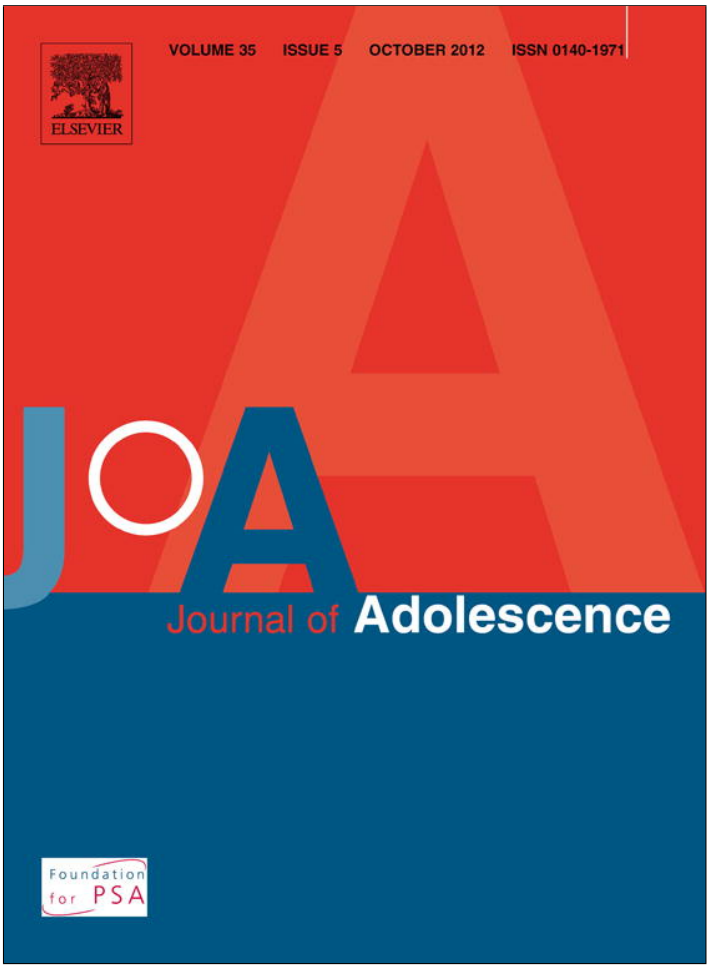

Journal of Adolescence 35 (2012) 1225–1235

Contents lists available at SciVerse ScienceDirect

Journal of Adolescence

journal homepage: www.elsevier.com/locate/jado

Participating in a policy debate program and academic achievement among at-risk adolescents in an urban public school district: 1997–2007

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Keywords:
Adolescent
Education
Debate
Graduation
At-risk

A B S T R A C T

This study investigates the relationship between participating in a high school debate program on college-readiness in the Chicago Public School district over a 10-year period. At-risk school students were identified using an index including 8th grade achievement, poverty status, and enrollment in special education. Regression analyses were used to assess the association between debate participation and graduation and ACT performance. Overall, debaters were 3.1 times more likely to graduate from high school (95% confidence interval: 2.7–3.5) than non-debaters, and more likely to reach the college-readiness benchmarks on the English, Reading, and Science portions of the ACT. This association was similar for both low-risk and at-risk students. Debate intensity was positively related to higher scores on all sections of the ACT. Findings indicate that debate participation is associated with improved academic performance for at-risk adolescents.

Introduction

There are substantial disparities in educational attainment according to race, income, geography and ethnicity. These disparities emerge early in the life course and accumulate over time (House, Lantz, & Herd, 2005), and have both intra-generational and intergenerational components. For example, parental education is directly linked to children's educational attainment (Melby, Conger, Fang, Wickrama, & Conger, 2008), and educational attainment influences other indicators of socioeconomic status (SES) in adulthood (e.g., occupation, income), which can compound the positive (or negative) effects of higher (or lower) education over the life course through a process of accumulated (dis)advantage (Duncan & Magnuson, 2005; Freudenberg & Ruglis, 2007; Krieger, 2008). Co-curricular activities, including debate, have been advocated as a potential means of addressing these education disparities (Breger, 2000). However, to date research is mixed as to whether such programs are effective, particularly for at-risk students.

State of educational disparities in the United States

Currently, only 68% of US students graduate from high school in four years, with marked disparities according to race/ethnicity, gender, income, and urbanicity. For example, 50% of black students graduated high school in 2001, compared with 53% of Latino students, 75% of white students, and 77% of Asian-American students (U.S. Census Bureau, 2009). Educational

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doi:10.1016/j.adolescence.2012.04.005

outcomes tend to be particularly poor in urban settings; for example, in Chicago from 2000 to 2005, only 43% of students graduated by age 18, and 54% graduated by age 19 (Consortium on Chicago School Research, 2008).

Factors that characterize "at-risk" high school students include academic failure in elementary and middle school, low family SES, and special education status (Mariage et al., 2009). Particularly in urban, understaffed, or underfunded schools, special education status has been associated with deficits in reading skills (Mariage et al., 2009). There is evidence that students with multiple risk factors for low achievement (e.g., needing special education services and coming from a high-poverty household) may respond differently to interventions designed to increase educational attainment (Feldman & Matjasko, 2005). These risk factors may compound educational disparities, and needs of students with multiple risk factors should be considered when designing, implementing, or evaluating interventions.

In order to reduce educational disparities, intervention programs should seek to improve students' school engagement (Melby et al., 2008). School engagement, or students' behavioral and emotional connectedness with school, is a strong predictor of high school graduation and college attendance (Finn, 2006). Increased engagement, such as participation in an organized co-curricular activity, can increase emotional engagement (Li & Lerner, 2011). Among "disengaged" students, connectedness to school may be improved via participation in school clubs or extracurricular activities, particularly in high school when peer groups can exert a stronger influence over behavior than parents (Melby et al., 2008).

Programs aimed at reducing educational disparities

A variety of programs aim to address these educational disparities by effecting change at a student, school, community, or policy level. However, only a fraction of existing programs have been systematically studied and evaluated for effectiveness, and differences in the type of intervention (e.g., tutoring, behavior training, sports), outcome criteria (e.g., standardized test scores, grade point average, grade retention, high school graduation, college entrance exams) and program design limit comparisons that can be drawn (Prevatt & Kelly, 2003; James, Jurich, & Estes, 2001). Some programs target the entire school or district population, while others focus on at-risk adolescents, such as students with previous discipline referrals or low test scores. Program length varies from a few weeks to multiple school years; however, long-term follow-up of program effectiveness is often limited (James et al., 2001). Co-curricular activities have been linked to increased school engagement and educational attainment, and in some cases fewer risk behaviors (Feldman & Matjasko, 2005). However, because of the wide diversity of programs encompassed by co-curricular activities, it is important that the mechanism by which such programs may increase school engagement be considered. For example, there is modest evidence that activities which involve frequent structured interactions with adults in a school setting, such as varsity sports, are associated with increased school engagement. In contrast there is little evidence that unstructured activities, such as after-school jobs and non-school athletics, improve engagement (Feldman & Matjasko, 2005).

The association between extracurricular activities and school engagement may vary by student characteristics. For example, while varsity sports tend to be associated with greater school engagement, this relationship varies by gender and race/ethnicity (Feldman & Matjasko, 2005). Also, while the definition of "at-risk students" varies across studies, reports are mixed as to whether co-curricular activities equally benefit at-risk and low-risk students. When programs or activities include a competitive component, increased engagement may also vary according to how successful a student is at the activity (Feldman & Matjasko, 2005). An additional consideration for education promotion programs for high school students is the psychology of the developmental stage of adolescence. Adolescence is characterized by reward-seeking behavior (Galvan, 2010) and the development of higher-level thinking and reasoning skills (Sternberg & Downing, 1982). Programs that utilize these developing skills may improve educational attainment via increased school engagement.

Debate as an educational intervention

The development and adoption of the Common Core Standards (CCS) (Porter, McMaken, Hwang, & Yang, 2011) and recent efforts to promote innovation in education programming (e.g., Department of Education Invest in Innovation and Race to the Top initiatives) have called attention to the need to develop, implement, and rigorously evaluate educational programs that align with explicit achievement goals (Dwyer, Millett, & Payne, 2006). The 2010 CCS aim to refocus literary education on analysis and evaluation of non-fiction texts and oral communication (i.e., listening, speaking, and presenting) (Porter et al., 2011). On face, competitive policy debate programs appear to match well with many of the English language arts and reading objectives outlined in the CCS. Debate is a co-curricular activity in which teams of students engage in structured, competitive argumentation about social policies (Breger, 2000). Students work in two-person teams to craft and defend arguments about a particular policy topic (called a *resolution*) which changes every academic year. Each 90-min debate round consists of students orally presenting their arguments and rebutting those of the opposing team. Anecdotal accounts and qualitative studies have indicated that students who participate in debate are more likely to graduate and attend college than their non-debate peers (Breger, 2000; Lee, 1998), however to date there is little quantitative evidence of these purported effects.

Competitive policy debate programs have been implemented in urban school districts. The majority of Urban Debate League (UDL) participants are racial/ethnic minorities because of the urban location of the programs. Debate participation may influence academic performance through several mechanisms, including increasing social engagement with school,

providing a forum for the practice of academic skills, particularly reading and writing, and providing students with a structured activity with a defined goal (i.e., winning debate tournaments). Unlike mentoring programs or participation on a sports team, debate reinforces the same critical thinking and academic writing and language skills that are the focus of standardized reading and writing tests (Mezuk, Bondarenko, Smith, & Tucker, 2011). While the skills necessary for being a successful debater mirror those practiced in class, the goal differs: winning a round of debate may motivate students more than achieving the perhaps less tangible outcome of a good grade on a class assignment.

Present study

The goal of this study is to examine the association between participation in a competitive policy debate program and likelihood of graduating high school and being ready for college, using a longitudinal assessment within a cohort of high school students in a large urban school district. The main hypotheses are: (1) the association between debate participation and academic achievement will be greatest for at-risk students, and (2) among students who participate in debate, the amount of participation and degree of competitive success will be positively associated with academic achievement. Unlike previous studies of this cohort which sought to assess the average influence of debate on achievement overall (Mezuk, 2009; Mezuk et al., 2011), this study aims to explicitly examine whether the association between debate participation and achievement varies for high-risk and low-risk students.

Methods

Sample

Data were obtained from Chicago Public Schools (CPS) and the Consortium on Chicago School Research (CCSR) at the University of Chicago. The CCSR maintains enrollment, demographic, attendance, and academic data on CPS high school students from 1991 to the present. Data collection for this study has been previously described (Mezuk, 2009; Mezuk et al., 2011). Briefly, the study data were derived from CPS academic records; private and charter schools are not included. CPS currently consists of 116 high schools, with enrollment of approximately 112,000 students. The racial/ethnic makeup of the CPS district is 47% Black, 39% Latino, 8% White, 3% Asian, and 3% multi-racial (CPS, 2009).

Debate participants were identified using tournament records kept by the Chicago Debate League (CDL), which spanned from the 1997/8 through 2006/7 school years. These tournament registration records were linked with CPS enrollment data by the CCSR. A random sample of comparison students were selected for each debater from students who attended the same school and entered high school in the same year as the debate participant in order to account for factors that might have influenced selection into particular schools. The selection targeted four comparison students for every one debate participant (actual sampling ratio was 3.978:1); the 4:1 sampling ratio was chosen to maximize the statistical power of the study design. In total, 12,179 CPS students enrolled in high school at some point during the 1997/8 through 2006/7 school years were selected, of which 2449 (20%) had participated in at least one CDL tournament. This final sample was representative of the general CPS student body in terms of gender and race/ethnicity.

Independent variables

Debate participation

Students were classified as debate participants (hereafter 'debaters') if they had participated in at least one CDL tournament between 1997/8 and 2006/7 academic years as indicated by tournament registration records. Among debaters, two metrics were created to indicate intensity of debate participation: (1) quantity and (2) competitive success. *Quantity of debate participation* was indexed by the number of preliminary competition rounds that each student completed. Each CDL tournament consisted of five 90-min preliminary rounds (students who did well in these rounds went on to elimination rounds, however CDL did not keep records of these elimination rounds and thus they are not included in our data). Each year the CDL held between five and seven tournaments, representing between 25 and 35 potential rounds that a student could have debated each year. *Competitive success* was indexed by two metrics: each student's win-loss ratio (number of wins/number of total rounds completed), and the number of times a student finished in the top eight teams at CDL tournaments.

Risk index

The primary hypothesis was to examine whether influence of debate participation on achievement varies as a function of whether students are "at-risk" of not completing high school. To identify at-risk students in the sample, an index was created composed of multiple factors that have been shown to contribute to poor academic outcomes (see Supplemental Table 1). Five factors were used to identify at-risk students: (1) free lunch status, (2) special education status, (3) neighborhood poverty, (4) 8th grade standardized math scores, and (5) 8th grade standardized reading test scores. Risk was initially evaluated on a six-point scale ranging from zero to five, with one point assigned for each of these five risk factors. Because of small numbers in risk groups four and five, they were combined for analysis; sensitivity analyses were completed for both five- and six-point risk scales to assess the influence of collapsing these groups were consistent with those reported here.

Risk indicator: free lunch status

Qualifying for free lunch status was used as a measure of family poverty. Students must submit an application with family financial information in order to qualify for free or reduced-fee lunch. Almost all CPS students are eligible for reduced-fee lunch, and thus we used the more conservative measure of free lunch to indicate family poverty. Students who had ever qualified for free lunch during high school were assigned a score of one; all others were assigned a score of zero.

Risk indicator: special education status

Students were assigned a score of one if they had ever received special education services through CPS ($n = 1763$). All others were assigned a zero. The majority of special education students in the non-debater sample ($n = 1557$) were classified as having a learning disability (67%); most special education debaters ($n = 206$) had either a learning disability (48%) or speech/language impairment (45%).

Risk indicator: neighborhood poverty

Neighborhood poverty was indicated by the concentration of poverty in the census block of the student's residence; it refers to the environment in which the student lives rather than his/her family income. Census block poverty was calculated from the percent of adult males employed and the percent of families with incomes above the poverty line. Poverty scores were standardized relative to the Chicago mean with 0 as the mean value for census block groups in Chicago (Mezuk, 2009). Higher scores indicate greater poverty, and because many students lived in high-poverty areas, more than half of students from the sample have scores above the Chicago mean (mean sample poverty score: 0.13). For the risk variable calculation, values ≥ 0.5 standard deviations above the mean were assigned a score of one, and values < 0.5 standard deviations below the mean were assigned a score of zero. Forty-four missing scores were imputed to the sample mean.

Risk indicator: low 8th grade standardized test scores

Eighth grade standardized test scores were used as an indicator of pre-high school (and thus pre-debate participation) achievement (the UDL program was not available for middle school students during the study period). Two different standardized tests were used by CPS to assess 8th grade student performance during the study period: the Iowa Test of Basic Skills (ITBS) was administered until 2005, and the Illinois Standards Achievement Test (ISAT) was administered from 1998 to 2007. Both tests evaluated students' math and reading skills. Missing test scores were imputed to the sample mean (268 on the reading ITBS and 266 on the mathematics ITBS among debaters; 250 on the reading ITBS and 255 on the mathematics ITBS among non-debaters; 163 on the reading ISAT and 165 on the mathematics ISAT among debaters; 156 on the reading ISAT and 159 on the mathematics ISAT among non-debaters). In total, 2237 (37.2%) reading scores and 2223 (36.8%) math scores were missing. Missing data was largely due to students moving into the CPS district after 8th grade. We repeated all analyses using only students with complete data (no imputation) and our inferences were the same.

The score ranges of the two tests differed (120–200 for the ISAT; 1–337 for the math ITBS; 1–349 for the reading ITBS), and therefore the scores were standardized relative to their overall mean. Scoring of the ISAT changed in 2005/06 (from a total possible score of 150–386 for reading; and a total possible score of 150–411 for math); scores for the 2005/06 school year were mean-centered separately. These mean standardized scores were then combined to yield one estimate of 8th grade reading and one estimate of 8th grade math performance for each student, in terms of standard deviations.

For the risk index, values ≤ 0.5 standard deviations below the mean were assigned a score of one for the reading and math tests, and values > 0.5 standard deviations below the mean for each test were assigned a score of zero.

Dependent variables

We examined the influence of debate on three indicators of academic performance: (1) graduation from high school, (2) dropping out of high school, and (3) American College Test (ACT) scores.

Graduation status

High school completion status was derived from CPS administrative records, which indicated whether students were still enrolled in CPS or whether they had completed high school (either through graduation or alternate modalities, including GED), transferred out of the CPS district, or dropped out of school. We created two dichotomous variables pertaining to high school completion for analysis. One variable (*graduate*) represented the proportion of students who graduated, in which the denominator included both students who transferred out of CPS and dropped out. The other variable (*drop out*) represented the proportion of students who dropped out of CPS during high school, and the denominator included graduates and students who transferred out of CPS.

College-readiness: ACT performance

ACT scores were derived from CPS administrative records. The ACT is a standardized assessment used in college admissions, and it consists of four sections: Reading, English, Mathematics, and Science. Each test is scored on a scale of one to 36, and the total reported score is an average of these four scores. The ACT purports to predict a student's college-readiness based on a designated benchmark score (English $\geq$ 18, Mathematics $\geq$ 22, Reading $\geq$ 21, Science $\geq$ 24). A score at or above the benchmark indicates that a student is "college-ready" in that particular subject, or has a 50% chance of earning a grade of B or

better in a college course in that subject area (ACT, 2006). For this analysis, dichotomous variables were created that indicated whether or not the students' scores met or exceeded the benchmark in each of the four subject tests.

Statistical analysis

Descriptive analyses were carried out in two steps. First, students who participated in the CDL were compared to non-debater CPS students using chi-square tests for categorical variables and *t* tests for continuous variables. Second, differences in demographic characteristics by level of debate participation in intensity (indicated by quantity and competitive success, as described above) were examined using chi-square and standardized *t* tests for continuous variables.

Multivariate logistic regression was used to assess the influence of debate participation and risk group on three outcomes: (1) probability of graduating from high school; (2) probability of dropping out of high school; and (3) probability of being college-ready as assessed by the ACT. Multiple linear regression was used to assess the influence of debate on the outcome of continuous ACT scores. All models were adjusted for gender, race, age in 9th grade, and risk index. To address whether the influence of debate varied as a function of the risk index (*Hypothesis 1*), these linear and logistic regression models were stratified by risk index. The statistical significance of any moderation was confirmed using interaction terms (debate status × risk index). A non-significant interaction term would indicate that the influence of debate on achievement did not vary as a function of student risk level; that is, all students benefited equally regardless of whether they were categorized as "at-risk" or not.

Finally, within the subset of CPS students who participated in the CDL, multiple linear and logistic regression were used to assess the influence of debate intensity on ACT performance and likelihood of graduating high school (*Hypothesis 2*). Four measures of debate intensity were examined: (a) number of tournaments attended, (b) number of debate rounds completed, (c) win-loss ratio, and (d) percentage of finishes in the top eight teams at a tournament. These models were also adjusted for gender, race, age in 9th grade, and risk index.

This study was approved by the University of Michigan Institutional Review Board and the Chicago Public Schools Office of Research Evaluation and Accountability, and received exempt status from the Virginia Commonwealth University. Statistical analyses were completed using SAS. Because of the number of comparisons being made statistical significance was set at $P = .01$, and all *P*-values refer to two-tailed tests.

Results

CPS students who participated in debate differed from their peers in several ways: debaters were more likely to be women (59.2% vs. 52.4%, $P < .001$), were younger in 9th grade (14.0 years vs. 14.2 years, $P < .001$), and were more likely to be at low-risk as indicated by the risk index ($P < .001$). Debaters were less likely to be have received special education services (8.4% vs. 16.0%, $P < .001$), and they performed better on standardized 8th grade math and reading assessments ($P < .001$). Debaters and non-debaters did not differ significantly in terms of concentration of poverty of residence.

Debate and high school graduation

Table 1 illustrates the relationship between participating in debate and graduating from high school. As expected, the risk index was strongly inversely related to likelihood of graduating high school ($P < .001$). After adjusting for risk index and demographic characteristics, debaters were 3.1 times more likely to graduate from high school than non-debaters (95% confidence interval (CI): 2.73–3.54), and nearly one third as likely to drop out of high school (Odds Ratio (OR): 0.38; 95% CI: 0.32–0.45). Fig. 1 illustrates the relationship between the risk index and high school graduation for debaters and non-debaters. As expected, likelihood of graduating was lower for both debaters and non-debaters at higher levels of risk, although the difference was greatest in the highest risk group, in which 72% of debaters and 43% of non-debaters graduated. In the stratified analysis, debaters remained significantly more likely to graduate from high school in each of the five risk groups. The interaction terms between risk index and debater status were not statistically significant, indicating that the association between debate and high school completion did not vary among differ between low-risk and at-risk students.

Debate and performance on the ACT

Table 2 describes the relationship between debate status and performance on the English, Mathematics, Reading and Science sections of the ACT. Debaters scored significantly higher on all sections of the ACT ($P < .001$), although the association was stronger for the English ($\beta = 1.42$ points higher) and Reading ($\beta = 1.57$ points higher) tests, as compared to the Science ($\beta = 0.98$ points higher) and Mathematics ($\beta = 0.55$ points higher) portions. Similarly, debate status was significantly related to reaching the college-readiness benchmarks on the ACT. Debaters were more likely to score at or above the benchmark in English (OR: 1.63, 95% CI: 1.43–1.86), Reading (OR: 1.54, 95% CI: 1.32–1.69) and Science (OR: 1.41, 95% CI: 1.21–1.65) after adjustment for demographic characteristics and risk index. Debaters and non-debaters did not significantly differ in

Table 1
Logistic regression analysis predicting likelihood of graduating or dropping out of high school.

		Graduate		Drop out	
		Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 1 OR (95% CI)	Model 2 OR (95% CI)
Debate participant (*ref: no*)	Debater	3.38 (2.97, 3.84)***	3.11 (2.73, 3.54)***	0.34 (0.29, 0.40)***	0.38 (0.32, 0.45)***
Race/ethnicity (*ref: White*)	Black	0.86 (0.76, 0.97)*	1.24 (1.08, 1.42)**	1.86 (1.59, 2.18)***	1.17 (0.99, 1.38)
	Latino	0.88 (0.77, 1.00)*	1.11 (0.97, 1.28)	1.40 (1.18, 1.65)***	1.01 (0.85, 1.20)
	Other	2.16 (1.72, 2.70)***	2.22 (1.77, 2.79)***	0.31 (0.22, 0.45)***	0.30 (0.21, 0.44)***
Gender (*ref: men*)	Women	1.70 (1.56, 1.85)***	1.66 (1.52, 1.81)***	0.61 (0.55, 0.67)***	0.62 (0.56, 0.69)***
Age (*years*)		0.46 (0.42, 0.50)***	0.55 (0.50, 0.60)***	2.37 (2.15, 2.60)***	1.91 (1.73, 2.11)***
Risk group (*ref: zero*)	1		0.70 (0.60, 0.82)***		2.06 (1.62, 2.61)***
	2		0.48 (0.41, 0.57)***		3.18 (2.49, 4.06)***
	3		0.34 (0.28, 0.40)***		4.88 (3.80, 6.27)***
	4 or 5		0.29 (0.24, 0.35)***		5.46 (4.22, 7.07)***
Model chi-square		1146.2***	1417.9***	919.2***	1228.2***
−2 log likelihood		12,861.1	12,589.4	9897.1	9588.2
Total graduated/dropped out		7210	7210	2143	2143
Total *N*		10,925	10,925	10,925	10,925

*$P < .05$, **$P < .01$, ***$P < .001$.

likelihood of meeting the college-readiness benchmark on the Mathematics section in adjusted analyses (OR: 1.14, 95% CI: 0.96–1.26).

Risk index was inversely associated with average ACT score (Fig. 2). When analyses were stratified by risk index group, debaters were significantly more likely to achieve a higher score on the English and Science sections of the ACT for all risk groups ($P < .01$). The interaction terms between debate status and risk score were not statistically significant, indicating that the association between debate participation and ACT performance did not vary by risk level.

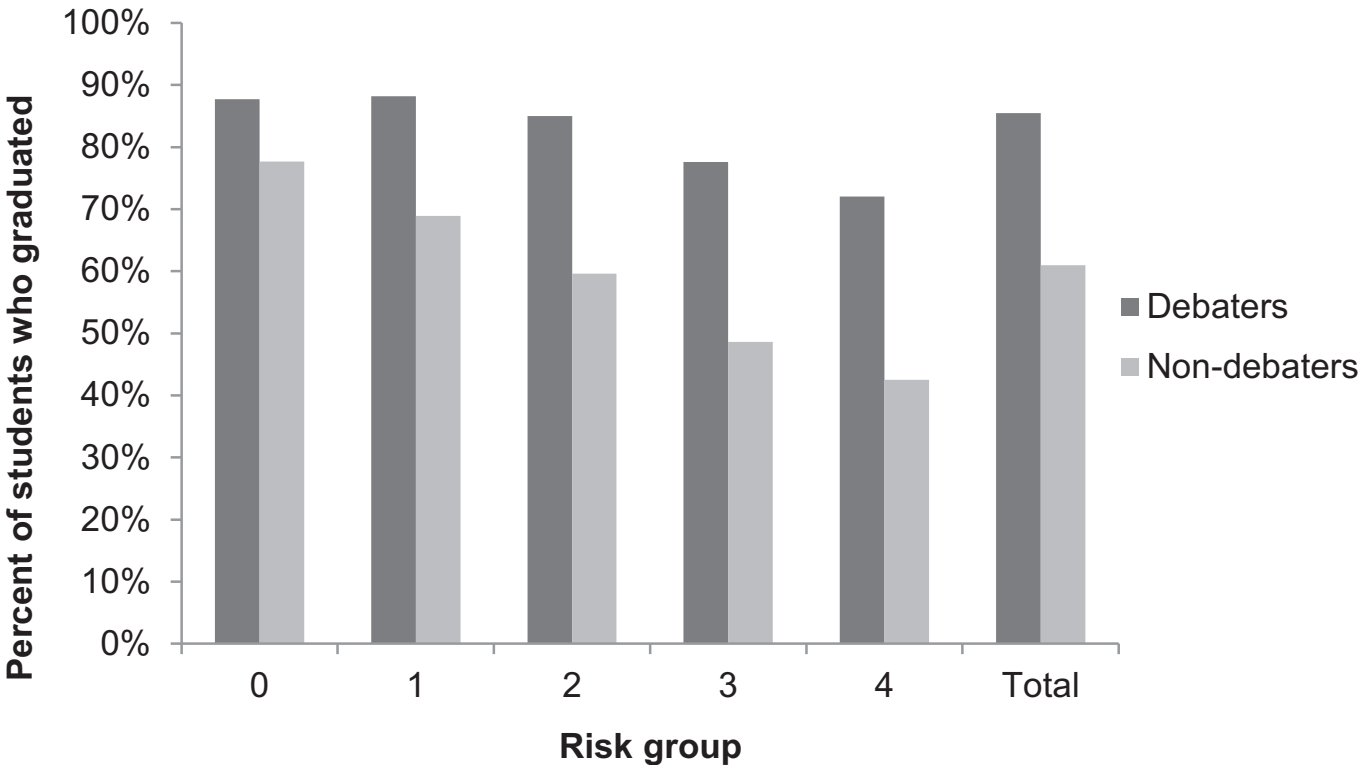

Fig. 1. Percent of students graduated by risk group and debater status, Chicago, 1997–2008.

Table 2
Association between debate participation and ACT performance by section.

		English ACT		Math ACT		Reading ACT		Science ACT	
		Model 1 β (SE)	Model 2 β (SE)	Model 1 β (SE)	Model 2 β (SE)	Model 1 β (SE)	Model 2 β (SE)	Model 1 β (SE)	Model 2 β (SE)
Debate participant (*ref: no*)	Debater	1.94 (0.13)***	1.42 (0.13)***	0.86 (0.12)***	0.55 (0.11)***	2.00 (0.15)***	1.57 (0.14)***	1.34 (0.12)***	0.98 (0.11)***
Race/ethnicity (*ref: White*)	Black	−5.25 (0.20)***	−1.80 (0.18)***	−4.76 (0.16)***	−2.36 (0.15)***	−4.99 (0.20)***	−1.82 (0.19)***	−4.14 (0.16)***	−1.77 (0.15)***
	Latino	−5.50 (0.21)***	−2.95 (0.19)***	−4.20 (0.16)***	−2.39 (0.16)***	−5.08 (0.21)***	−2.70 (0.19)***	−3.87 (0.17)***	−2.14 (0.16)***
	Other	−0.81 (0.30)*	0.04 (0.26)	1.16 (0.24) ***	1.78 (0.21)***	−0.99 (0.31)**	−0.17 (0.27)	0.25 (0.24)	0.81 (0.21)***
Gender (*ref: men*)	Women	0.66 (0.13)***	0.49 (0.11)***	−0.59 (0.10)***	−0.70 (0.09)***	0.39 (0.14)*	0.24 (0.12)*	−0.35 (0.11)***	−0.47 (0.09)***
Age (*years*)		−3.77 (0.16)***	−9.75 (0.23)***	−2.31 (0.12)***	−0.99 (0.12)***	−3.22 (0.16)***	−1.42 (0.15)***	−2.57 (0.13)***	−1.16 (0.12)***
Risk group (*ref: zero*)	1		−3.64 (0.18) ***		−2.70 (0.15)***		−3.54 (0.19)***		−2.36 (0.15)***
	2		−6.09 (0.20) ***		−4.52 (0.16)***		−5.90 (0.21)***		−4.15 (0.16)***
	3		−9.75 (0.23) ***		−6.74 (0.19)***		−8.78 (0.25)***		−6.67 (0.19)***
	4 or 5		−11.5 (0.26) ***		−7.55 (0.21)***		−10.4 (0.28)***		−7.87 (0.22)***
R-squared		0.21	0.44	0.23	0.40	0.18	0.37	0.20	0.38
F-value		307.0***	544.1***	343.5***	447.7***	248.2***	393.0***	279.3***	412.2***
Total *N*		6932	6932	6932	6932	6930	6930	6927	6927

*$P < .05$, **$P < .01$, ***$P < .001$.

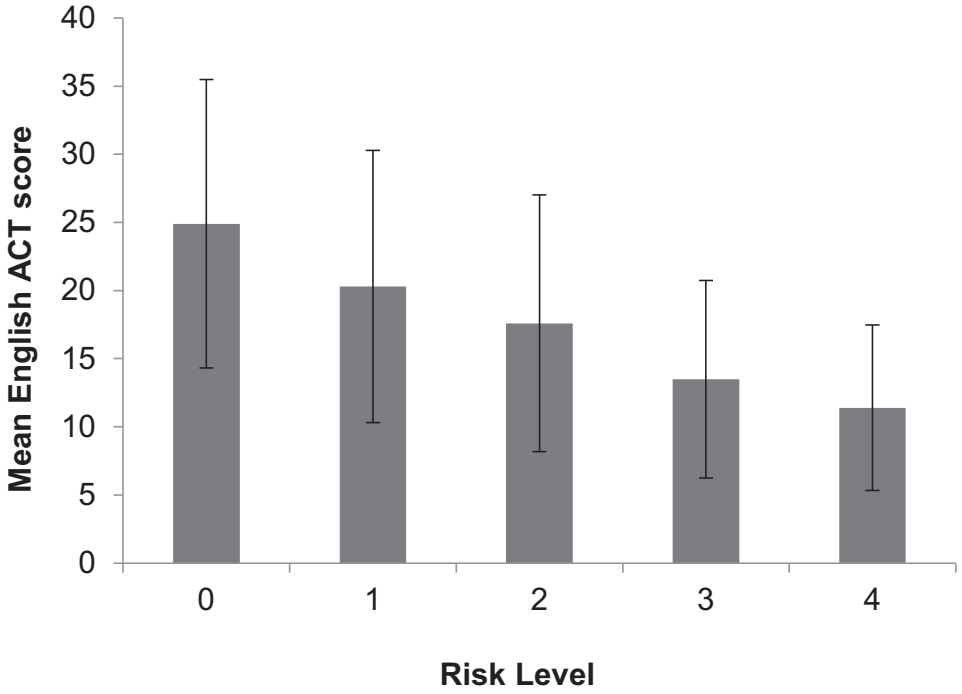

Fig. 2. Mean English ACT score by risk level, Chicago, 1997–2007.

Examining the influence of debate intensity on academic performance

High school graduation

Among debaters, both dimensions of participation intensity – *quantity of participation* (e.g., number of rounds completed and number of tournaments attended) and *competitive success* (e.g., winning percentage and number of times a student finished in the top weight teams) – were significant associated with likelihood of graduating (Table 3). Greater quantity of participation in debate (indicated by number of rounds debated) was a stronger predictor of high school completion than competitive success (indicated by wins-ratio) (OR: 1.55 for quantity vs. OR: 1.15 for competitive success). Analyses substituting number of tournaments for number of rounds, and number of times a student finished in the top eight teams for win-ratio, were consistent with these findings.

Performance on the ACT

Table 4 describes the association between debate intensity, represented by rounds debated and wins-ratio, and scores on the English, Mathematics, Reading, and Science sections of the ACT. Both number of rounds and wins-ratio were significant predictors of ACT scores, although the effect estimate of the latter was larger. Similarly, both number of rounds and wins-ratio

Table 3
Association between debate intensity and high school completion outcomes among debate participants.

	Graduate		Drop out	
	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 1 OR (95% CI)	Model 2 OR (95% CI)
Total rounds	1.63 (1.39–1.91)***	1.55 (1.31–1.83)***	0.72 (0.59–0.87)***	0.79 (0.65–0.97)*
Model chi-square	117.3***	121.1***	99.8***	105.3***
−2 log likelihood	1727.0	1687.7	1141.3	1110.5
Wins-ratio	1.29 (1.14–1.46)***	1.15 (1.01–1.30)*	0.71 (0.61–0.83)***	0.76 (0.64–0.90)**
Model chi-square	89.3***	121.1***	99.8***	105.3***
−2 log likelihood	1719.5	1687.7	1116.0	1110.5
Total graduated/dropped out	1878	1878	174	174
Total *N*	2194	2194	2194	2194

Model 1 for each outcome (graduate or drop out) adjusts for age, sex, race and risk score, but includes only one measure of debate intensity (total rounds or wins-ratio). Model 2 adjusts for age, sex, race, and risk score and includes both measures of debate intensity (total rounds and wins-ratio).
*$P < .05$, **$P < .01$, ***$P < .001$.

Table 4
Association between debate intensity and ACT performance among debate participants.

	English ACT		Mathematics ACT		Reading ACT		Science ACT	
	Model 1 β (SE)	Model 2 β (SE)	Model 1 β (SE)	Model 2 β (SE)	Model 1 β (SE)	Model 2 β (SE)	Model 1 β (SE)	Model 2 β (SE)
Total rounds	0.58 (0.11)***	0.41 (0.11)***	0.41 (0.09)***	0.28 (0.09)**	0.88 (0.12)***	0.70 (0.12)***	0.53 (0.09)***	0.40 (0.09)***
R-squared	0.36	0.39	0.36	0.39	0.29	0.33	0.33	0.35
F-value	99.23***	103.2***	101.0***	100.1***	73.3***	78.1***	86.9***	85.6***
Wins-ratio	1.29 (0.11)***	1.16 (0.12)***	0.93 (0.10)***	0.84 (0.10)***	1.45 (0.12)***	1.23 (0.13)***	0.91 (0.09)***	0.79 (0.10)***
R-squared	0.39	0.40	0.39	0.39	0.32	0.33	0.35	0.35
F-value	111.34***	103.2***	108.8***	100.1***	80.9***	78.1***	91.3***	85.6***
Total *N*	1729	1729	1729	1729	1728	1728	1728	1728

Model 1 for each outcome (English, Mathematics, Reading and Science ACT score) adjusts for age, sex, race and risk score, but includes only one measure of debate intensity (total rounds or wins-ratio). Model 2 adjusts for age, sex, race, and risk score and includes both measures of debate intensity (total rounds and wins-ratio).
*$P < .05$, **$P < .01$, ***$P < .001$.

were significantly associated with likelihood of reaching the college-readiness benchmark on each section of the ACT. Fig. 3 illustrates the relationship between wins-ratio and score on the English ACT by risk index. Although average ACT score decreased as risk index increased, wins-ratio was significantly associated with higher test scores for all risk groups.

Discussion

The primary finding from this study is that students who participated in the Chicago Debate League were more likely to graduate from high school and less likely to drop out than students who did not participate in debate. This association persisted after accounting for the risk index, which included key indicators that strongly predict student academic performance: prior achievement, poverty, and special education status. In analyses stratified by risk index, debaters were significantly more likely to graduate than non-debaters in every risk group; there was no evidence that the association between debate and high school completion varied as a function of risk index (e.g., both high and low-risk students benefited equally from participating in the activity). These findings suggest that debate participation may be an effective tool for maintaining or increasing school engagement even among students most at-risk for dropping out of high school.

Students who participated in debate had significantly higher scores on all sections of the ACT after adjusting for demographic and risk variables. The ACT reports that a difference of 0.5 points is "practically important" for post-secondary scholastic performance (ACT, 2006), and debate participation was associated with expected score differences greater than this threshold on each section of the test. Debaters were also more likely to reach the college-readiness benchmark on the English, Reading, and Science sections of the ACT. It is noteworthy that debaters in every risk index group were more likely to reach the college-readiness benchmark on the English, Reading, and Science sections of the ACT. That is, debate was associated with greater college-readiness, as indicated by this test, even among at-risk students.

Consistent with these results, more intense participation was associated with better academic performance. Quantity of debate participation, indicated by number of rounds completed, and competitive success at the activity, indicated by the ratio of wins-ratio debated, were both significantly associated with likelihood of graduating high school and performance on the

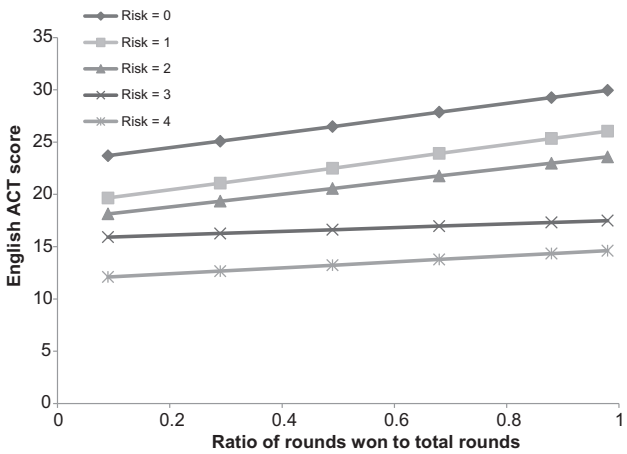

Fig. 3. Ratio of rounds won to total rounds debated by English ACT score among CDL debaters, 1997–2007.

ACT. Competitive success was more strongly related to ACT performance than number of rounds debated, consistent with the notion that the skills practiced as part of successful debating are concordant with the skills tested on this college entrance exam. However, participation, measured by total rounds debated, remained significantly associated with graduation even after accounting for competitive success. It has been argued that the positive association between co-curricular activities and achievement may be weaker or nonexistent for less successful participants (Feldman & Matjasko, 2005); however, our findings reflect a positive association between amount of participation and likelihood of graduation, regardless of how successful students were at debate.

Limitations and strengths

These findings should be interpreted in light of study limitations. The graduation rates reported in this study may differ from those reported by CPS because of differences in the way in which these statistics were calculated. Students who transfer out of CPS are excluded from some graduation reports, whereas this study included transfer students. Also, only schools with debate programs were included in the study. These results may not be generalizable in rural, suburban, or less diverse school districts. Additionally, although analyses adjusted for and examined interactions between debate and the risk index, which included 8th-grade standardized test performance, special education status, and student and neighborhood poverty, there are components of self-selection into debate may not have been fully addressed. Without a randomized controlled experiment it is impossible to assess the degree of this bias; however, another analysis of this data found significant associations between debate participation and achievement using propensity score techniques to explicitly account for self-selection (Mezuk et al., 2011), indicating that these findings are robust to such bias. Finally, although the ACT is a valid indicator of college-readiness, we acknowledge that multi-dimensional measures of college preparedness are important to consider. This study also has a number of strengths. The sample is large, followed over a 10-year period, and representative of the CPS district. It also examined multiple indicators of achievement and of debate participation, which provide more robust evidence of the association between debate and academic performance.

Participation in an UDL has the potential to interrupt the intergenerational cycle of low parental SES determining their children's educational attainment and subsequent social status in adulthood (Melby et al., 2008). While previous research has indicated that some co-curricular activities have weaker effects for racial/ethnic minorities and women (Feldman & Matjasko, 2005), our results indicate that debate participation is significantly associated with greater likelihood of graduation and better ACT performance regardless of students' race/ethnicity or gender. More importantly, Feldman and Matjasko reported inconsistent results of co-curricular activities' association with school engagement for at-risk students (2005), and our analysis shows no difference in the association between debate and college-readiness based on at-risk status.

The organization and structure of UDLs may contribute to the association between debate and academic achievement. Previous research has shown that structured activities, such as varsity sports, are associated with better outcomes than unstructured activities, such as intramural sports (Feldman & Matjasko, 2005). Debate is a structured activity that involves an adult mentor (coach) and reinforces academic skills in a competitive manner. Although students with stronger verbal and language skills may self-select into debate programs (Mezuk et al., 2011), debate itself reinforces academic language skills, which may be why debate was most strongly associated with better performance on the English and Reading portions of the ACT.

These results are consistent with the hypothesis that urban debate programs offer an opportunity to improve school engagement and reduce educational disparities among at-risk adolescents. UDLs may present an opportunity to impact educational attainment while students are in high school, as opposed to earlier in the academic life course. Because educational attainment has repercussions for social status and outcomes in adulthood, including health and well-being (Krieger, Chen, Waterman, Rehkopf, & Subramanian, 2005; Williams & Jackson, 2005), public health researchers and policymakers should work with educators to evaluate the long-term effects of programs and interventions that aim to improve educational attainment for at-risk adolescents.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.adolescence.2012.04.005.

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