BREAKTHROUGH AUSTIN

IMPACT STUDY

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EXECUTIVE SUMMARY

Breakthrough Austin is a college preparation program for low-income students who will be the first in their families to graduate from college. Sixth-grade students are selected for participation based on their grades, state assessment performance, regular school attendance, and teacher recommendations. The program begins serving students during the summer before 7th grade through a rigorous academic bridge program and continues a multi-year commitment to students by providing them the academic and social support they need to graduate from high school and enroll in college.

The present evaluation study examined three cohorts of Breakthrough program students to determine, (a) if there is evidence of program selectivity when comparing Breakthrough participants to other students who attended the same 6th grade campuses, (b) Breakthrough students' likelihood of graduating from high school and enrolling in college after accounting for their demographic, academic, and behavioral characteristics, and (c) the incremental impact of Breakthrough participation after accounting for these same characteristics.

The main results are as follows:

Program selectivity

- Breakthrough participants were similar to other students from the same 6th grade campuses according to their ethnicity and economic disadvantage.

- Breakthrough students were more likely to be female, to be in magnet programs and to pass the reading and math state assessments than other students from the same 6th grade campuses. Breakthrough students also had higher average grades in reading and math and better daily attendance than other students.

- Breakthrough students were less likely to participate in special education programs and less likely to have a disciplinary referral than other students from the same 6th grade campuses.

Likelihood of high school graduation and college enrollment

➢ After accounting for student characteristics, Breakthrough students were 3.5 times more likely to graduate from high school, rather than drop out, in comparison to other students from the same 6th grade campuses.

➢ After accounting for student characteristics, Breakthrough participants were 1.98 times more likely to enroll in college, rather than not be enrolled, in comparison to other students from the same 6th grade campuses.

Incremental impact on high school graduation and college enrollment

➢ *Among students with a propensity to be served by the program*, Breakthrough has the largest incremental impact on high school graduation (+18%) among students with slightly lower academic achievement and attendance rates, and slightly higher rates of disciplinary referrals than other students.

➢ *Among students with a propensity to be served by the program*, Breakthrough has the largest incremental impact on college enrollment (+63%) among students who met 6th grade academic achievement standards, who had good attendance and good behavior, but who were not served by district magnet programs.

➢ *Among students with a propensity to be served by the program* who also were served by district magnet programs, Breakthrough program participation had a little impact on high school graduation (+3%); however, participation had a modest positive impact on college enrollment (+16%).

INTRODUCTION

Regardless of socioeconomic status (SES), children who have strong academic backgrounds are more likely to graduate from high school and enroll in and succeed in college then those that do not (National Center for Educational Statistics, 2001). It is also the case that students from low-income families often lack the social capital needed to navigate the complicated road of seeking academic support, selecting rigorous high school courses, applying to college, seeking and obtaining financial aid, and other aspects of preparing for postsecondary education (Coleman, 1988; Cabrera & La Nasa, 2000; Cabrera & La Nasa, 2001).

Breakthrough Austin's (Breakthrough) mission is to provide a path to college for low-income students who will be the first in their families to graduate from college. Breakthrough provides students the extensive personal and academic supports they need to strive for academic excellence, to graduate from high school, and to apply for and enroll in college. The program model comprises a suite of research-based services that promote student success including early intervention, case management, and academic supports outside of school.

Early intervention. In contrast to college-preparation programs that begin in high school (Dynarski, Gleason, Rangarajan, & Wood, 1998) Breakthrough begins program services in middle school. Early intervention often is necessary for low-income students, because even those who appear to be making adequate academic progress in elementary and middle school according to their grades and meeting minimum standards on state assessments may, in fact, not be on track to acquire the skills needed to be successful in rigorous high school coursework.

There is considerable evidence that middle school intervention programs that provide extensive academic supports, particularly in reading and writing, are highly effective at reducing the likelihood of truancy, grade level retention, and dropout (Schargel & Smink, 2001). In contrast, intensive high school programs often do not show the same effects (Dynarski et al, 1998). Breakthrough programs begin immediately after the 6th grade with a rigorous

summer academic enrichment program designed to address any skill deficits that students may have accumulated in the core academic areas of English, math, science, and social studies.

Case management. Upon entering Breakthrough, each student is assigned a case manager, another best practice to help low-income students succeed academically and to graduate from high school (Dynarshi, Clark, Cobb, Finn, Rumberger & Smink, 2008). Breakthrough case managers support students in several important ways. First, they serve as an adult advocate within the school system, for example, by advising them to register for rigorous coursework. They also play an important role in monitoring students' daily school attendance and grades, and holding students accountable for their schoolwork.

Through their frequent interaction with students, case managers have many opportunities to model positive behavior and long-term, goal-oriented decision-making skills that are often in contrast to those modeled by peer groups at school. Case management support has been consistently associated with increased school attendance rates and improved course grades among low-income and ethnic minority students (Dynarshi, Clark, Cobb, Finn, Rumberger & Smink, 2008; Larson & Rumberger, 1995; Sinclair, Christianson, Evelo, & Hurley, 1998).

Academic support out of school. Through Saturday and after school tutoring, Breakthrough directly addresses students' academic skill deficits and supports ongoing academic success. There is substantial evidence that when tutoring programs are aligned academically with the school day and when they provide a sufficient time investment, i.e., 45 hours or more of tutoring each academic year, participating students are more likely to graduate from high school and enroll in college than students who do not receive the out of school tutoring support (Beckett, Borman, Capizzano, Parsley, Ross, Schirm, & Taylor, 2009; Constantine, Seftor, Martin, Silva & Myers, 2006; Lauer, Akiba, Wilkerson, Apthorp, Snow, & Martin-Glenn, 1995).

BREAKTHROUGH AUSTIN IMPACT STUDY

Breakthrough is a college preparation program for low-income students who will be first generation college graduates. Sixth-grade students apply to Breakthrough and are selected for participation based on their grades, state assessment performance, regular school attendance, and teacher recommendations. The program begins serving students during the summer before 7th grade through a rigorous academic bridge program and continues a multi-year commitment to students by providing them the academic and social support they need to graduate from high school and enroll in college. Breakthrough Austin admitted its first class in the summer of 2002, and currently serves over 350 students in grades seven through twelve, across several Central Texas school districts, in addition to the three classes of high school graduates. Breakthrough Austin's program goals are for at least 90% of participating students to graduate from high school and for at least 80% of them to enroll directly in college.

The purpose of the present evaluation study is to estimate the impact of Breakthrough program participation on high school graduation rates and college enrollment after accounting for students' pre-participation demographic, academic, and behavioral characteristics. Because of the logistical challenges associated with obtaining approval to conduct research and evaluation projects using school district data and because the majority of students served by Breakthrough during the 2001-2002, 2002-2003, and 2003-2004 school years were enrolled in the Austin Independent School District (AISD), the present study is limited to program and comparison students who were enrolled in AISD.

The three research questions that this report seeks to answer are:

Phase I. Selectivity Analyses:

Are Breakthrough students significantly different from other students at the same 6th grade campuses before they begin the program?

Phase II. Likelihood and Incremental Impact Analyses:

A. What is the likelihood of high school graduation and college enrollment among Breakthrough students in comparison to other students after controlling for 6th grade demographic, academic, and behavioral characteristics?

B. What is the incremental impact of Breakthrough participation on high school graduation and college enrollment?

METHOD

Because it was not possible to retroactively design a random assignment experiment to determine the impact of Breakthrough participation on students' likelihood of graduating from high school and enrolling in college, and because of the logistical and ethical challenges associated with this research method, several non-experimental methods were used to estimate program effects after accounting for as many 6th grade student characteristics as possible.

Participants

The participants in this study were the 3487 students who were enrolled in 6th grade in the Austin Independent School District (AISD) across the 2001-2002 (Cohort 1), 2002-2003 (Cohort 2) and 2003-2004 (Cohort 3) school years (Table 1). Within the study population, 131 students were selected to participate in Breakthrough programs either at the end of 6th grade (n = 122) or the end of 7th grade (n = 9). The remaining students (n = 3356) comprise all other students who were enrolled in 6th grade at the same campuses, during the same cohort years, as the Breakthrough participants. Across the three cohorts, 718 students (21%) attended 6th grade on an elementary campus and the remainder, 2769 students (79%), attended 6th grade on a middle school campus.

Table 1 shows the number of Breakthrough participants and comparison students by campus and 6th grade cohort year. The full population was used in the selectivity analyses (Phase I); however, only the subsample of students who either graduated from or dropped out of Austin ISD was used to address the evaluation questions concerning the likelihood of

graduation and college enrollment and the incremental impact of program participation. The

analysis subsample is described in the next section.

Table 1. Number of Breakthrough (BT) and Comparison (Other) students who were enrolled in Austin Independent School District, by 6th grade cohort year.

Campus	Cohort 1: 2001-2002		Cohort 2: 2002-2003		Cohort 3: 2003-2004		Total
	BT	Other	BT	Other	BT	Other	
Allison Elementary	6	43	3	46	5	36	139
Blackshear Elementary					3	46	49
Brown Elementary					2	14	16
Campbell Elementary			2	82	1	60	145
Dobie Middle School	11	290					301
Fulmore Middle School	10	346	20	339	10	310	1035
Govalle Elementary			3	36			39
Lee Elementary			1	50			51
Maplewood Elementary			2	41	1	41	85
Martin Middle School			5	117	8	219	349
Mendez Middle School	4	303					307
Metz Elementary	9	69	8	65			151
Pearce Middle School					6	266	272
Webb Middle School	2	247	1	255			505
Zavala Elementary					8	35	43
Grand Total	42	1298	45	1031	44	1027	3487

Note. Sixth grade students from Cohorts 1, 2, and 3 were expected to graduate from high school in the Spring of 2008, 2009, and 2010 respectively.

Records used in the likelihood of high school graduation, college enrollment, and incremental program impact analyses (Phase II). To answer these evaluation questions, the number of students available for analysis was reduced; only students who remained in AISD until they graduated or dropped out were included in these analyses (n = 1991). Students who left the district for any other reason, e.g., transferred to another school district, returned to their home country, etc., or for whom there was no clear leave reason specified in district records were excluded from these analyses.

Also for this set of analyses, Breakthrough participation was refined to include only students who remained enrolled in AISD *and* continued to participate in the program until they graduated or dropped out of AISD, i.e., they received full program treatment. Students who remained in AISD but who withdrew from Breakthrough for any reason were considered non-program participants in the high school graduation, college enrollment, and incremental program impact analyses. Although Breakthrough staff continued to provide services to program students if they left AISD, the analysis sample necessarily was limited to Breakthrough and comparison students for whom there were AISD administrative records; the final outcomes for all non-AISD students are censored within the context of this evaluation.

Redacted records. As of the 2008-2009 school year, AISD has offered families the option to opt-out of sharing deidentified student records for external research and evaluation projects. If parents or guardians desire to opt-out of data sharing, they complete the appropriate form and return it to the district along with other student registration forms. This preference is then entered into the student information system, so district staff can identify which records to withhold from all data requests. These opt-out requests are tied to records created during the school year for which the student is enrolled and therefore may change from year to year. All Breakthrough student families provide active consent to share education

records upon enrollment in the program, so no Breakthrough student records were redacted because of the external research opt-out provision.

As shown in row 3 of Table 2, there were 167 comparison students whose final outcome data was redated due to the external research opt-out provision, which accounts for about 9% of the Phase II comparison group. The vast majority of the redacted records (n = 144) were for students who were 12th graders in 2009-2010; therefore, it is very likely that their final district leave reason was graduation. This systematic pattern of missing data must be taken into account when interpreting the results of this evaluation, the most likely result being a slight overestimation of Breakthrough program effects on high school graduation.

Table 2. Number of Breakthrough and comparison students in the high school graduation, college enrollment, and program impact analyses by final leave reason from Austin Independent School District (AISD)

Final outcome	Breakthrough Active	Deactivated with Breakthrough	Other students	Total
	Participants	Comparison students		
Graduation	85	4*	1258	1347
Dropout	3	2*	472	477
Leaver reason redacted	0	0	167	167
Total Phase II Analysis sample	88	1903		1991
Withdrew from AISD	21	16	1231	1268
Leave reason unclear	0	0	228	228
Total censored cases	21	1475		1496
Grand total	109	22	3356	3487

*Note. *Students who deactivated with Breakthrough but remained in AISD were considered non-participants in the high school graduation, college enrollment, and incremental impact analyses.*

Measures

Dependent Variables

High school graduation. Students were identified as high school graduates in AISD records if they met the Texas Education Agency (TEA) criteria for graduation at any time during the requested school years, i.e., August 2001 through August 2010. Evaluation questions regarding "on-time" graduation were not addressed in this study because of different definitions of on-time that are used by TEA and Breakthrough Austin. Texas public school students who meet graduation requirements by August following their 12th grade year are considered part of their 4-year graduation cohort, whereas Breakthrough considers on-time graduation May or June of the senior year. Of the 109 Breakthrough students included in the graduation v. dropout analyses, there was 100% correspondence between district and program records with regard to student graduation. For the Phase II analyses, students who met state graduation requirements were coded as *graduate* = 1. If the final leave reason was redacted, graduate was coded as missing.

High school dropout. Students were identified dropouts in the analysis data set if the last leaver reason in AISD records was *dropout* and the district records included a dropout date (month and year). If district records had a dropout indicator, but no associated date, the final status for the purpose of this study was considered *unclear* and the student records were removed (n = 228); the result of which may be an underestimate of Breakthrough program impact on graduation in comparison to dropout. Of the 109 Breakthrough students included in the graduation v. dropout analyses, there was 100% correspondence between district and program records with regard to student dropout. For the Phase II analyses, these students who dropped out were coded as *graduate* = 0.

College enrollment. Students were identified as college enrollees in the Phase II data set according to AISD college enrollment records through December 2010. The source of AISD college enrollment information is the National Student Clearinghouse (NSC). For the Phase II

analyses, students were coded as *enrolled* (1) or *not enrolled* (0); students with missing data on college enrollment were excluded from these analyses.

Of the 109 students Breakthrough students included in these analyses, there was 57% correspondence between district and program records with regard to college enrollment. This disparity is due, in part, to the fact that Breakthrough Austin remains in direct contact with students after graduation and therefore has more up-to-date information on student enrollment status than the district. Although the NSC database is fairly inclusive, it does not include data from every college, university, and technical school in the US, including several large universities in Texas. Both AISD and Breakthrough records indicate the type of college in which students enrolled, i.e., 2-year, 4-year; however, no analyses were conducted regarding the type of college enrollment due to concerns about data quality and completeness.

Independent Variables

Breakthrough program participation (Phase I). Students who were accepted as *Breakthrough participants* (1) during their 6th or 7th grade school year were coded as '1' in the selectivity analysis. All other students were coded as *comparison students* (0).

Full Breakthrough program participation (Phase II). Students who remained active *Breakthrough participants* (1) until they graduated or dropped out of AISD were coded '1' in the likelihood and incremental impact analyses. All other AISD graduates and dropouts, including deactivated Breakthrough students were coded as *comparison students* (0).

Gender. Students were identified as male or female by their parent or guardian upon enrollment in the district. In the analysis data sets, *male* = 1 and *female* = 0

Ethnicity. Parents or guardians specified student ethnicity upon enrollment in the district. The analysis data sets contains three dummy codes based on TEA race/ethnicity variables in use during these students' 6th grade year: *Hispanic*, *African American*, or *other* (the aggregation of *Native American*, *Asian*, and *White*)

Economic disadvantage. Students were classified as economically disadvantaged if their parent or guardian applied for and the student was approved to receive free or reduced-priced lunch according to criteria set by the US Department of Agriculture during the students 6th grade year. In the analysis data sets, *economic disadvantage* = 1 and *not economically disadvantaged* = 0.

Magnet program participation. Magnet participation is the only independent variable that was collected as of the students' 7th grade year, i.e., after Breakthrough program admission, because 6th grade magnet participation data was not available for these cohort school years. All magnet students from these analysis cohorts were enrolled in the specialized academic program at Fulmore Middle School. In the analysis data sets*, magnet student* = 1 and *non-magnet student* = 0.

Special education. Students were identified as special education students if they were enrolled in special education programs or in general education programs that used special education support services during their 6th grade year. In the analysis data sets, *special education* = 1 and *general education* = 0.

Texas state academic proficiency assessments in reading and math. Students from the first two cohorts included in this study were tested with the Texas Assessment of Academic Skills (TAAS) as 6th graders; however, students from the third cohort were tested using the Texas Assessment of Knowledge and Skills (TAKS). Because scale scores on the two assessments are not directly comparable, we examined student academic performance in reading and math according to whether the student met the passing standard the school year they were tested. In the analysis data sets, *met passing standard* = 1 and *did not meet the passing standard* = 0.

Course grades in reading and math. The district provided the requested final course grades records, on a 0-100% scale, in reading and math during the 6th grade year; however, at the time these three cohorts of students were enrolled, AISD elementary campuses did not

maintain electronic grade records. Final reading and math grades are included in the selectivity analyses (Phase I), but because grade reports were missing for all students enrolled in 6th grade on elementary campuses, student grades are not included in the likelihood analyses or incremental impact analyses to avoid the systematic loss of a large number of cases.

Disciplinary event. Students have an indicator for whether they had one or more TEA required disciplinary referrals during their 6th grade year. In the analysis data sets, *student had one or more discipline referrals* = 1 and *no disciplinary referrals* = 0. Campus discretionary discipline referrals are not included in these analyses because referral rates are known to vary from campus to campus.

Annual attendance rate. The 6th grade annual daily attendance rate was calculated by dividing the number of days each students attended school by the number of days each student was enrolled in the district.

Analysis Plan

Phase I – Selectivity. To address the evaluation question regarding Breakthrough program selectivity, we used analysis of variance (ANOVA) for continuous variables and Pearson chi-square for dichotomous variables to determine if Breakthrough students differed from other 6th grade students on the same campuses before they enrolled in the program. The analysis included a range of 6th grade demographic, academic achievement, and behavioral indicators known to be associated with later high school graduation and college enrollment.

Phase IIA - Likelihood of high school graduation and college enrollment. Logistic regression was used to estimate the likelihood that Breakthrough students would graduate from high school rather than drop out and the likelihood that they would enroll in college in comparison to not enrolling in college, after controlling for a range of 6th grade demographic, academic achievement, and behavioral characteristics, including attendance and discipline, that are known to be associated with later high school graduation and college enrollment.

Phase IIB- Program incremental impact. In order to estimate the incremental

impact of Breakthrough program participation on high school graduation and college

enrollment, we used a multistep procedure in STATA 11 (Leuvern & Sianesi, 2003). First,

students' 6th grade demographic, academic achievement, and behavioral characteristics were

used to estimate the conditional probability (propensity) that students would participate in

Breakthrough, whether they actually participated or not. Second, we used the propensity block

procedure to assign participants and non-participants to groups in which they were not

significantly different from each other according to their propensity to be served by the

program, and their demographic, achievement, and behavioral characteristics. Third, within

propensity block group, the percentage of Breakthrough students who graduated from high

school or enrolled in college was compared to the percentage of non-participants who graduated

from high school or enrolled in college.

RESULTS

Results are grouped according to the evaluation question they were designed to answer.

The entire Phase I analysis population was used to answer the question about selectivity, but

the reduced Phase II sample that included only students who graduated or dropped out of

AISD was used to answer the second and third questions.

Phase I: Are Breakthrough students significantly different from other students at the same schools before they begin the program?

The selectivity analysis was conducted for all students in the study sample and then

repeated for each cohort sub-sample separately to determine if there were differences across

cohorts. Results for the entire Phase I sample are presented in Table 3; if the comparison also

was significant within a cohort group, the cohort for which the comparison was statistically

significant is indicated in the final column of the table.

Across the entire study sample and the three cohorts, Breakthrough students were not

significantly different from other students on the same campuses with regard to their ethnicity

or economic disadvantage. The majority of students in both groups were Hispanic or African American and the majority of both groups were economically disadvantaged, which confirms that the program effectively targeted students from populations that are less likely to graduate from high school and enroll in college. In only one case, this pattern did not hold; Breakthrough students from Cohort 1 were more likely to be African American than other students from the same campuses.

Although the program effectively targeted students from demographic groups who were likely to benefit from an intensive program designed to help them graduate from high school and enroll in college, there is evidence of selectivity with regard to key academic and behavioral characteristics. In fact, across the full sample, Breakthrough students were significantly different from other 6th grade students on the same campuses with regard to all remaining demographic, academic, and behavioral characteristics. Breakthrough students were more likely to be female, to participate in magnet programs, and to pass the reading and math state assessments than would be expected within these schools. Breakthrough students were less likely to participate in special education programs and were less likely to have a disciplinary referral than would be expected on these campuses. Breakthrough students also had higher average grades in reading and math and had better daily attendance than other students on the same campuses. There were a few exceptions within Cohort 1; Breakthrough students who were in 6th grade in 2001-2002 did not differ from other students with regard to their final math course grades, the proportion of students with a disciplinary referral, or average daily attendance rate.

These results are not surprising given the criteria for Breakthrough program acceptance, but they strongly confirm the need to include cohort year and pre-participation demographic, academic, and behavioral characteristics as covariates in the analyses designed to estimate the associations between program participation and high school graduation or college enrollment.

Table 3. Breakthrough students' pre-participation demographic, academic achievement, and behavioral characteristics in comparison to all other 6th grade students at the same campuses

Student Characteristic	Breakthrough (BT) (n 131)		Other students (O) (n 3356)		Significance tests	Sig. Tests within cohort
Demographics	N	Percentage	N	Percentage		
Female	87	66.4%	1691	49.6%	BT > O***	2001, 2002, 2003
Male	44	33.6%	1665	50.4%	BT < O***	2001, 2002, 2003
Other Ethnicity	12	9.2%	342	10.2%	*ns*	
African American	27	20.6%	627	18.7%	*ns*	2001 BT > O*
Hispanic	92	70.2%	2387	71.1%	*ns*	
Economic Disadvantage	99	76.7%	2510	79.4%	*ns*	
Academics	N	Pct./Average	N	Pct./Average		
Magnet student (7th grade)	53	40.5%	2844	15.3%	BT > O***	2001, 2002, 2003
Special Education	4	3.1%	665	19.8%	BT < O***	2001, 2002, 2003
Passed State Reading Assessment	123	94.6%	1867	71.6%	BT > O***	2001, 2002, 2003
Passed State Math Assessment	117	92.9%	1788	68.6%	BT > O***	2001, 2002, 2003
Final Reading Course Grade	77	89.8%	2598	85.5%	BT > O***	2001, 2002, 2003
Final Math Course Grade	77	87.6%	2615	81.5%	BT > O***	2002, 2003
Behavior	N	Pct./Average	N	Pct./Average		
One or More Disciplinary Referrals	16	12.2%	936	27.9%	BT < O***	2002, 2003
Attendance Rate	131	97.3%	3356	95.2%	BT > O***	2002, 2003

Note. These n's represent the number of students with each characteristic; although the denominator used to calculate the frequencies varied slightly across indicators as a result of missing data. The n associated with averages is the total number of students with data for that indicator.

* p < .05, ** p <.10, ***p < .001

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Phase IIA: What is the likelihood of high school graduation and college enrollment among Breakthrough students in comparison to other students after controlling for 6th grade demographic, academic and behavioral characteristics?

Before conducting logistic regressions to estimate the Breakthrough students' likelihood to graduate from high school and enroll in college, we examined the correlation matrix of all independent and dependent variables to determine if there might be problems of multicolinearity among some of the independent variables. Among the Phase II independent and dependent variables, the highest correlation was between 6th grade course grades in math and reading (r = .554); however, because course grades were not to be included in the analyses due to systematically missing data, this was not a cause for concern. The correlation between passing the reading state assessment and the math state assessment was also moderately high, but the logistic procedure in STATA 11 did not detect multicolinearity between these two variables; both were retained in the final model. The full correlation matrix is included in Appendix A.

The results of logistic regression analyses predicting high school graduation are presented in Table 4. After accounting for pre-participation demographic, academic, and behavioral characteristics, students who remained active Breakthrough participants were 3.5 times more likely to graduate from high school than to drop out, in comparison to students who did not participate. It is important to note the wide confidence interval associated with this estimate, i.e., 1 to 11 times more likely to graduate. An interval this large indicates that it was difficult for the procedure to calculate an accurate odds ratio, most likely due to the small sample of Breakthrough participants in the analysis (n = 89). The most appropriate way to think about these

> *After accounting for pre-participation demographic, academic, and behavioral characteristics, students who remained active Breakthrough participants were 3.5 times more likely to graduate from high school than to drop out, in comparison to students who did not participate.*

results is that there is an increased likelihood of graduation even after accounting for program selectivity and to consider the odds ratio of 3.5 as a rough estimate of program effectiveness. To obtain a firmer estimate, we strongly recommend replicating these analyses with a larger participant group. Students who participated in the district magnet program, those who passed reading or math state assessments, and those with regular attendance also were more likely to graduate from high school than students without these characteristics. Students with a disciplinary referral in 6th grade were only one third as likely to graduate from high school compared to those who did not.

The results of logistic regression analyses predicting the likelihood of college enrollment are presented in Table 5. After accounting for pre-participation demographic, academic, and behavioral characteristics, students who remained active Breakthrough participants were 1.98 times more

After accounting for pre-participation demographic, academic, and behavioral characteristics, students who remained active Breakthrough participants were 1.98 times more likely to enroll in college than comparison students from the same 6th grade campuses.

likely to enroll in college than other students from the same 6th grade campuses. The confidence interval for the college enrollment is much narrower, i.e. 1 to 4, than for the high school graduation estimate; however it must also be interpreted with caution. We know that the district college enrollment data had only a 57% correspondence rate with Breakthrough college enrollment records and that the NSC does not collect data from all postsecondary institutions in the US. It is best to consider this college enrollment estimate accurate within the context of data available to AISD from the NSC and not to extrapolate the accuracy of the odds ratio beyond this data source.

Magnet program participation, passing the state assessments in reading or math, and being a member of the 6th grade class of 2002-2003 (Cohort 2) also were associated with a higher likelihood of enrolling in college; however, the increased likelihood of college enrollment

for students in Cohort 2 likely is an artifact of the missing outcome data among the students in Cohort 3 due to the AISD external research opt-out provision, rather than a true performance difference among the students in Cohort 2. Student gender also was significantly associated with college enrollment; males were half as likely to enroll in college as females after accounting for the other demographic, achievement, and behavioral indicators in the model. This reflects state and national trends of female students comprising an increasingly large percentage of college enrollees (Mather & Adams, 2007).

Table 4. Logistic regression analysis of graduation from high school rather than dropping out

	Odds Ratio	Standard Error	z	p	95% Confidence Interval	
Breakthrough Participation	3.47*	2.10	2.06	0.04	1.06	11.36
Cohort 1	0.72	0.14	-1.74	0.08	0.49	1.04
Cohort 2	0.96	0.19	-0.22	0.82	0.64	1.42
Male	1.08	0.16	0.51	0.61	0.80	1.45
Hispanic	0.58	0.22	-1.40	0.16	0.27	1.24
African American	0.83	0.34	-0.46	0.65	0.37	1.86
Economic Disadvantage	0.72	0.16	-1.46	0.14	0.47	1.11
Magnet	2.74***	0.77	3.58	0.00	1.58	4.75
Special Education	1.59	0.71	1.04	0.30	0.66	3.83
Passed State Reading Sssessment	1.72***	0.30	3.07	0.00	1.22	2.43
Pass State Math Assessment	2.87***	0.51	5.96	0.00	2.03	4.05
One or More Disciplinary Referrals	0.34***	0.06	-6.29	0.00	0.24	0.48
Daily Attendance Rate	1.10***	0.02	5.38	0.00	1.06	1.14

Note. Overall model evaluation using the likelihood ratio test (13, 1411) $X^2 = 344.18$, $p < .001$.
*$p < .05$, **$p < .01$, ***$p < .001$

Table 5. Logistic regression analysis of enrolling in college rather than not enrolling

	Odds Ratio	Standard Error	z	p	95% Confidence Interval	
Breakthrough Participation	1.98*	0.65	2.10	0.04	1.05	3.75
Cohort 1	0.53	0.23	-1.45	0.15	0.23	1.25
Cohort 2	1.72***	0.28	3.31	0.00	1.25	2.38
Male	0.56***	0.09	-3.53	0.00	0.41	0.77
Hispanic	0.68	0.18	-1.50	0.13	0.41	1.13
African American	1.66	0.51	1.65	0.10	0.91	3.04
Economic Disadvantage	1.02	0.21	0.10	0.92	0.69	1.52
Magnet	2.43***	0.48	4.50	0.00	1.65	3.58
Special Education	1.42	0.85	0.58	0.56	0.44	4.58
Passed State Reading Assessment	2.27***	0.66	2.84	0.00	1.29	4.01
Passed State Math Assessment	1.55*	0.35	1.92	0.05	0.99	2.41
One or More Disciplinary Referrals	1.32	0.30	1.22	0.22	0.85	2.06
Daily Attendance Rate	1.02	0.03	0.76	0.45	0.97	1.07

Note. Overall model evaluation using the likelihood ratio test (13, 786) $X^2 = 143.51$, $p < .001$.
*$p < .05$, **$p < .01$, ***$p < .001$

Phase IIB: What is the incremental impact of Breakthrough participation on high school graduation and college enrollment?

A multistep procedure was used, first, to determine students' propensity to have participated in Breakthrough according to their 6th grade demographic, academic, and behavioral characteristics. A second step grouped students into "blocks" within which the program students (Breakthrough) and the non-program students (comparison) had similar propensity to have been served by the program *and* were not statistically different from each other according to their demographic, achievement, and behavioral characteristics. The procedures resulted in three blocks of students whose 6th grade characteristics are summarized in Table 6. There were 4 Breakthrough students and 815 comparison students whose propensity to be served by the program and other demographic characteristics made them significantly different from the students retained in the procedure; their characteristics are tabled in the final column of Table 6.

The students in Block 3 had the highest percentage of magnet students, the highest daily attendance rates, 100% passing rates on the state assessments in reading and math, and almost no students who were involved in a disciplinary incident. The students in Block 2 differed from those in Block 3 by having a higher percentage of economically disadvantaged students and a lower percentage of magnet students, but were similar to those in Block 3 according to their very high pass rates on the state reading and math assessments and high average daily attendance.

The students in Block 1 differed somewhat from the other two groups according to their lower passing rates on the state assessments and their higher percentage of students with a disciplinary referral in 6th grade. The remaining students, who were not assigned to a propensity block because of their low probability of participating in Breakthrough, had higher percentages of special education students, lower percentages of magnet students, lower state assessment passing rates, higher percentages of students with a disciplinary incident, and

lower daily attendance rates than any of the groups who were assigned to a propensity score

block group.

Table 6. Sixth-grade demographic, achievement, and behavioral characteristics by propensity block

	Block 1	Block 2	Block 3	Not included in a propensity block
Breakthrough Participants	18	39	27	4
Comparison Students	440	449	199	815
Cohort 1	176	219	58	300
Cohort 2	136	146	92	249
Cohort 3	146	123	76	270
Other Ethnicity	31.0%	8.2%	0.0%	5.6%
Hispanic	56.8%	81.4%	57.5%	73.9%
African American	12.2%	10.5%	42.5%	20.5%
Economic Disadvantage	64.1%	76.9%	67.1%	86.2%
Magnet	31.0%	19.7%	81.9%	1.7%
Special Education	1.5%	1.4%	0.9%	43.7%
Passed State Reading Assessment	84.5%	98.8%	100.0%	31.9%
Passed State Math Assessment	82.3%	99.8%	100.0%	21.5%
One or More Disciplinary Referrals	24.5%	4.1%	0.9%	41.4%
Average Attendance Rate	96.3%	97.4%	98.4%	93.3%

To answer the question regarding the incremental impact of Breakthrough participation on high school graduation and college enrollment after accounting for students' likelihood of participating in the program, we examined the percentages of students with each outcome within each propensity block (see Table 7). Overall, without accounting for student pre-participation characteristics and propensity to participate in the program, Breakthrough appears to have a profound effect on student outcomes; 33% more Breakthrough students graduate from high school and 69% more students enroll in college than other AISD students. However, after accounting for students' probability of participating in the program, the impact is more nuanced. Among the highest achieving students, many of whom were magnet students (Block 3), Breakthrough participation produced 3% more graduates and 16% more college enrollees than attending AISD alone. This suggests that high performing, low-income, minority students, particularly those who enrolled in district magnet programs, needed little additional assistance to graduate from high school, but gain some benefit from program participation with regard to college enrollment. Follow up analyses designed to isolate the impact of magnet participation were conducted; however, the results did not change the overall conclusions presented here (see Appendix B).

Among the students who met 6th grade academic standards, but who were less likely to be in the district magnet program (Block 2), Breakthrough program participation resulted in approximately 10% more graduates and 63% more college enrollees than district enrollment alone. This suggests that students who passed their 6th grade state reading and math assessments and who regularly attended school, but who weren't served by the district magnet program, were somewhat more likely to graduate from high school and much more likely to enroll in college if they had the support of Breakthrough.

Breakthrough had the largest impact on high school graduation rates among the students … (with) somewhat lower 6th grade state assessment passing rates and somewhat lower rates of daily attendance.

Breakthrough had the largest impact on high school graduation rates among the students in Block 1. These students had a somewhat lower 6th grade state assessment passing rates and somewhat lower rates of daily attendance than the other two groups of students, although both rates far exceeded those with a low probability of participating in the program. Within this group, Breakthrough had an incremental impact of 18% on high school graduation and a similar level of impact on college enrollment; 20% more of these students enrolled in college than similar students in the district.

Among the students who met 6th grade academic standards, but who were less likely to be in the district magnet program…Breakthrough program participation resulted in approximately 10% more graduates and 63% more college enrollees than district enrollment alone.

Table 7. Incremental impact of Breakthrough (BT) participation by propensity block group

	Block 1		Block 2		Block 3		Not included in a block		Overall	
Students with Graduation or Dropout Records	BT (n =18)	Other (n = 397)	BT (n = 39)	Other (n = 419)	BT (n = 27)	Other (n = 186)	BT (n = 4)	Other (n = 734)	BT (n = 88)	Other (n = 1736)
Graduated	94.4%	79.6%	94.9%	86.4%	100%	97.3%	100%	54.1%	96.6%	72.4%
Incremental impact on Graduation	+18%		+10%		+3%		n/a		+33%	
	Block 1		Block 2		Block 3		Not included in a block		Overall	
Students with AISD college enrollment indicators	BT (n = 17)	Other (n = 318)	BT (n = 37)	Other (n = 363)	BT (n = 27)	Other (n = 182)	BT (n = 4)	Other (n = 399)	BT (n = 85)	Other (n = 1262)
Enrolled in College	41.2%	34.3%	45.9%	28.1%	55.6%	47.8%	75.0%	17.8%	49.4%	29.2%
Incremental impact on College Enrollment	+20%		+63%		+16%		n/a		+69%	

Note. Four (4) program students and 815 non-program students were not assigned to a propensity block based on their 6th grade characteristics.

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DISCUSSION

The purpose of this evaluation study was to estimate the impact of Breakthrough Austin program participation on high school graduation rates and college enrollment after accounting for student characteristics. Phase I of the study confirmed that the Breakthrough admissions process was selective with regard to academic achievement and behavioral characteristics for students who were in 6th grade during the 2001-2001, 2002-2003, and 2003-2004 school years; however, the students who were selected to participate in the program were ethnically and economically similar to other students on their campuses. These findings confirm that the program selects the students they intend to select, i.e., students who show grade level academic proficiency but who are likely to benefit from additional academic and social support to be the first in their families to enroll in and graduate from college.

The Phase II analyses indicate that the program is successful in its mission to serve these students. The results of logistic regression showed that Breakthrough students were more likely than other district students to graduate from high school and to enroll in college after controlling for student demographic, academic, and behavioral characteristics. The program incremental impact analyses show that Breakthrough participation had the biggest impact on college enrollment among students who met 6th-grade academic achievement standards but who were not served by district magnet programs. Breakthrough also had a notable impact on both high school graduation and college enrollment among students with slightly lower levels of academic achievement but who, on average, were doing grade level work in middle school and who were not served by district magnet programs.

Program Implications

These results have several important program implications. First, it is clear that Breakthrough has the lowest incremental impact of students who have academic achievement levels, motivation, and family support to have applied to and enrolled in district magnet programs. Program leaders and staff should consider whether or not to continue enrolling

students who have access to other rigorous academic enrichment programs like district magnet programs.

Breakthrough participation has its greatest impact on the college enrollment rates of students who met 6th-grade academic standards in middle school, but who were not enrolled in a magnet program. This group appears to be the appropriate target for the program. Within the context of this evaluation study, middle school academic achievement appears to be a baseline for later college enrollment, but it is well-known that there are many obstacles along the road to college for low-income, minority students and Breakthrough programs appear to give students the support they need to reach this important life benchmark.

Breakthrough also appears to provide an important resource for students who are close to grade level achievement but who have slightly lower average levels of attendance (though still over 95%) or a disciplinary referral. This group of students was most likely to show notable incremental gains on high school graduation as a result of Breakthrough participation. Breakthrough participants showed similar incremental gains on college enrollment within this group; however the impact was not as high as among those with slightly higher levels of achievement.

Limitations

Although every effort was made to address the evaluation questions with the appropriate research methods, there are several important limitations to this study.

Sample size. The size of the Breakthrough participant group was quite small in comparison to the non-participant group, which had an impact on the estimation of firm odds ratios. Ideally, evaluations with future cohorts will have participant samples that are large enough for the estimation of independent effects and of interaction effects among Breakthrough participation and participation in other programs like district magnet programs, which also are strongly associated with high school graduation and college enrollment.

Data quality. One of the most important Breakthrough program entry criteria, 6th grade course grades, was not included in the Phase II analyses because of systematically

missing electronic grade records for all students who were enrolled on AISD elementary campuses. If these data are missing among future evaluation cohorts, it is recommended that a multiple imputation procedure is used to estimate these missing values. Missing data on this important indicator of grade level academic achievement has implications for the calculation of accurate likelihood estimates and propensity block groups. However, of the two available academic achievement indicators that could have been included here (state assessment performance and grade reports), the state assessment results could be considered more valuable because they are relatively objective, whereas course grades are subject to inflation and other non-random effects.

There also were notable problems with final graduation v. dropout data. Over 200 records were eliminated from the Phase II analyses because there was no dropout date provided in the district records. Another 167 final outcomes were systematically redacted because of the external research opt-out provision in AISD. To a certain extent, these two sources of missing data may "cancel each other out" because one set of records would have led to higher estimates of program impact and the other to lower estimates of program impact.

The most significant problem with data quality was among the college enrollment records. Because of the infrequency with which districts receive these records and because of limitations to the number of postsecondary institutions that participate in the NSC, it is very likely that a large number of postsecondary college enrollment records were missing for both Breakthrough participants and other students. Interpretations of the Breakthrough impact on college enrollment should be limited to the context of schools that participate in NSC and for students who were enrolled in a college or university on or about December 2010.

Unmeasured student characteristics. Although a wide range of student characteristics were included in both phases of this evaluation study, there are likely important unmeasured family support and motivational characteristics that led students to seek out the support of a program like Breakthrough. The inclusion of support and motivation

factors would increase the accuracy of estimates of program impact in future evaluation studies.

No direct examination of program characteristics. Although the Breakthrough program model uses research-supported best practices for helping low-income and minority students graduate from high school and enroll in college, this study did not directly examine the effectiveness of particular program features. Future evaluation studies could include qualitative and quantitative measures of program implementation and effectiveness to answer formative evaluation questions for the purposes of program improvement. Similarly, program features could be examined in a cost-utility or cost-benefit framework to answer questions about program scalability and to determine which program features provide the maximum benefit for the minimum cost.

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APPENDIX A. CORRELATION MATRIX

	Graduated	Enrolled in College	Male	Other Ethnicity	African American	Hispanic	Econ. Dis	Magnet	Special Education	Pass State Reading.	Pass State Math	Final Reading Grade 6th	Final Math Grade 6th	Disciplinary Referral	Attendance Rate
Graduated	1.000														
Enrolled in College	-0.028	1.000													
p	(0.299)														
Male	-0.100	-0.102	1.000												
p	(0.000)	(0.000)													
Other Ethnicity	0.152	0.111	-0.012	1.000											
p	(0.000)	(0.000)	(0.491)												
African American	-0.009	0.104	-0.012	-0.162	1.000										
p	(0.691)	(0.000)	(0.466)	(0.000)											
Hispanic	-0.099	-0.169	0.018	-0.527	-0.754	1.000									
p	(0.000)	(0.000)	(0.277)	(0.000)	(0.000)										
Economic Disadvantage	-0.171	-0.109	0.005	-0.382	-0.014	0.268	1.000								
p	(0.000)	(0.000)	(0.755)	(0.000)	(0.412)	(0.000)									
Magnet	0.267	0.238	-0.101	0.396	-0.026	-0.242	-0.331	1.000							
p	(0.000)	(0.000)	(0.000)	(0.000)	(0.127)	(0.000)	(0.000)								
Special Education	-0.156	-0.128	0.160	-0.043	0.119	-0.073	0.061	-0.189	1.000						
p	(0.000)	(0.000)	(0.000)	(0.011)	(0.000)	(0.000)	(0.001)	(0.000)							
Passed State Reading Assessment	0.318	0.193	-0.064	0.187	0.011	-0.140	-0.162	0.281	-0.103	1.000					
p	(0.000)	(0.000)	(0.001)	(0.000)	(0.562)	(0.000)	(0.000)	(0.000)	(0.000)						
Pass State Math Assessment	0.347	0.076	-0.025	0.193	-0.043	-0.099	-0.168	0.274	-0.074	0.502	1.000				
p	(0.000)	(0.008)	(0.195)	(0.000)	(0.024)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)					
Final Reading Course Grade	0.324	0.157	-0.222	0.218	-0.126	-0.046	-0.167	0.214	-0.133	0.339	0.335	1.000			
p	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.019)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)				
Final Math Course Grade	0.356	0.113	-0.204	0.219	-0.072	-0.092	-0.166	0.273	-0.066	0.337	0.445	0.554	1.000		
p	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)			
Disciplinary Referral	-0.307	0.010	0.205	-0.102	0.151	-0.062	0.116	-0.201	0.154	-0.153	-0.159	-0.318	-0.297	1.000	
p	(0.000)	(0.700)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
Attendance Rate	0.327	0.085	-0.054	0.044	-0.038	0.003	-0.077	0.153	-0.139	0.126	0.136	0.290	0.308	-0.256	1.000
p	(0.000)	(0.001)	(0.001)	(0.010)	(0.027)	(0.849)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

APPENDIX B. INCREMENTAL IMPACT OF BREAKTHROUGH (BT) PARTICIPATION BY MAGNET PARTICIPATION

	Magnet		Non-magnet		Overall	
Students with Graduation or Dropout Records	BT (n = 40)	Other (n = 370)	BT (n = 48)	Other (n = 1366)	BT (n = 88)	Other (n = 1736)
Graduated	95.0%	95.4%	97.9%	66.1%	96.6%	72.4%
Incremental impact on Graduation	-.04 %		+ 48.1%		+ 33.5%	
Students with AISD college enrollment indicators	BT (n = 38)	Other (n = 393)	BT (n = 47)	Other (n = 907)	BT (n = 85)	Other (n = 1262)
Enrolled in College	60.5%	46.2%	40.4%	22.6%	29.2%	49.4%
Incremental impact on College Enrollment	+ 31%		+ 79%		+ 69%	

Note. As found in the propensity block analyses, Breakthrough participation had little impact on the graduation rates of magnet students. There was an impact on college enrollment among magnet and non-magnet students; however the impact was higher among non-magnet students.