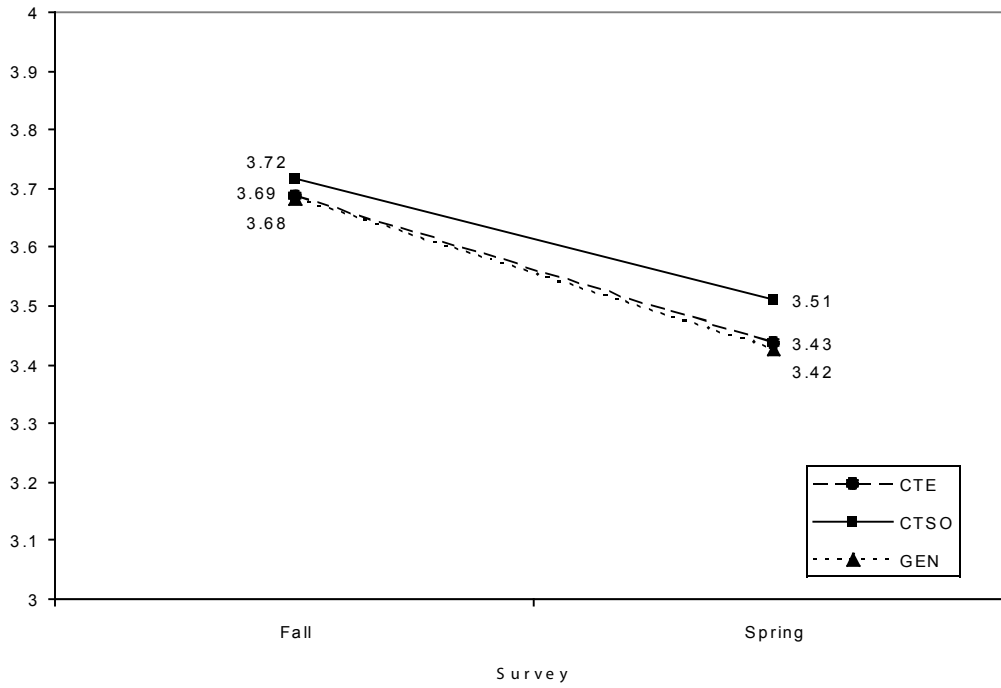


Figure 4. *Academic engagement*

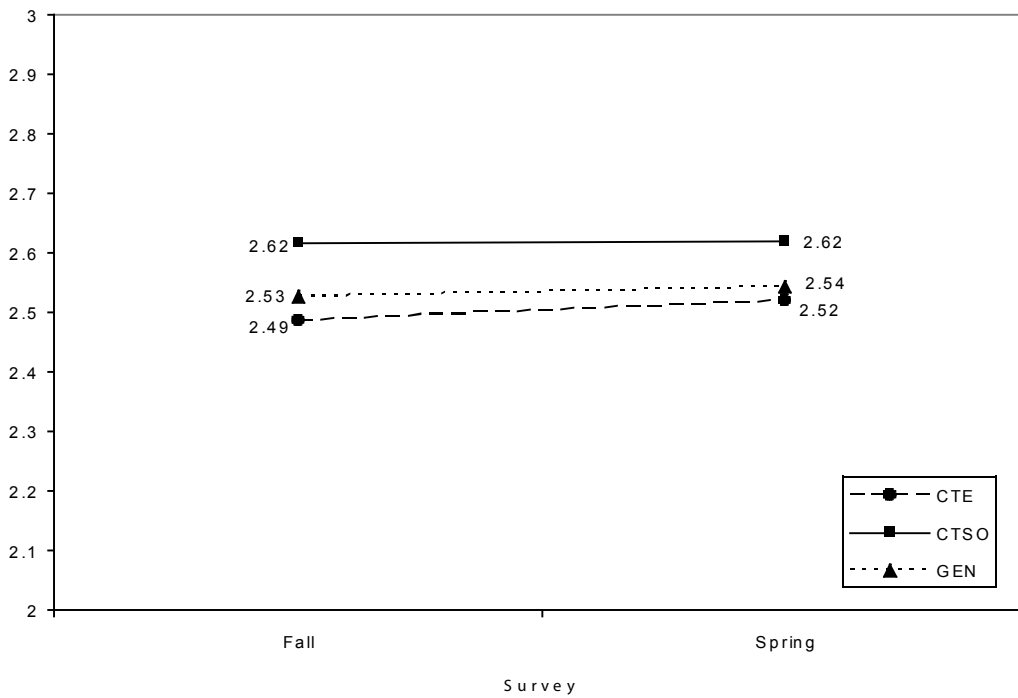


Figure 5. *Civic engagement*

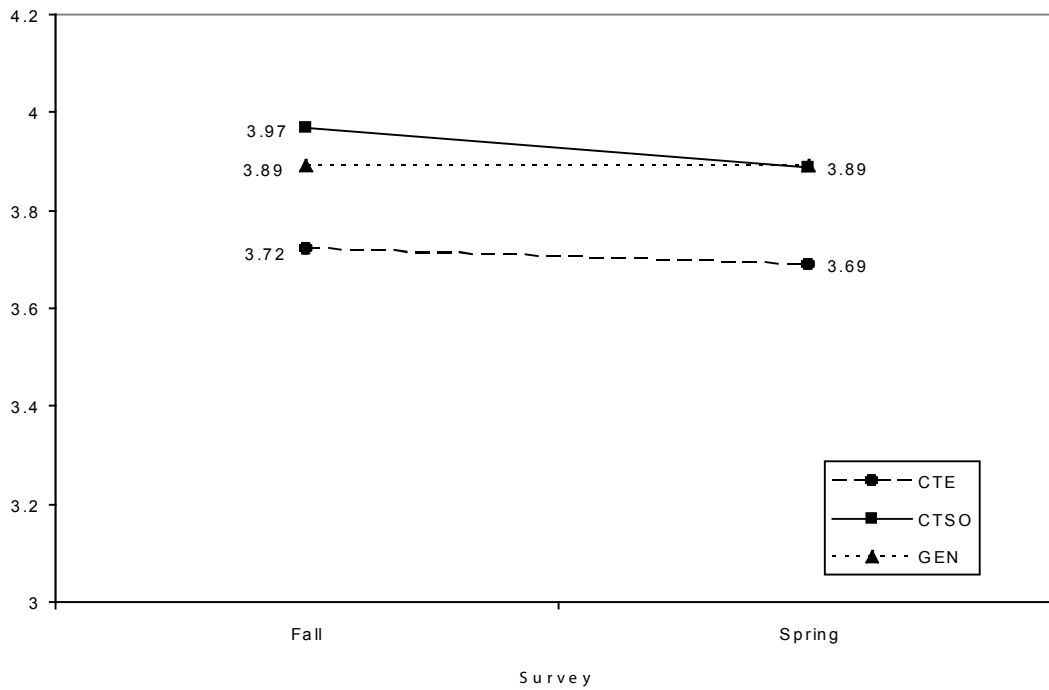


Figure 6. *Grades*

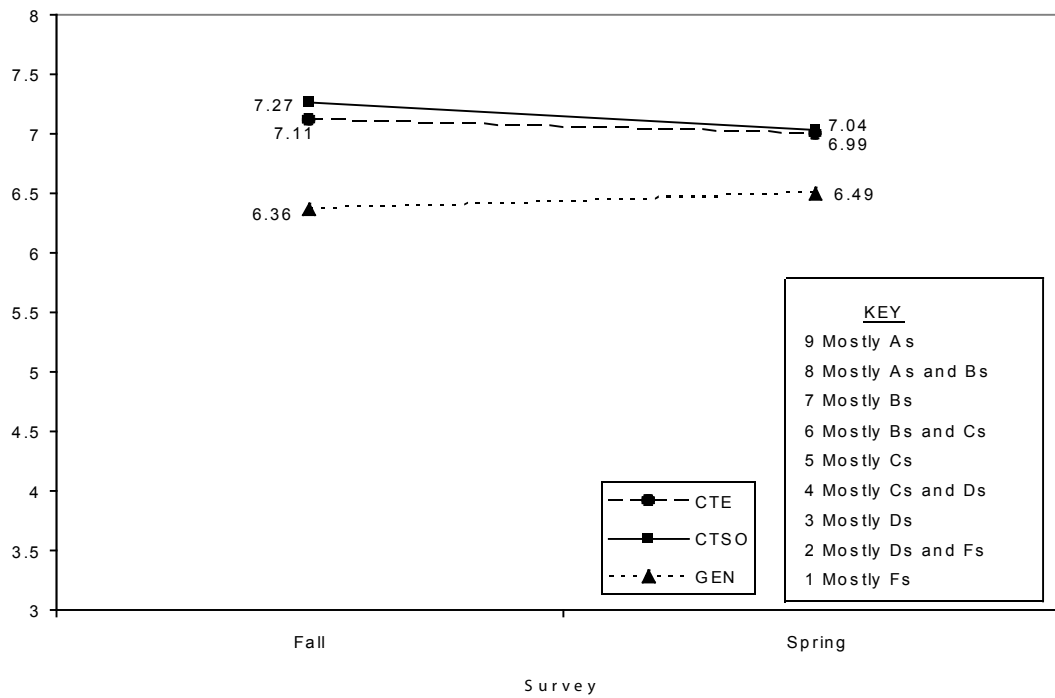


Figure 7. *Career self-efficacy*

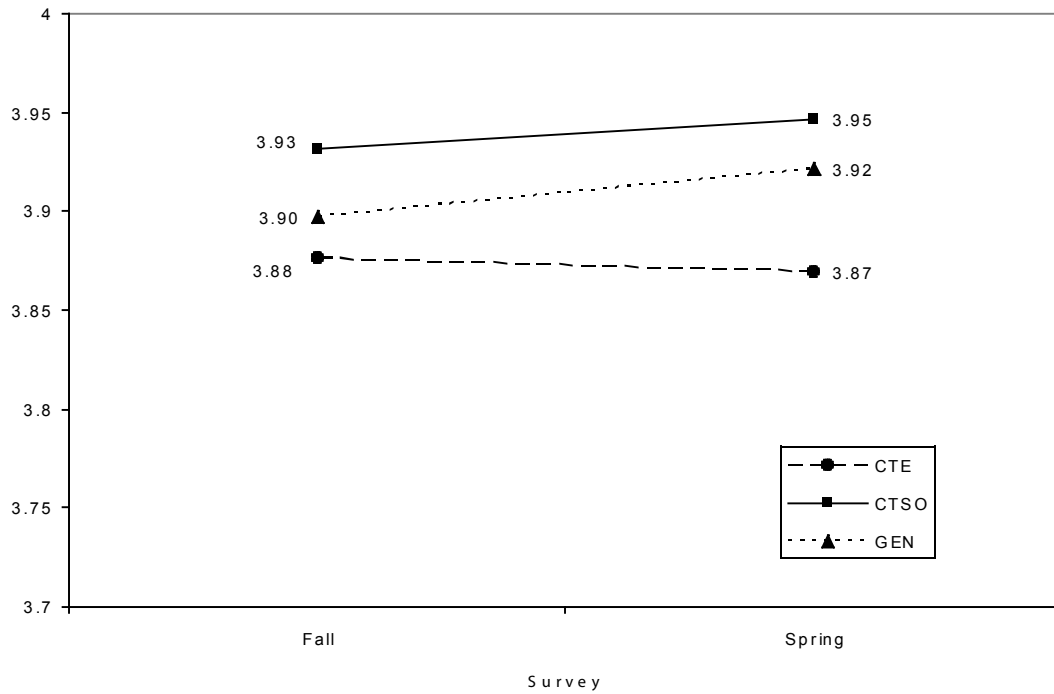


Figure 8. *College aspirations*

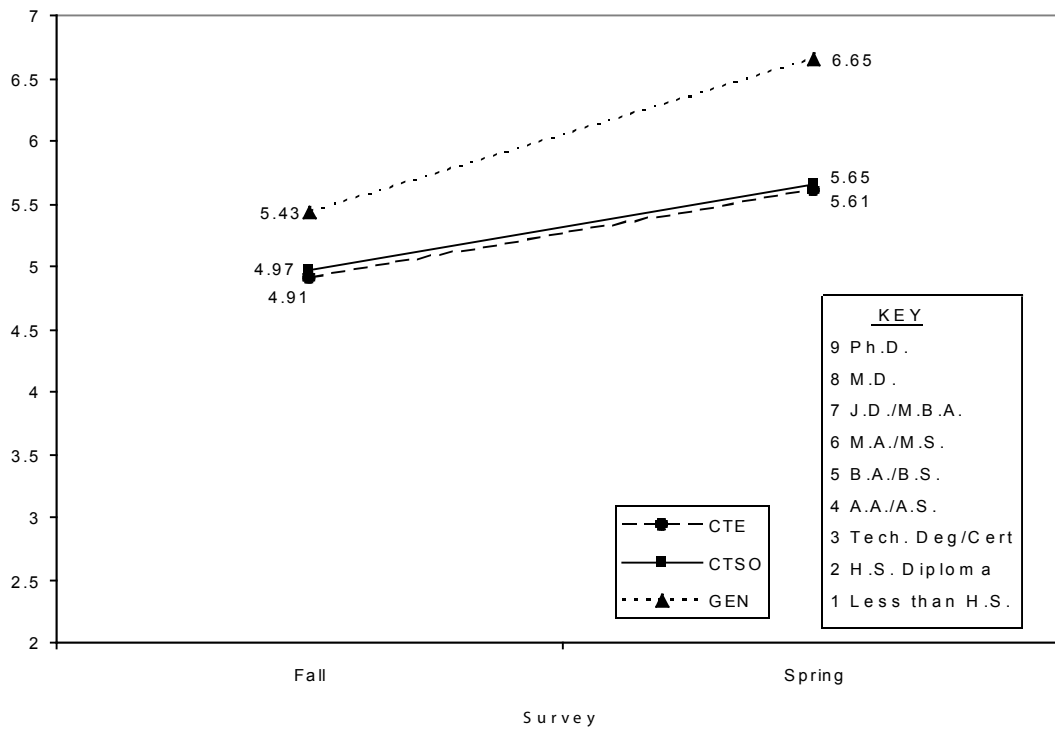
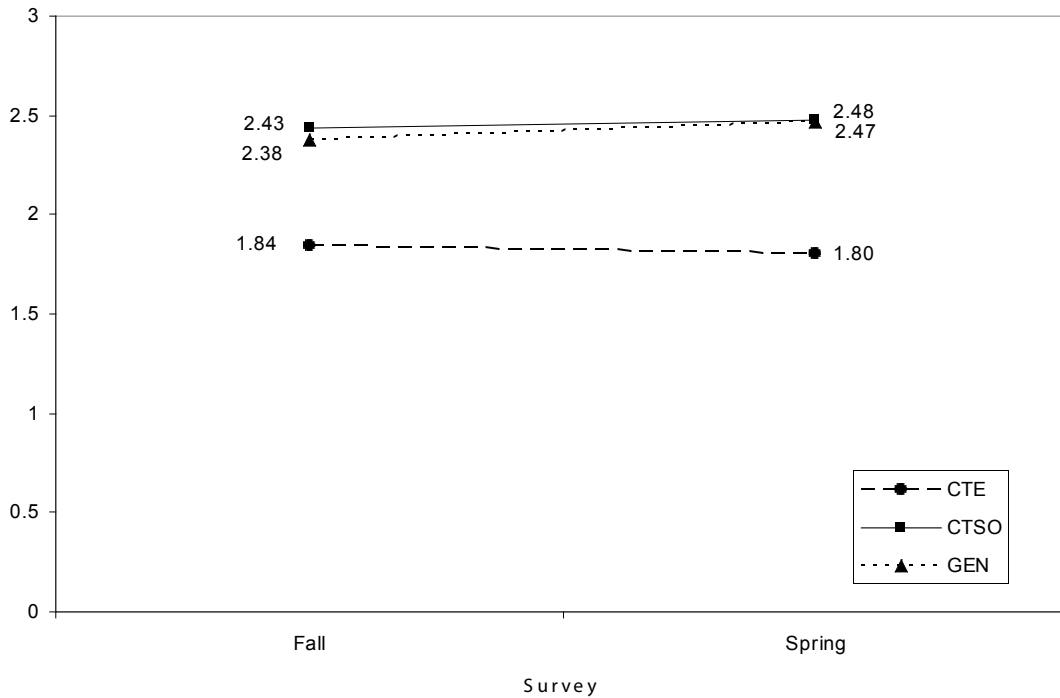


Figure 9. *Employability skills*



Research Question #2

The second analysis examines changes in the outcome variables due to *amount of participation* in CTSO activities. This means that only the CTE-with-CTSO student data were used, since students in the other two groups did not answer questions regarding participation in CTSO activities. In Table 12, the same controls as in the previous analyses were used for the first model, while a continuous variable indicating the amount of participation was entered in the second model as the variable of interest. Table 12 shows that the more the student is involved in a CTSO, the higher their academic motivation, academic engagement, grades, career self-efficacy, college aspirations, and employability skills (greater participation does not affect civic engagement). Thus, the answer to the second research question is that the amount of CTSO participation does make a difference (i.e., the more the better).

Table 12. *Change in outcomes associated with students' amount of participation in CTSO activities*

	Academic Motivation		Academic Engagement		Civic Engagement		GPA		Career Self-Efficacy		College Aspirations		Employability Skills	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
	Intercept	2.42***	0.201	1.51***	0.136	2.27***	0.294	2.39***	0.525	2.711***	0.208	3.99***	0.544	1.19***
Slope	0.29***	0.049	0.03***	0.006	0.36***	0.058	0.55***	0.065	0.250***	0.054	0.199*	0.076	0.38***	0.042
Amount of CTSO Participation	0.018*	0.007	0.32***	0.061	0.017	0.012	0.035*	0.018	0.021**	0.007	0.054*	0.024	0.025**	0.008
Control Variables														
Female	0.068	0.043	0.038	0.038	0.060	0.059	0.360**	0.109	0.054	0.057	0.031	0.119	-0.001	0.036
White	<-0.001	0.067	-0.023	0.049	-0.121	0.106	0.076	0.176	-0.064	0.092	-0.236	0.238	-0.076 [†]	0.040
Grade	<-0.001	0.026	0.024	0.019	0.019	0.047	0.059	0.065	0.036	0.026	<-0.001	0.101	-0.016	0.024
Extracurricular Involvement	-0.007	0.005	-0.002	0.007	0.016	0.008	0.026**	0.012	0.001	0.004	0.050**	0.018	0.018***	0.004
Volunteering Weekly Hours	0.033	0.021	0.054**	0.020	0.108**	0.037	<-0.001	0.055	0.032	0.027	0.125	0.078	0.090**	0.013
Job Weekly Hours	-0.034*	0.016	0.002	0.011	-0.062	0.035	-0.015	0.043	0.019	0.023	-0.039	0.044	0.041**	0.015
Total Variance	0.217		0.208		0.704		1.403		0.326		2.075		0.247	

[†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Research Question #3

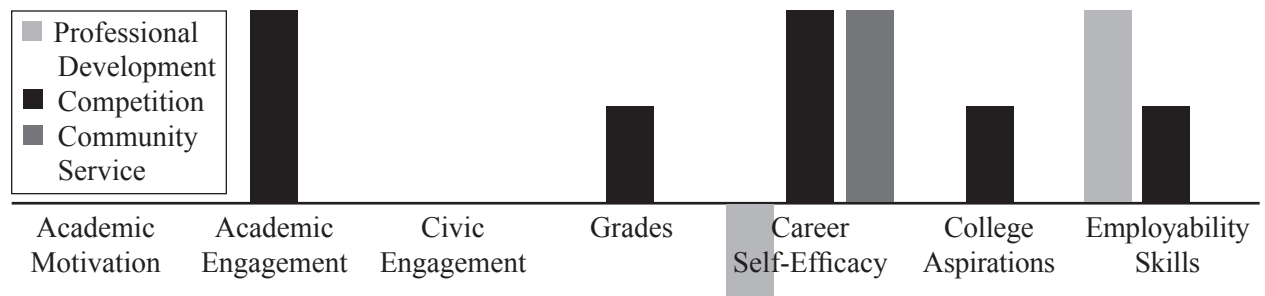
The third research question examined change in the outcome variables due to participation in the four different *types* of CTSO activities. Again, only the CTSO student data were used, since students in the other two groups did not respond to CTSO-related questions. As in previous analyses, demographic and time use variables were controlled in the first model; in the second model the *type of CTSO activity* (leadership positions, professional development, competitive events, and community service) was entered. Table 13 shows that, surprisingly, having a leadership position(s) in the CTSO did *not* significantly affect any of the outcome variables. However, participating in competitive events had significantly positive effects on academic engagement and career self-efficacy. There was also a slight positive effect of competitive events on grades, college aspirations, and employability skills. Participation in community service activities also increased students' career self-efficacy, while professional development activities increased students' employability skills. Oddly, professional development activities tended to decrease students' career self-efficacy. None of the four types of CTSO activities (organizational elements) had an effect on academic motivation or civic engagement. Thus, the answer to the third research question is that participation in three of the four types of CTSO activities has a positive impact on students, but these vary by activity (see Figure 10).

Table 13. Predicting change in outcomes from types of CTSO activities

	Outcome Variables													
	Academic Motivation		Academic Engagement		Civic Engagement		GPA		Career Self-Efficacy		College Aspirations		Employability Skills	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Intercept	2.42***	0.209	1.58***	0.138	2.25***	0.278	2.31***	0.519	2.72***	0.205	3.92***	0.552	1.69***	0.212
Slope	0.28***	0.054	0.32***	0.062	0.37***	0.058	0.56***	0.064	0.247***	0.054	0.201*	0.076	0.247**	0.084
Leadership Position (A)	0.034	0.022	0.042	0.022	0.003	0.042	0.044	0.062	0.015	0.022	0.002	0.068	0.039	0.038
Professional Development (B)	-0.025	0.031	-0.034	0.032	0.043	0.051	-0.047	0.077	-0.048 [†]	0.026	0.039	0.074	0.119**	0.052
Competitive Events (C)	0.060	0.037	0.11**	0.044	0.053	0.052	0.145 [†]	0.080	0.074*	0.032	0.160 [†]	0.094	0.056 [†]	0.052
Community Service (D)	0.031	0.080	0.080	0.052	-0.077	0.111	0.025	0.168	0.209**	0.049	0.060	0.235	-0.040	0.088
Control Variables														
Female	0.070	0.041	0.030	0.043	0.065	0.072	0.367**	0.109	0.058	0.058	0.047	0.119	0.018	0.092
White	0.005	0.054	0.001	0.046	-0.116	0.112	0.105	0.176	-0.045	0.094	-0.214	0.244	-0.100	0.152
Grade	-0.003	0.023	0.017	0.022	0.019	0.040	0.060	0.065	0.028	0.025	-0.007	0.103	-0.153	0.080
Extracurricular Involvement	-0.006	0.010	<-0.001	0.007	0.016*	0.008	0.029**	0.012	0.003	0.004	0.055**	0.018	0.020	0.012
Volunteering Weekly Hours	0.035*	0.016	0.061**	0.019	0.111**	0.036	0.006	0.055	0.035	0.026	0.136	0.079	0.089*	0.037
Job Weekly Hours	-0.033*	0.015	0.002	0.013	-0.056*	0.028	-0.009	0.043	0.018	0.022	-0.025	0.043	0.037	0.031
Total Variance	0.217		0.216		0.706		1.415		0.324		2.100		0.284	

[†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 10. Pattern of effects of CTSO organizational elements on outcome variables



Summary of Findings

In this longitudinal study of the value added by career and technical student organizations (CTSOs) to the high school experience, we compared CTE-with-CTSO classrooms to (a) CTE-without-CTSO classrooms and (b) general education classrooms. In order to isolate the CTSO experience, we controlled for students' participation in other activities (extracurricular activities, part-time work, and volunteering) that might affect our outcomes of interest. This means that we can be fairly certain that our findings are due to CTSO participation alone rather than any of the students' other involvements.

Our first research question simply asked whether being in a CTSO vs. CTE-only or a general classroom had any effect on the outcome variables elsewhere associated with CTSOs in the literature. We found that being in CTE with a CTSO (vs. CTE-without-CTSO) was associated with higher beginning (fall) levels of academic engagement, civic engagement, career self-efficacy, and employability skills (it also tended to be associated with higher levels of motivation). However, while both groups gained in these measures over the academic year, those in CTE-with-CTSO classrooms gained less (but still ended at the same level or higher) than those in CTE-without-CTSO classrooms.

Compared to being in a general classroom (non-CTE courses such as English and social studies), being in a CTSO was only associated with higher levels of career self-efficacy in the fall, and while both CTSO and general students gained over the school year, CTSO students gained significantly less. In addition, while their levels were not significantly different from those of general students in the fall, CTSO students also gained less than general students in college aspirations (and tended to gain less in civic engagement) between fall and spring.

The second research question went beyond this simple comparison of classroom type and asked whether the *amount* of participation in a CTSO mattered. The answer was an unequivocal yes. Specifically, we found that the more the students participated in CTSO activities, the higher their academic motivation, academic engagement, grades, career self-efficacy, college aspirations, and employability skills. The only measure that was unaffected by degree of participation in a CTSO was civic engagement.

The third research question asked whether the specific *type* of CTSO activity mattered—that is, what is it about participation in a CTSO that affects what kind of outcome? We found that the only element of CTSO participation that did not have a specific benefit was leadership, perhaps because students in leadership positions come in with high scores on these measures to begin with, and therefore have little more to gain.

Overall, we found some support for our theoretical model, while some specific hypothesized links were not borne out. Further research may be able to ascertain whether these positive effects endure after high school and into postsecondary and employment contexts.

Limitations

There are several limitations to this study. First, the sample of teachers was not a random sample and therefore not representative of the population. Nor were teachers blind to the purpose of the study. We recruited volunteer teachers to have their classes take our survey, and such individuals may differ from the rest of the CTE, CTSO, and general population. Another limitation is that the number of teachers recruited from each of the eight CTSOs varied, so that students whose teachers had higher rates of participation are better represented in these results. Because the teacher sample was not necessarily representative, it follows that their students are also not likely to be representative. However, because few students refused to participate, we were able to survey a good cross-section of students in these classes.

National data show that there are about equal numbers of males and females in CTE (DeLuca, Plank, & Estacion, 2006) but that minority students participate at higher rates (DeLuca et al., 2006; Stone & Aliaga, 2007). Our sample was mostly white and therefore is not necessarily representative of the population of CTE students.

There was some attrition between fall and spring survey administrations which reduced our overall *N* for these analyses, but a missing data analysis showed that there was no significant pattern to which students did not take the second survey. Still, as was seen in the results, we had a relatively small sample size for the number of variables we examined.

We called everyone in a CTE class a “CTE student,” although their experience with CTE could range from one semester to several years. Furthermore, because participation in CTE is voluntary/elective, and participation in the associated CTSO, if one is offered at the school, is also voluntary, students who enroll in CTE and/or join a CTSO are likely to differ from students who do not enroll in CTE and/or join a CTSO.

Finally, for most students, participation in a CTSO is, at minimum, a two-year process; for some it may be a four-year process. Therefore, in the space of one academic year it is unlikely that we were able to capture the full effects of participation in a CTSO.

Discussion and Implications

As a whole, our findings suggest that CTSOs do have beneficial effects on the experience of high school students, though in general not more than other types of classes. The CTSO students in this study started out and ended up with higher levels of academic engagement, civic engagement, career self-efficacy, and employability skills than CTE-only students (they also reported higher levels of participation in extracurriculars, work, and volunteering). CTSO students did not gain as much over the academic year as students in the comparison groups; the gap between the groups simply narrowed. It appears that students who are drawn to participate in CTSOs are “good students” to begin with. Indeed, this self-selection bias has been noted in other studies of activity participation (e.g., Hansen et al., 2003; McIntosh, Metz, & Youniss, 2005). However, we

did find evidence that the benefits of CTSOs can be enhanced the more a student participates, and the effects for academic engagement are particularly strong. This may mean that positive outcomes for individual students could be enhanced by participating in CTSOs at high levels, particularly in competitive events, which we found to have effects on the most outcomes.

Our results suggest that it would be beneficial if an even larger group of students (not just the “good students”) were to participate in CTSOs. The National Research Council (2004) found that many students who are at risk of disengaging from school lack peer groups with high expectations for success and strong ties to education. Furthermore, there is some evidence from other research that school-based activities “benefit socioeconomically disadvantaged students as much or more than advantaged students” (Marsh & Kleitman, 2002, p. 464), and that, conversely, students who disengage from structured activities exhibit higher rates of delinquency (Persson et al., 2007). CTSOs might be one way to re-engage “at-risk” students, *if CTSOs can attract and retain them*.

As mentioned in the introduction, CTSOs were hypothesized to have beneficial effects on key outcomes for participating students for a variety of reasons, including their provision of authentic instruction, supportive adults, a task-focused peer group, clear goals and rewards, and opportunities for achievement, leadership, and skill development in a career-related field. The effects of participation were smaller than we expected, and not always in the hypothesized direction. One academic year is likely not a long enough time frame in which to detect measurable results. Furthermore, because many of the CTSO participants were already high on characteristics such as academic engagement at the start, their gains look very small. However, at least in the case of the negative slope for motivation, the result should not be surprising; Eccles, Wigfield, et al. have found steady decreases in academic motivation across all demographic groups through the high school years (Wigfield & Eccles, 2002; Wigfield & Wagner, 2005). These researchers attribute the decline to a variety of social and cognitive factors that come into play in adolescence, including more a more accurate sense of one’s competence and a heightened awareness of competition (Wigfield, Eccles, & Rodriguez, 1998). It is reassuring that in our study, the CTSO students declined in academic motivation at a slower rate than did other students.⁷ Other longitudinal research with adolescents has found a decline in participation in structured activities over time (Persson et al., 2007). Not only are the CTSO students in our sample involved in a CTSO, they also have higher rates of participation in extracurricular activities than do general students, suggesting that they are engaged in positive activities that may buffer them from the negative influences of unstructured time outside of school (Mahoney et al., 2005; Persson et al., 2007).

While there was not much gain in levels of civic engagement over the academic year for any group, CTSO students had higher levels than CTE students, suggesting that adding a CTSO component to CTE programs would help more high school students participate in their communities as citizens. We also found that CTSO students reported similar levels to general students, and higher levels than CTE students, of employability skills. This suggests that the attraction of a “real world” instructional environment in the CTE classroom can be enhanced by incorporating a

⁷ Or, the drop in grades over the year among CTSO students may just be a reflection of the fact that a greater proportion of them are seniors than the other groups and may be experiencing “senioritis” (Hoover, 2003).

student organization component that helps students understand and experience what is necessary in the workplace.⁸

The results indicating that CTE and CTSO students have lower college aspirations than the general group of students should not be worrisome for several reasons. First, on average, they still aspire to somewhere between a B.A. and an M.A. degree. Second, if more career technical students are drawn to a two-year or technical college than to a four-year college, pulling the average down lower than that of general students, this may actually reflect a realistic and adaptive choice if they are interested in a technical career (Berg, 1972; Csikszentmihalyi & Schneider, 2000; Gray, 2000). Researchers have suggested that many of the students from the general population who aspire to more education either will not finish or will find themselves downwardly-mobile after they graduate (Berg, 1972; Csikszentmihalyi & Schneider, 2000). Gaining a technical education at a less-than-four-year college may in fact be a better bet in terms of future employability (Gray, 2000; Wood, 2006). However, this does not imply that a technical education is devoid of academics; in fact, CTE requires many academic skills (Stone et al., 2006, Zirkle, 2004). Third, we found that participating specifically in leadership and professional development activities in a CTSO serves to raise students' educational aspirations. Incidentally, our finding of lower college aspirations among CTE students also supports the findings recently reported in the National Assessment of Vocational Education (NAVE) (Levesque, 2003) and elsewhere (e.g., DeLuca et al., 2006).

Suggestions for Further Research

Future research on the effect of CTSOs should examine student transcripts for achievement, attendance, and on-time graduation data. It is especially important to look at coursetaking. The program of courses that students take is highly predictive of college enrollment (Adelman, 1999). Taking Algebra I in 8th grade has been found to be particularly crucial to the college-bound pipeline (Speilhagen, 2006). Stone and Aliaga (2003) found that CTE students have been taking more and higher levels of math and science in the last 10 years, which bodes well for their future academic and occupational success. Follow-up studies with students who participated in CTE and CTSO in high school should be conducted to examine their post-school trajectories into work and/or college. It might be possible to do this by following up with teachers, who tend to know about their students' post-graduation activities.

More analysis could also be done with existing student data on race and gender, and school district data on average family income. We also plan to take advantage of the other teacher and student data we collected. Finally, other variables—such as peer influence in CTE programs, skills assessments, type of learning structure, and student learning styles in CTE/CTSO classrooms—could be studied.

⁸ Together, these two findings may reflect the fact that CTSO students report spending more hours per week volunteering and working, variables which were held constant in the statistical analysis. Had they not been controlled, we might have seen even stronger effects of CTSO participation on the civic engagement and employability outcomes.

Conclusion

While CTSOs have received much attention in the CTE field, most of the research on their contributions and benefits to high school CTE students is anecdotal. This study aimed to test many of the anecdotal claims empirically. A foundation of 30 years of descriptive literature on CTSOs, as well as research on the development and education of high school students, formed the basis for the theoretical model. The study used a rigorous research design and reliable measures to test the model in a variety of states and programs. It is one of the first studies to systematically examine the context of CTSOs and their relation to student outcomes. Since the Carl D. Perkins Career and Technical Education Act has recently been reauthorized by Congress, we hope this research will be helpful to both policy and practice in career and technical education. Thousands of students participate in CTSOs, and we are glad to have opened the “black box” of processes that occur within them. In sum, we found that CTSOs are beneficial to students, but that they have great untapped potential that can be realized if they become more prevalent in CTE programs and more inclusive of all kinds of students.

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Appendix A
Career and Technical Student Organizations in America

Career and Technical Student Organizations at the Secondary Level

CTSO; URL	Current Name; Former Name(s)	Year Est.	Career & Technical Education Area
BPA www.bpanet.org	Business Professionals of America; Vocational Office Education Clubs of America	1966	Business Education
DECA www.deca.org	Distributive Education Clubs of America	1947	Marketing Education
FBLA www.fbla-pbl.org	Future Business Leaders of America	1940	Business Education
FCCLA www.fcclainc.org	Family, Career and Community Leaders of America; Future Homemakers of America-Home Economics Related Occupations (FHA-HERO), Future Homemakers of America (FHA)	1945	Family and Consumer Sciences
FFA www.ffa.org	FFA; Future Farmers of America	1928	Agricultural Education
HOSA www.hosa.org	Health Occupations Students of America	1976	Health Occupations
SkillsUSA www.skillsusa.org	SkillsUSA; SkillsUSA-VICA (Vocational Industrial Clubs of America)	1965	Trade, Industrial, and Health Occupations Education
TSA www.tsaweb.org	Technology Students of America; American Industrial Arts Student Association	1965	Technology Education

Appendix B
Survey Questions and Scale Reliabilities

STUDENT SURVEY

Extracurricular Activities

Please indicate your level of involvement in the following organizations/activities

Please fill in the bubble that best describes your *highest level* of participation for each organization or activity. If you do not participate in that specific organization or activity, mark the “no participation” bubble.

Organization/Activity	Level of Participation				
	No Participation	Local	County, Regional, District	State	National
1. Athletics (Club or Intramural)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Boy Scouts or Girl Scouts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Boys or Girls Clubs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Church Youth Group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. 4-H Club	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Junior Livestock Associations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Athletics (School Team)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Band/Choir	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Class Officer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Foreign Language Club	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Math/Science Club	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Military (e.g., Jr. ROTC)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Drama	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Other (specify): _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Other (specify): _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Volunteer and Work Time

Generally, how much have you been involved as a volunteer in any school, community, professional, or religious organization? (fill in one bubble in the column)

- No involvement
- 1-2 hours per week
- 3-5 hours per week
- 6-10 hours per week
- More than 10 hours per week

Generally, how much have you been working for pay? (fill in one bubble in the column)

- None
- 1-5 hours per week
- 6-10 hours per week
- 11-20 hours per week
- More than 20 hours per week

Civic Engagement

alpha = .89

Please indicate how strongly you disagree or agree with each statement.

(fill in one bubble per row)

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I often discuss and think about how political, social, or national issues affect the community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I participate in political or social causes in order to improve the community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. It is my responsibility to help improve the community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I benefit emotionally from contributing to the community, even if it is hard and challenging work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I feel I have the power to make a difference in the community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Being actively involved in community issues is everyone's responsibility, including mine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I try to find time or a way to make a positive difference in the community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Academic Engagement

alpha = .73

At school this year, how often have you done each of the following?

(fill in one bubble per row)

	Never	Sometimes	Often	Very Often
1. Asked questions in class or contributed to class discussion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Prepared two or more drafts of a paper or assignment before turning it in	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Attended class with readings or assignments completed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Worked with other students on projects or assignments outside of class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Put together ideas or information that I learned in different classes when completing assignments or during class discussions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Discussed ideas from your readings or classes with teachers outside of class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Discussed ideas from your readings or classes with others outside of class (students, family members, coworkers, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Academic Motivation

alpha = .86

Mark how much you agree with each statement.

(fill in one bubble per row)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I put forth a great deal of effort when doing my school work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I think the things I learn at school are useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I take pride in my school work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I think it is important to make good grades	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I place high value on learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I've worked harder than I expected to work at school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I am challenged to do my best at school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I am excited about my classes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. My school work makes me curious to learn about other things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I have the skills and abilities to complete my work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Career Self-Efficacy

alpha = .89

Please indicate how confident you are about each statement.

(fill in one bubble per row)

How confident are you in your ability to...	Not at all confident	Not very confident	Neutral	Somewhat confident	Completely confident
1. Make a plan of your goals for the next five years	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Accurately assess your abilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Select one occupation from a list of occupations you are considering	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Determine the steps you need to take to successfully attain your chosen career	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Persistently work at your career goal even if you get frustrated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Prepare a good resume	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Change careers if you did not like your first choice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Decide what you value most in an occupation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Talk with a person already employed in the field in which you are interested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Choose a career that will fit your interests	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Identify employers, firms, and institutions relevant to your career possibilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Find information about universities and colleges	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Successfully manage the job interview process	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Employability Skills

alpha = .99

Please respond to the following questions based upon your experiences in this class this year.
(fill in one bubble per row)

I . . .	Not At All	A Little	Quite A Bit	Yes, Definitely
1. Read new and challenging material	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Write reports and papers that address real-world problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Use math to solve real-life problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Communicate in writing or verbally to others, not just the teacher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Set goals for myself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Achieve my goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Focus my attention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Observe how others solve problems and try to use those problem-solving techniques	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Develop detailed plans for solving a problem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Practice self-discipline	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Learn about people from different backgrounds	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Learn about helping others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Was able to change my school or community for the better	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Work in groups where we sometimes have to compromise to succeed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Share responsibility for a project with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Learn how my emotions and attitudes affect others in the group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Learn that it is not necessary to like people to work with them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Led groups or other students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please answer the following demographic questions.

If it were up to you, how far would you like to go in school? (fill in one bubble)

- | | |
|------------------------------------------------|-----------------------|
| Less than high school (will probably drop out) | <input type="radio"/> |
| High school graduate or G.E.D. | <input type="radio"/> |
| Technical college degree or certificate | <input type="radio"/> |
| Community college degree (AA) | <input type="radio"/> |
| 4-year college degree (BA, BS) | <input type="radio"/> |
| Master's degree (MA, MS) | <input type="radio"/> |
| Professional degree (MBA or law degree) | <input type="radio"/> |
| Medical degree (MD, DVM, DDS) | <input type="radio"/> |
| Doctorate (Ph.D.) | <input type="radio"/> |

Which of the following best describes the average grades you get in school? (fill in one bubble)

- | | |
|--------------------|-----------------------|
| Mostly A's | <input type="radio"/> |
| Mostly A's and B's | <input type="radio"/> |
| Mostly B's | <input type="radio"/> |
| Mostly B's and C's | <input type="radio"/> |
| Mostly C's | <input type="radio"/> |
| Mostly C's and D's | <input type="radio"/> |
| Mostly D's | <input type="radio"/> |
| Mostly D's and F's | <input type="radio"/> |
| Mostly F's | <input type="radio"/> |

What grade are you in currently (the 2004-2005 school year)?

- | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|
| Freshman | Sophomore | Junior | Senior |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

What is your gender?

- | | |
|--------|-----------------------|
| Female | <input type="radio"/> |
| Male | <input type="radio"/> |

(Optional) Which *one* category *best* describes your ethnicity? (please fill in one bubble)

- | | |
|--------------------------------|-----------------------|
| White/Caucasian | <input type="radio"/> |
| African American | <input type="radio"/> |
| Hispanic | <input type="radio"/> |
| Asian/Pacific Islander | <input type="radio"/> |
| American Indian/Alaskan Native | <input type="radio"/> |
| Other (please explain): _____ | <input type="radio"/> |

Appendix C
Degree of Participation in CTSO

Note: Activity wording varied by CTSO

J. In what ways have you been involved in [CTSO] in the last year?
(fill in all that apply)

For each of the following statements, please mark all the levels at which you participated in [CTSO] last year (2003-2004).	Local	District	State	Region	National	Does Not Apply
Activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1. As an elected officer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. As a voting delegate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. As a committee leader (chair, secretary, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. As a non-competitive conference participant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. As a workshop participant (motivational speaker, resume building, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. As a competitor in a competitive event	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. As a participant in a recognition program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. As a membership campaign leader	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

K. In what ways will you be involved in [CTSO] this year?
(fill in all that apply)

For each of the following statements, please mark all the levels at which you are participating or plan/hope to participate during the 2004-2005 school year.	Local	District	State	Region	National	Does Not Apply
Activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1. As an elected officer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. As a voting delegate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. As a committee leader (chair, secretary, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. As a non-competitive conference participant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. As a workshop participant (motivational speaker, resume building, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. As a competitor in a competitive event	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. As a participant in a recognition program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. As a membership campaign leader	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>