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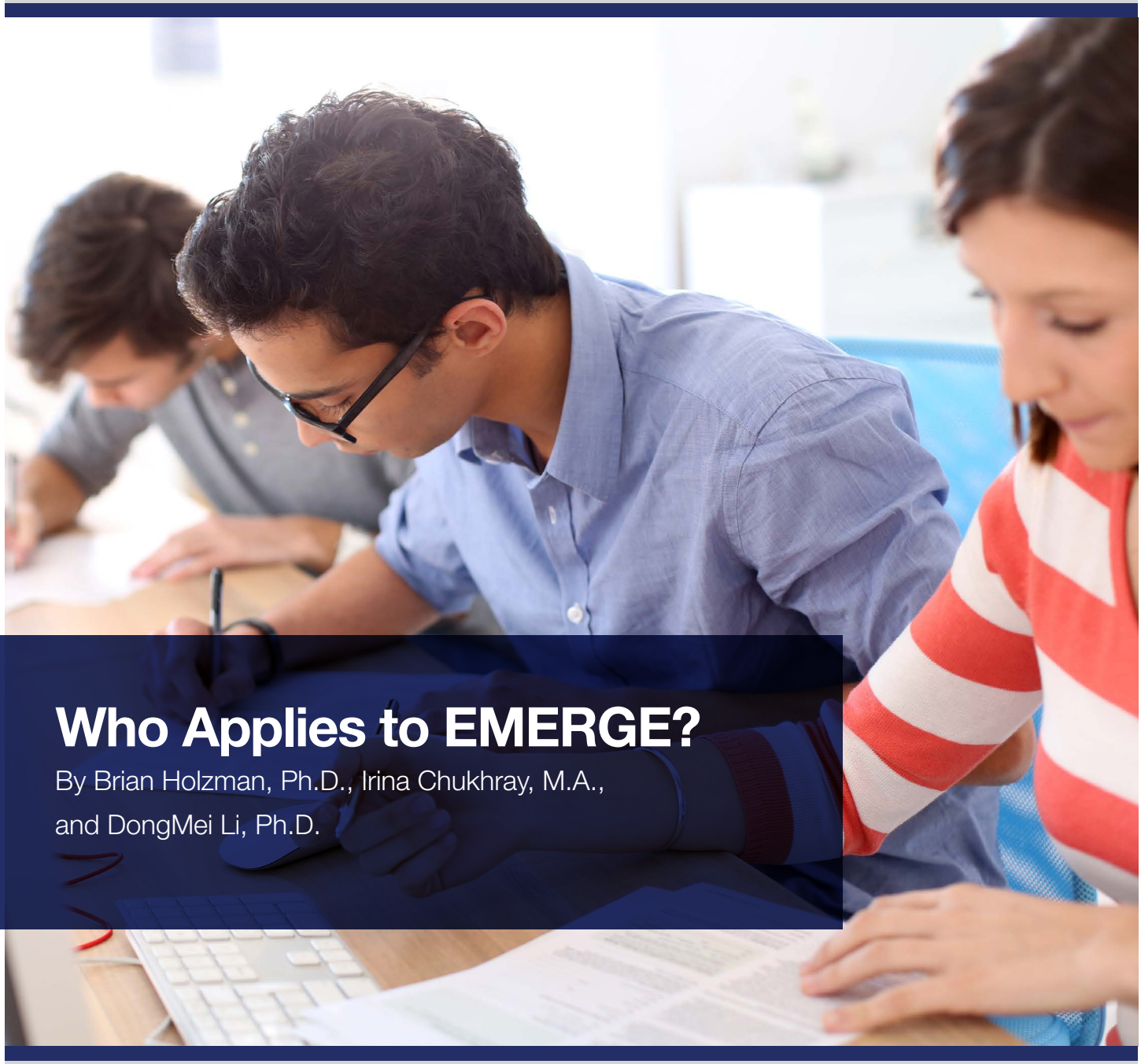

Who Applies to EMERGE?

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Research Brief

for the Houston Independent School District

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About HERC

The Houston Education Research Consortium (HERC) is a partnership between Rice University and several Houston-area school districts. Through this partnership, HERC aims to improve the connection between education researchers and decision makers for the purpose of closing the socioeconomic gaps in educational achievement and attainment for students.

HERC Research Brief

Who Applies to EMERGE?

The EMERGE Fellowship is an intensive college access program which targets talented but underserved students. It aims to encourage them to attend selective colleges and universities since these students often attend less selective postsecondary institutions (known as academic undermatch). However, not all students eligible for EMERGE apply. This descriptive study compares 2016-2017 EMERGE applicants to students who do not apply and finds that although they are generally comparable, students who apply to EMERGE are more likely to be female and more likely to have attended an information session.

Background

Academic undermatch occurs when students attend colleges and universities less selective than their academic qualifications allow (Bowen, Chingos, & McPherson, 2011; Roderick, Coca, & Nagaoka, 2011; Smith, Pender, & Howell, 2013). Undermatch is problematic because selective postsecondary institutions offer more financial aid and support services, have higher graduation rates, and yield greater economic returns (Hoxby, 2004). By undermatching, students may miss these positive college experiences and life outcomes. While 41 percent of U.S. students undermatch, students from lower-socioeconomic backgrounds are more likely to do so than students from higher-socioeconomic backgrounds (Smith, Pender, & Howell, 2013). Given HISD's student population (77% economically disadvantaged in the 2016-2017 school year (Houston Independent School District, 2017)), the undermatch rate at HISD may be higher than the national rate.

The EMERGE Fellowship is a potential solution to the problem of academic undermatch among students from lower-socioeconomic backgrounds. EMERGE is a nonprofit organization that prepares talented students from underserved communities to attend and graduate from the nation's top colleges and universities. The program currently operates in three local school districts, the Houston Independent School District, the Spring Branch Independent School District, and the Spring Independent School District, but is eager to expand statewide. EMERGE is a highly personalized approach to college advising; for the HISD students accepted during the 2016-2017 application cycle, the student-to-counselor ratio is 7:1. The program provides high school juniors and seniors with the following supports:

- **School-based programming**: Biweekly and occasional weekend workshops during the academic year
- **Summer programming**: Opportunities to visit colleges and universities, enroll in residential programs at selective institutions, take standardized test preparation courses, and participate in college application workshops
- **College persistence support**: Periodic student and family check-ins, mentoring, alumni networking, webinars, and workshops during summer and holiday breaks

Because of these personalized supports, EMERGE is quite competitive. Students must apply for admission and are evaluated on a variety of factors, including, but not limited to, grade point average, PSAT score, participation in extracurricular activities, and a personal statement. Of the 1,078 HISD students who applied in 2016-2017, only 279 (26 percent) were accepted to the program (as of fall 2017). Details on EMERGE's application process are in Appendix A.

Research Questions

In this research brief, we focus on the 2016-2017 cohort of EMERGE applicants by answering two key research questions:

1. How do students who applied to EMERGE compare to students who did not apply to EMERGE?
2. Who is invited to the EMERGE information sessions? What is the relationship between attending an EMERGE information session and applying to EMERGE?

Empirical Analyses

Research Question 1: How do students who apply to EMERGE compare to students who do not apply to EMERGE?

Understanding who applies to EMERGE is important as the program expands and reaches out to its target populations. This information may be useful to program staff as they make decisions on how to increase their overall application numbers and whom to target in the recruitment process.

The primary data source used to answer this research question is the Houston Education Research Consortium (HERC) Longitudinal Database. Raw data for the HERC Longitudinal Database are provided by HISD and contain information on student background characteristics, academic performance measures, and school context. We supplement data from the HERC Longitudinal Database with data on whether a student applied to EMERGE; this information is provided to HERC by EMERGE staff. The sample is limited to 10th grade students with non-missing data.[1] Appendix B, Section I describes the variables used in this brief.

Table 1 presents student and school characteristics for all HISD 10th grade students; HISD 10th grade students who did not submit an application to EMERGE; and HISD 10th grade students who did submit an application to EMERGE. For each characteristic, the final column shows whether there is a statistically significant difference between students who do and do not apply to EMERGE. Of the students in the sample, 11 percent submitted an application to EMERGE. Applicants and non-applicants appear distinct on nearly every characteristic examined. For example, applicants are more likely to be female (67% versus 48% among non-applicants) and economically disadvantaged (83% versus 72% among non-applicants).

In terms of race and ethnicity, the two groups show some statistical differences; however, the magnitudes of said differences are relatively small (e.g., 2 percentage-point difference in the share of white students, 4 percentage-point difference in the share of Asian students). Differences between EMERGE applicants and non-applicants are most pronounced when considering measures of academic performance, with applicants demonstrating higher PSAT scores (1,014 vs. 868 among non-applicants), higher grade point averages (3.78 vs. 2.61 among non-applicants), and higher numbers of advanced credits earned in the ninth grade (3.53 vs. 1.66 among non-applicants).

Using a multilevel logistic regression model, we examine which student and school characteristics are most predictive of applying to EMERGE. (Details on the statistical models are available in Appendix B, Section II.) Appendix C, Table C1 presents the regression results. Because odds ratios are difficult to interpret, we use Stata's margins command to calculate predicted values for selected coefficients. The results show that economic disadvantage and GPA are positively related to EMERGE application. After accounting for other factors, economically disadvantaged students are five percentage points more likely to apply to EMERGE than non-economically disadvantaged students. A one-point increase in ninth grade GPA is associated with a six percentage-point increase in EMERGE application. These findings are anticipated since EMERGE uses economic disadvantage and GPA to recruit and select students. We also find that black students are four percentage points more likely to apply to EMERGE than white students, while Hispanic students are three percentage points more likely to apply to EMERGE than white students.

1 Students missing data are in HISD's ADA files but not found in other data files used in the analyses (i.e., their masked I.D. is not in the PSAT, GPA, course grades, or endorsement files). Additional explanation is available from the authors upon request.

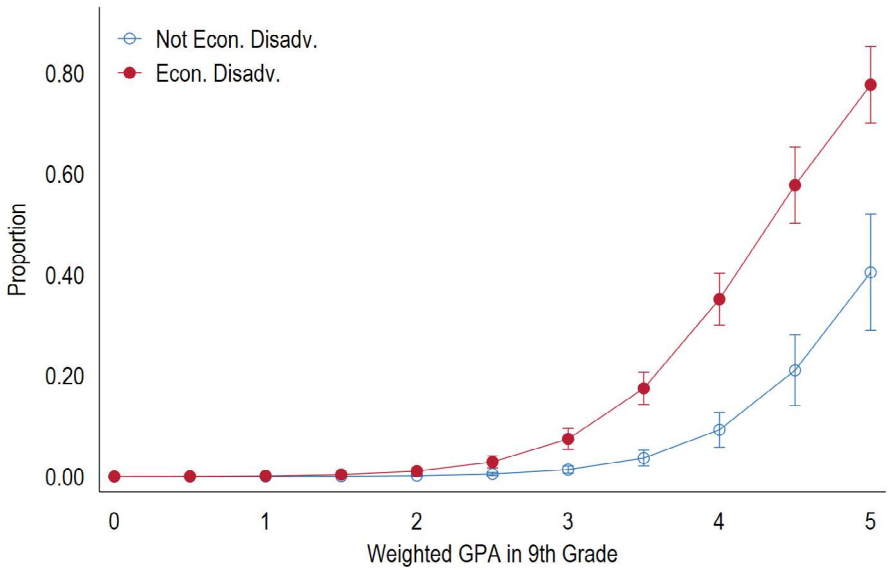
Table 1. Summary Statistics by EMERGE Application Submission

Variable	HISD 10th Grade Students (N = 9,822)	Did Not Submit an Application to EMERGE (N = 8,783)	Submitted an Application to EMERGE (N = 1,039)	Submitted versus Did Not Submit Difference
Level 1—Individual Characteristics				
Age (in years)	15.40	15.42	15.19	***
Female	50%	48%	67%	***
Race/Ethnicity				
White	8%	8%	6%	**
Black	23%	23%	22%	
Hispanic	63%	63%	64%	
Asian	5%	4%	8%	***
Other	1%	1%	1%	
Immigrant	14%	14%	15%	
English Learner	12%	13%	4%	***
Special Education	9%	10%	4%	***
Economically Disadvantaged	73%	72%	83%	***
PSAT Score (in points)	883.44	867.98	1,014.17	***
Weighted GPA in 9th Grade (in points)	2.74	2.61	3.78	***
Number of Advanced Credits in 9th Grade	1.86	1.66	3.53	***
Endorsement				
Art and Humanities	8%	8%	7%	*
Business and Industry	32%	33%	21%	***
Public Services	13%	13%	16%	**
STEM	15%	15%	20%	***
Multi-Disciplinary	20%	20%	21%	
More Than 1 Endorsement	11%	10%	15%	***
Level 2—Site Characteristics				
% Economically Disadvantaged	73%	73%	72%	
Avg. PSAT Score (in points)	900.32	894.06	953.29	***

Sources: EMERGE Application Data, 2017 and Houston Education Research Consortium (HERC) Longitudinal Database, 2015–2017.
Notes: Sample limited to 10th grade students who had no missing data.
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001 (two-tailed tests)

Using the regression results, Figure 1 plots the relationship between GPA and EMERGE application by economic disadvantage status. We focus on these characteristics because the regression results show that they are strongly related to application. Regardless of socioeconomic background, virtually no students with a GPA below 2.00 apply to EMERGE. Differences in application rates among economically and non-economically disadvantaged students appear and grow as GPA increases. This is consistent with the program eligibility criteria, which considers academic performance and socioeconomic status (economically disadvantaged or first-generation college student).[2]

Figure 1. EMERGE Application by Economic Disadvantage and Weighted GPA in 9th Grade



The graph shows that most, but certainly not all, economically disadvantaged students with a GPA around 4.50 or 5.00 apply to EMERGE. It is unclear why some economically disadvantaged students do not apply to EMERGE despite demonstrating high levels of academic performance. Some students may be unaware of the program, some may not plan to attend college, and others may plan to attend college but feel that they already have a strong support system. Nevertheless, if EMERGE plans to expand its outreach efforts within HISD, this group of students—high-peforming economically disadvantaged students who do not apply— may be ideally situated to benefit from EMERGE.

Research Question 2: Who is invited to the EMERGE information sessions? What is the relationship between attending an EMERGE information session and applying to EMERGE?

In an effort to recruit students to apply to EMERGE, Program Managers (PMs) hold sessions with students during which they discuss the purpose of EMERGE, the supports it provides, and the criteria it considers in the application process. Although all HISD students can attend these sessions, PMs develop a target list and invite a select number of students to attend these sessions and subsequently apply. During the 2016-2017 EMERGE application cycle, 44 schools kept track of which students received invites to the information sessions and 40 recorded who attended. In this section, we analyze this outreach strategy. Specifically, we examine which students are more likely to be invited to the EMERGE information sessions and, among those invited, whether attending a session is associated with application submission.

First, we compare students who receive and do not receive invitations to the EMERGE information sessions. Table 2 shows summary statistics for all 10th grade students, students who do receive an invite, and students who do not receive an invite. The final column indicates whether there is a statistically significant difference between students who are and are not invited to the information sessions. Of the students in the sample, 13 percent received invites to the EMERGE information sessions. Overall, students invited to the information sessions are quite different from students not invited. For instance, they are more likely to be female (62% versus 49% among

2 Non-economically disadvantaged students may apply to EMERGE. If they are first-generation college students, they can still qualify for the program and be selected. We are unable to examine first-generation in this section since the district does not collect that information for all its students; it is available for EMERGE applicants only.

non-invitees), less likely to be black (16% versus 24% among non-invitees), and more likely to be Hispanic (71% versus 62% among non-invitees). They are also more likely to be economically disadvantaged (91% versus 71% among non-invitees) and demonstrate higher levels of academic performance in terms of PSAT scores (1,019 versus 864 among non-invitees), grade point averages (3.91 versus 2.56 among non-invitees), and the number of advanced credits earned (3.52 versus 1.62 among non-invitees).

Next, we estimate a multilevel logistic regression model to determine which student and school characteristics are most predictive of being invited to attend an EMERGE information session. (Details on the statistical models are available in Appendix B, Section II.) The complete regression results are available in Appendix C, Table C2. The findings show that black and Hispanic students are slightly more likely to be invited to attend a session than white students (about 1 percentage point more likely). However, the results indicate that economic disadvantage and GPA are strongly related to being invited to attend a session. The final model demonstrates that economically disadvantaged students are two

Table 2. Summary Statistics by Invitation to the EMERGE Information Sessions

Variable	HISD 10th Grade Students (N = 9,822)	Did Not Submit an Application to EMERGE (N = 8,571)	Submitted an Application to EMERGE (N = 1,251)	Invited versus Not Invited Difference
Level 1—Individual Characteristics				
Age (in years)	15.40	15.43	15.16	***
Female	50%	49%	62%	***
Race/Ethnicity				
White	8%	8%	4%	***
Black	23%	24%	16%	***
Hispanic	63%	62%	71%	***
Asian	5%	4%	7%	***
Other	1%	1%	1%	
Immigrant	14%	14%	14%	
English Learner	12%	14%	3%	***
Special Education	9%	10%	4%	***
Economically Disadvantaged	73%	71%	91%	***
PSAT Score (in points)	883.44	863.67	1,018.90	***
Weighted GPA in 9th Grade (in points)	2.74	2.56	3.91	***
Number of Advanced Credits in 9th Grade	1.86	1.62	3.52	***
Endorsement				
Art and Humanities	8%	8%	8%	
Business and Industry	32%	34%	21%	***
Public Services	13%	13%	14%	
STEM	15%	14%	23%	***
Multi-Disciplinary	20%	20%	20%	
More Than 1 Endorsement	11%	11%	14%	***
Level 2—Site Characteristics				
% Economically Disadvantaged	73%	72%	73%	
Avg. PSAT Score (in points)	900.32	893.45	947.44	***

Sources: EMERGE Application Data, 2017 and Houston Education Research Consortium (HERC) Longitudinal Database, 2015–2017.
Notes: Sample limited to 10th grade students who had no missing data.
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001 (two-tailed tests)

percentage points more likely to be invited to an EMERGE information session than non-economically disadvantaged students. Additionally, a one-point increase in GPA (e.g., a change from 3.00 to 4.00) corresponds to a two percentage-point increase in being invited to an information session. Since the EMERGE information session invitation rate is 13 percent, the two percentage-point increases for economic disadvantage and GPA are quite large. In sum, these findings show that EMERGE is targeting the right students—low-income high-performers.

Figure 2. EMERGE Information Session Invitation by Economic Disadvantage and Weighted GPA in 9th Grade

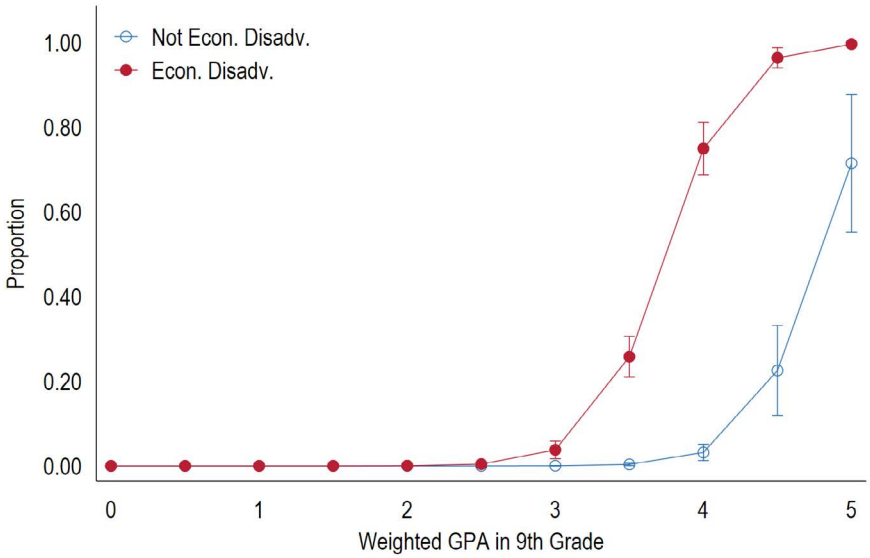


Figure 2 plots the relationship between GPA and being invited to attend an EMERGE information session by economic disadvantage status. First, we see that very few students with a weighted GPA under 3.00 are invited to attend the information sessions. Second, students with GPAs above 3.00 are increasingly likely to be invited. Third, economically disadvantaged students are more likely to be invited than non-economically disadvantaged students. At very high GPAs (4.50 or 5.00), nearly all economically disadvantaged students are invited to information sessions. The graph is consistent with EMERGE's eligibility criteria and shows that there is little room to grow if they want to target high-performing students from economically disadvantaged backgrounds. If EMERGE wants to reach out to more students in their target population (economically disadvantaged or first-generation college students), then they either must invite more students with GPAs in the 3.00-4.00 range or first-generation college goers not classified as economically disadvantaged.

Lastly, we compare students who do and do not attend these EMERGE information sessions. For this analysis, we focus on students invited to the information sessions—students who PMs reach out to—and examine the relationship between attending a session and applying to EMERGE.[3] Table 3 presents summary statistics of the students invited to the information sessions by attendance. For each student and school characteristic listed, the final column provides a test of whether there is a statistically significant difference by information session attendance. First, we see that among the 1,123[4] students invited to attend an EMERGE information session, 769 (68%) attended one. However, there is a 35 percentage-point difference in EMERGE application between those who do and do not attend the information sessions. As shown in the Attended versus Did Not Attend column, this difference is statistically significant. For most other characteristics, students who do and do not attend the sessions appear quite similar.[5]

Through a multilevel logistic regression model, we examine the relationship between EMERGE information session attendance and application, controlling for the

3 According to our records, only 20 students not invited to the EMERGE information sessions attended one.

4 Although Table 2 reports that 1,251 students in the sample were invited to attend the EMERGE information sessions, the sample used in our analysis of the role of information session attendance decreased to 1,123 students. We excluded 128 students because they attended schools that did not keep records on information session attendance.

5 Two notable differences between students who did and did not attend an EMERGE information session are PSAT scores and STEM endorsements. Students who did not attend a session have slightly higher PSAT scores and are more likely to choose STEM as their endorsement. It is possible that higher-performing students or students who choose the STEM endorsement feel that they do not need additional support in the college search and application process. However, this is speculative and, as a whole, we do not find that the two groups are substantively different.

Table 3. Summary Statistics by Attendance at the EMERGE Information Sessions

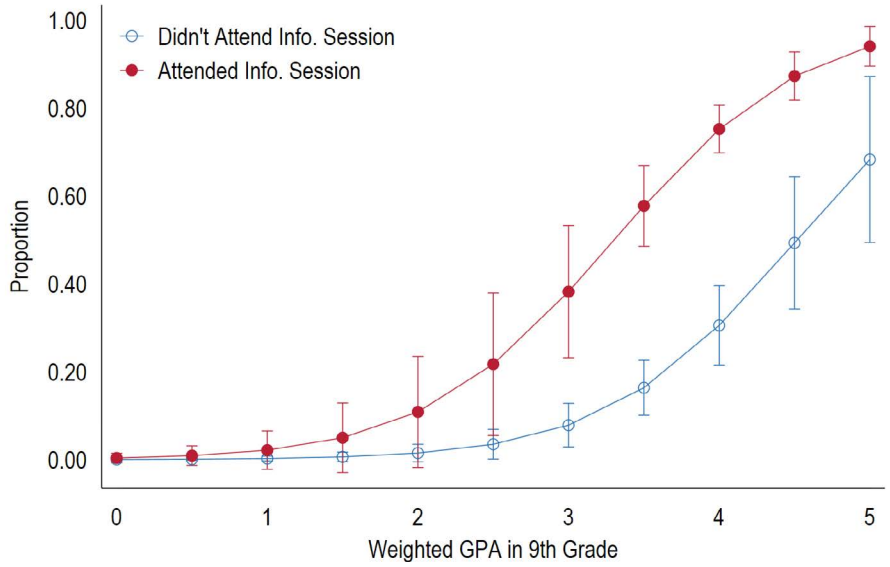
Variable	All Students Invited to Attend an EMERGE Information Session (N = 1,123)	Did Not Attend an EMERGE Information Session (N = 354)	Attended an EMERGE Information Session (N = 769)	Attended versus Did Not Attend Difference
Level 1—Individual Characteristics				
EMERGE Application Submission	55%	31%	66%	***
Age (in years)	15.17	15.18	15.16	
Female	63%	60%	64%	
Race/Ethnicity				
White	4%	4%	3%	
Black	15%	17%	14%	
Hispanic	74%	72%	74%	
Asian	7%	6%	7%	
Other	1%	1%	1%	
Immigrant	13%	13%	14%	
English Learner	3%	3%	3%	
Special Education	4%	4%	4%	
Economically Disadvantaged	92%	92%	92%	
PSAT Score (in points)	1,018.64	1,002.57	1,026.03	**
Weighted GPA in 9th Grade (in points)	3.91	3.90	3.91	
Number of Advanced Credits in 9th Grade	3.49	3.48	3.50	
Endorsement				
Art and Humanities	8%	7%	9%	
Business and Industry	21%	25%	19%	*
Public Services	12%	11%	12%	
STEM	22%	17%	25%	**
Multi-Disciplinary	22%	24%	21%	
More Than 1 Endorsement	14%	15%	14%	
Level 2—Site Characteristics				
% Economically Disadvantaged	74%	74%	74%	
Avg. PSAT Score (in points)	949.80	939.83	954.39	+

Sources: EMERGE Information Session Data, 2017 and Houston Education Research Consortium (HERC) Longitudinal Database, 2015–2017.
Notes: : Sample limited to 10th grade students who were invited to attend the EMERGE information sessions, who did not attend one of the four sites which failed to keep attendance records for the information sessions, and who had no missing data. + p<0.10, * p<0.05, ** p<0.01, *** p<0.001 (two-tailed tests)

factors listed in Table 3. (Details on the statistical models are available in Appendix B, Section II.) Appendix C, Table C3 contains these results. After accounting for student and school characteristics, we find that students who attend an information session are 46 percentage points more likely to apply to EMERGE than students who do not attend a session. The strong, positive relationship between attending an information session and applying to EMERGE suggests that the sessions may be useful in getting more students to participate in EMERGE than may have otherwise. It is possible that this association captures characteristics unobserved in our data. For instance, students who attend the information sessions may be more motivated to attend selective colleges or participate in a program like EMERGE. Regardless, the relationship between information session attendance and EMERGE application submission is strong, especially when considering that attendees and non-attendees are observably similar.

Using the regression results, in Figure 3, we graph EMERGE application by information session attendance and GPA, two of the strongest predictors as shown in Appendix C, Table C2. Among students with lower grades (GPA below 3.00), there appears to be no statistically significant difference in application by information session attendance (i.e., the error bars are overlapping). Low-performing students are unlikely to be accepted to EMERGE given the admissions criteria. Low-performing students who do attend an information session may learn more about these criteria and reasonably decide not to apply. In contrast, among students with middle to high grades (GPA between 3.00-5.00), information session attendance is positively associated with EMERGE application rates.

Figure 3. EMERGE Application by Information Session Attendance and Weighted GPA in 9th Grade



Discussion and Recommendations

In this brief, we present descriptive statistics on the 2016-2017 EMERGE Fellowhip applicant pool. We focus on what predicts application submission and being invited to attend an EMERGE information session, and whether attending an information session is associated with application submission. As EMERGE expands its programming within HISD and to other districts, it is important to understand the applicant pool since it may inform outreach and recruitment efforts and help target populations most at risk of academic undermatch.

The analyses confirm that EMERGE applicants are quite different from other high school sophomores in HISD. They are more likely to be economically disadvantaged and demonstrate higher academic performance, both of which reflect the target population for EMERGE. In our analyses, both these factors have positive relationships with EMERGE application. Females are more likely to apply to EMERGE as are black and Hispanic students. The results also show that there may be an untapped market of high-performing, economically disadvantaged students in HISD (see Figure 1). A non-trivial number of these students are not applying to EMERGE despite the fact that they meet the main selection criteria. The data are unable to tell us why these students decide not to apply to EMERGE; maybe these students have not heard of EMERGE, maybe they are uninterested in college, or maybe they already have the college supports they need. HERC's qualitative research brief on newly-accepted EMERGE students may be a resource for better understanding EMERGE applications' motivations.[6]

During the recruitment period, EMERGE holds information sessions in which students have an opportunity to learn about the program and application process. Although any student can attend the information sessions, Program Managers proactively reach out to students who likely qualify for EMERGE and invite them to attend a session. First, we find that students invited to the information sessions are quite different from students not invited to attend the sessions. In particular, they are more likely to be economically disadvantaged and have higher GPAs. Our assessment confirms that EMERGE is targeting the right students in its outreach efforts. If, however, they wish to expand the pool of applicants, they may need to reach out to slightly lower-performing economically disadvantaged students (in the 3.00-4.00 GPA range) or to non-economically disadvantaged students who are first-generation college goers.

Finally, using the sample of invited students, we find that students who do and do not attend the information sessions are rather similar to one another. However, we find large differences in application rates between the two groups. After accounting for student- and school-level control variables, students who attend an information session are 46 percentage points more likely to apply to EMERGE than students who do not attend the sessions. Regardless of causality, we encourage the district to identify additional strategies to spread the word about EMERGE. Increasing the applicant pool will likely help EMERGE broaden its reach to more talented yet underserved students and help them attend colleges and universities that match their academic qualifications.

6 This brief, F*inishing What My Parents Started: College Aspirations among EMERGE Students*, is available at https://kinder.rice.edu/houston-education-research-consortium.

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Acknowledgements

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For additional information on the findings presented in this report, contact the Houston Education Research Consortium at 713-348-2802 or email herc@rice.edu.

Appendix A. EMERGE Application Process

In fall 2016, the Houston Education Research Consortium (HERC) research team worked with EMERGE staff to design an application process that was consistent and well documented. The application process consisted of two phases. In Phase I, students submitted an online application that, in addition to answering basic questions on their demographic and socioeconomic background, asked them to describe their participation in extracurricular activities and complete a short essay. EMERGE staff, with assistance from the HERC research team, developed rubrics for scoring extracurricular activities and essays.[7] In addition to the online application, EMERGE staff gathered information on students' freshman year grade point average (GPA) and PSAT scores.[8] Two groups that EMERGE staff specifically sought to serve, male and black students, both received extra points on their applications. EMERGE staff scored the online applications, assigning each component the following point values:

Table A1. Phase I Scoring

Component	Maximum Points
Grade Point Average	35
PSAT Score	25
Extracurricular Activities	16
Essay	16
Male	2
Black	1
Total Phase I	**95**

Each school advanced a specified number of students from Phase I to Phase II. The number of students allotted to each school was based on the gradient score—a metric based on GPA and PSAT scores from the previous 10th grade cohort that was used to estimate the number of students who might apply to EMERGE.[9] Within each school, students were sorted by their Phase I scores and the top students (based on the number of students allotted) advanced to Phase II. For example, if a school had eight slots, the eight students with the highest Phase I scores advanced.

Students who advanced to Phase II participated in in-person interviews with EMERGE staff, HISD staff, and volunteers. Interviews were short and lasted 10-15 minutes. Most students were interviewed by two individuals who used a rubric to score the interview on a 30-point scale. The Phase II score was an average of all the individual interviewers' scores.

The total score was the sum of Phase I and Phase II scores (maximum = 125 points).[10] As in Phase I, each school was allotted a certain number of slots for selection into EMERGE. Within schools, students were ranked by their total scores and the top students (based on the number of slots allotted) qualified for EMERGE.

It should be noted that not all students qualified for EMERGE agreed to participate and not all students who participated qualified for EMERGE. Additional details are available from the authors upon request.

A similar application process was implemented during the 2017-2018 application cycle. During the 2018-2019 application cycle, a different application process was used. Please contact EMERGE staff for updates to recruitment, application, and selection.

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7 These rubrics are available from the authors upon request.

8 EMERGE staff imputed missing PSAT scores using a nearest neighbor approach: within each school, they looked at the 10 students most similar in GPA and took the average PSAT score. GPA and PSAT scores were converted to points using ranges developed by HISD; these are available upon request.

9 The share of students who advanced from Phase I to Phase II varied by school (Mean: 58%, Range: 20-100%). Advancement rates differed across schools due to the number of slots available and the number of students who applied.

10 Students who were not interviewed (did not make it past Phase I) were assigned a Phase I score of zero.

11 The share of students who were admitted to EMERGE varied by school (Mean: 24%, Range: 9-75%). Admission rates differed across schools due to the number of slots available and the number of students who applied.

Appendix B. Methodology

Variable	Description
EMERGE Application Submission	Binary.
Attendance at the EMERGE Information Sessions	Binary.
Age	Continuous.
Female	Binary.
Race/Ethnicity	Categorical: White (ref.), Black, Hispanic, Asian, and Other.
Immigrant	Binary: Foreign-born.
English Learner	Binary.
Special Education	Binary.
Economically Disadvantaged	Binary: Participates in the federal free and reduced-price lunch program or other federal poverty programs or lives below the federal poverty line.
PSAT Score	Continuous (reported in 100s).
Weighted Grade Point Average (GPA) in 9th Grade	Continuous.
No. Advanced Credits in 9th Grade	Continuous: Advanced courses include Pre-Advanced Placement (Pre-AP), Pre-International Baccalaureate (Pre-IB), AP, IB, and academic dual enrollment courses. Academic dual enrollment courses are dual enrollment courses that are not also Career & Technical Education courses. Courses failed do not count in this calculation.
Endorsement	Categorical: Art and Humanities, Business and Industry, Public Services, STEM, Multi-Disciplinary, and More Than 1 Endorsement (ref.).
School-Level Percent Economically Disadvantaged	Continuous: Percentage of economically disadvantaged students (reported in 10s). Calculated by aggregating student data to the school level.
School-Level Average PSAT Score	Continuous: Average PSAT score among 10th grade students (reported in 100s). Calculated by aggregating student data to the school level.

I. Statistical Models

We estimate multilevel logistic regression models to answer two questions:

1. How do students who apply to EMERGE compare to students who do not apply to EMERGE?
2. Who is invited to the EMERGE information sessions? What is the relationship between attending an EMERGE information session and applying to EMERGE?

In both analyses, the models take the following form:

Level 1

$$logit\,(P_{ij}) = \beta_{0j} + \sum_{q=1}^{q} \beta_{qj} X_{qij}$$

Level 2

$$\beta_{0j} = \gamma_{00} + \sum_{s=1}^{s} \gamma_{0s} W_{sj} + u_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

$$\beta_{2j} = \gamma_{20}$$

$$\vdots$$

$$\beta_{qj} = \gamma_{q0}$$

where P_{ij} is the dichotomous indicator of applying to EMERGE or being invited to an EMERGE information session. The coefficient β_{0j} is a school-level random intercept and $\sum_{q=1}^{q} \beta_{qj} X_{qij}$ is a vector of student-level covariates. In the analysis restricted to EMERGE information session invitees, the key covariate of interest is whether a student attends an information session. Each school-level intercept is modeled as a function of school-level covariates $\sum_{s=1}^{s} \gamma_{os} W_{sj}$ and a normally distributed error term u_{0j}.

We estimate three models that control for demographic and socioeconomic characteristics (Model 1), academic characteristics (Model 2), and school characteristics (Model 3). In models examining the role of attending an EMERGE information session, we first control for a dichotomous indicator of whether a student attended an information session. The subsequent models add in demographic and socioeconomic characteristics (Model 2), academic characteristics (Model 3), and school characteristics (Model 4). Standard errors are clustered at the school level. After each regression, we use Stata's margins command to calculate adjusted predictions at the means, which we then use to generate graphs.

Appendix C. Regression Results

Table C1. Odds Ratios from Multilevel Logistic Regression Models Predicting EMERGE Application Submission

Variable	Model 1		Model 2		Model 3	
	O.R.	Sig.	O.R.	Sig.	O.R.	Sig.
Level 1—Individual Characteristics						
Age (in years)	0.64	***	0.99		1.00	
Female	2.05	***	1.63	***	1.62	***
Race/Ethnicity (ref. = White)						
Black	1.22		4.26	***	4.29	***
Hispanic	1.09		2.65	***	2.57	***
Asian	1.79	+	1.12		1.10	
Other	1.47		1.78	*	1.77	*
Immigrant	1.61	***	1.51	**	1.50	**
English Learner	0.32	***	1.20		1.19	
Special Education	0.51	***	0.92		0.91	
Economically Disadvantaged	2.66	***	5.65	***	5.55	***
PSAT Score (in 100s of points)			1.20	**	1.18	**
Weighted GPA in 9th Grade (in points)			7.41	***	7.51	***
Number of Advanced Credits in 9th Grade			1.10	*	1.09	*
Endorsement (ref. = More Than 1 Endorsement)						
Art and Humanities			0.63	+	0.67	+
Business and Industry			0.72		0.77	
Public Services			0.67	*	0.72	
STEM			0.71	*	0.72	+
Multi-Disciplinary			0.77		0.80	
Level 2—Site Characteristics						
% Economically Disadvantaged (in 10s)					1.25	**
Avg. PSAT Score (in 100s of points)					1.45	***

Sources: EMERGE Application Data, 2017 and Houston Education Research Consortium (HERC) Longitudinal Database, 2015–2017.
Notes: Sample limited to 10th grade students who had no missing data (N = 9,822). Standard errors are clustered at the campus level.
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001 (two-tailed tests)

Table C2. Odds Ratios from Multilevel Logistic Regression Models Predicting Being Invited to the EMERGE Information Sessions

Variable	Model 1		Model 2		Model 3	
	O.R.	Sig.	O.R.	Sig.	O.R.	Sig.
Level 1—Individual Characteristics						
Level 1—Individual Characteristics						
Age (in years)	0.51	***	0.76	***	0.77	***
Female	1.55	***	0.96		0.96	
Race/Ethnicity (ref. = White)						
Black	0.82		4.95	***	5.11	***
Hispanic	1.18		5.86	***	5.59	***
Asian	2.24	**	1.10		1.04	
Other	1.20		1.55		1.48	
Immigrant	1.34	**	1.13		1.11	
English Learner	0.20	***	1.04		1.05	
Special Education	0.52	***	1.20		1.18	
Economically Disadvantaged	7.73	***	75.83	***	75.14	***
PSAT Score (in 100s of points)			1.16	*	1.12	
Weighted GPA in 9th Grade (in points)			77.48	***	81.38	***
Number of Advanced Credits in 9th Grade			1.00		0.98	
Endorsement (ref. = More Than 1 Endorsement)						
Art and Humanities			1.13		1.28	
Business and Industry			0.87		1.07	
Public Services			0.68		0.83	
STEM			0.96		1.07	
Multi-Disciplinary			1.02		1.06	
Level 2—Site Characteristics						
% Economically Disadvantaged (in 10s)					1.21	***
Avg. PSAT Score (in 100s of points)					1.57	***

Sources: EMERGE Application Data, 2017 and Houston Education Research Consortium (HERC) Longitudinal Database, 2015–2017.
Notes: Sample limited to 10th grade students who had no missing data (N = 9,822). Standard errors are clustered at the campus level.
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001 (two-tailed tests)

Table C3. Odds Ratios from Multilevel Logistic Regression Models Predicting EMERGE Application Submission among Students Invited to Attend the Information Sessions

Variable	Model 1		Model 2		Model 3		Model 4	
	O.R.	Sig.	O.R.	Sig.	O.R.	Sig.	O.R.	Sig.
Level 1—Individual Characteristics								
Attended Information Session	6.94	***	7.42	***	8.20	***	8.04	***
Age (in years)			1.48	**	1.65	**	1.64	**
Female			2.02	***	2.06	***	2.04	***
Race/Ethnicity (ref. = White)								
Black			0.66		0.77		0.79	
Hispanic			0.40	***	0.49	*	0.47	*
Asian			0.34	*	0.25	*	0.24	*
Other			0.77		0.75		0.76	
Immigrant			2.01	***	2.06	***	2.05	***
English Learner			1.70		2.54	*	2.49	*
Special Education			0.86		1.10		1.08	
Economically Disadvantaged			0.74		0.75		0.73	
PSAT Score (in 100s of points)					1.13	+	1.10	
Weighted GPA in 9th Grade (in points)					5.41	***	5.69	***
No. Advanced Credits in 9th Grade					0.98		0.97	
Endorsement (ref. = More Than 1 Endorsement)								
Art and Humanities					0.60	+	0.63	
Business and Industry					0.87		0.94	
Public Services					0.65		0.69	
STEM					0.67		0.68	
Multi-Disciplinary					0.78		0.82	
Level 2—Site Characteristics								
% Economically Disadvantaged (in 10s)							1.16	
Avg. PSAT Score (in 100s of points)							1.31	+

Sources: EMERGE Information Session Data, 2017 and Houston Education Research Consortium (HERC) Longitudinal Database, 2015–2017.
Notes: Sample limited to 10th grade students who were invited to attend the EMERGE information sessions, who did not attend one of the four sites which failed to keep attendance records for the information sessions, and who had no missing data (N = 1,123). Standard errors are clustered at the campus level.
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001 (two-tailed tests)

Mission

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