When Information is Not Enough: Evidence from a Centralized School Choice System

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Abstract

Students often make school choice decisions with inadequate information. We provided randomly selected junior high students (and some randomly selected parents) across 900 junior high schools in Ghana, a country with universal secondary school choice, guidance on application strategies and information about the selectivity and certification exam performance of secondary schools, the information students and parents said they needed. We find that despite information changing the characteristics of schools to which students applied and students being admitted to higher value-added schools, they were not more likely to matriculate on time or at all. The binding constraint was not information.

JEL: D84, I21, I24, I25, O15.

1 Introduction

Each year, millions of families face the daunting task of selecting a school for their child. School choice can offer families an array of academic options, but families can only accurately apply their preferences when they have adequate information about the available alternatives. Previous research from settings as varied as Boston, China, Ghana, Kenya, and Mexico has shown that families (especially those from lower socio-economic backgrounds) lack critical information, leading to sub-optimal choices and an inefficient allocation of household and schooling sector resources (Abdulkadiroğlu et al., 2006; Pathak and Sönmez, 2008; Lai et al., 2009; Lucas and Mbiti, 2012; Ortega Hesles, 2015; Ajayi et al., 2017).

This paper investigates the effects of information on school choice. We focus on three questions: 1) What information do parents and students say they want? 2) Does receiving this information affect choices and educational outcomes? 3) Does who receives this information matter? To address these questions, we conducted a randomized control trial in 900 junior high schools in Ghana, a country with universal secondary school choice. We designed and distributed a booklet, produced and screened a video, and facilitated a school-based workshop to close the information gaps that students, parents, and researchers had identified as barriers to efficient secondary school choice. Together, the intervention provided information on both how to navigate the school choice process and the characteristics of available secondary schools. We then experimentally varied receipt of this information among students in their final year of junior high school and their parents.

Theoretically, providing agents with information, especially the information they say they want, should result in more informed decisions and better outcomes. We find that even though our information was what principals, teachers, parents, and students stated would help them make more informed choices and was salient, our information campaign did not change enrollment or on-time matriculation. We found that respondents received, believed, and understood the information provided. Respondents even remembered specific details of the intervention materials more than one year later. The information changed students'

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application decisions, but it did not improve students' outcomes during the transition to secondary school. We generally do not find any differential impacts of targeting students versus parents directly, with the exception that targeting parents increased the likelihood that students were assigned to higher value added schools and marginally increased the likelihood that they attended their assigned school.

> we should mention what we find on differential treatment effects, since we highlight this as a contribution. would you both agree with this summary?

Despite the importance of school choice in many education systems, relatively few studies have looked at ways to improve students' interactions with existing centralized systems. Information interventions have focused on improving student applications to schools in non-centralized systems (e.g., Hoxby and Turner (2013) in US higher education; Allende et al. (2019) for Chilean primary schools), student sorting to higher quality schools or pressuring schools to improve in systems without formal applications (Banerjee et al., 2010; Mizala and Urquiola, 2013; Andrabi et al., 2017), how to finance higher education (Dinkelman and Martinez, 2014), the importance of peer networks (Dustan, 2018), the returns to schooling (Jensen, 2010), and updating beliefs about one's own ability (Barrera-Osorio and Deming, 2020). Another avenue of research has advocated for changes to existing systems (Abdulkadiroğlu et al., 2006; Kapor et al., 2020).

Information could be especially valuable in centralized systems where students have limited ability to sort ex post or to gain admission to multiple schools ex ante. More than 30 countries use centralized school choice systems for primary or secondary school and 46 countries use it for tertiary education (Neilson, 2019). Three existing studies focus directly on the effect of information provision on students' choices in such systems. Two of the interventions focused on simplifying and amplifying information in a relatively rich information environment. Relative to a control group that had access to a 100 page book on schools, Hastings and Weinstein (2008) found that providing simplified information to parents on the test score performance of schools in Charlotte-Mecklenburg Public School District in North Carolina led to parents choosing schools with higher test scores. Corcoran et al. (2018)

provided students selecting high schools in New York City with a one-page list of 30 geographically proximate schools with higher than median graduation rates. This intervention caused students to be more likely to match with higher-performing schools.[1] In a much less information rich environment, Ajayi et al. (2017) found that directly targeting parents in Ashanti Region, Ghana caused them to be more engaged in the school choice process using evidence from the same experiment as the current study.

Further, few studies have experimentally varied who receives the information. In the above settings, information typically targeted the entire household or community through mailings, newspapers, village meetings, or through banners advertising success at schools.[2] In Ghana, especially with low levels of parental literacy, students are often the primary conduit of information for their parents. Informing only students and teachers is easier and less expensive as they are accessible at school. Informing parents is more costly for parents and information providers because parents must be mobilized to receive information. However, targeting parents can magnify the effect of information provision. Parents generally pay for education expenses and often intervene in school choice ex post even if they are not aware of students' choices ex ante.

Our findings have implications for the implementation and design of these school choice systems, particularly with regard to ensuring equal opportunities for students from underprivileged backgrounds. Additionally, we provide evidence that improving information, even by offering the information respondents want, may not be sufficient to overcome other structural barriers to improved decision making.

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[1]Other arms of the intervention layered additional treatments in addition to this list, but in most cases the authors are unable to reject equality with the basic treatment.

[2]Most studies that have tried to estimate the role of parents in students' decision-making did not engage parents directly, instead varying whether students were asked to pass along information to parents ((Dinkelman and Martinez, 2014)) or varying the addressee on a mailing ((Hoxby and Turner, 2013)).

2   Schooling and School Choice in Ghana

2.1   Schooling System

Ghana's school year starts in September and ends in July, with three terms that typically run from September to December, January to April, and May to July. The 6-3-3 system consists of 6 years of primary school (P1 through P6), three years of junior high school (JHS1 through JHS3), and three years of secondary school (SHS1 through SHS3). Ghana has two types of secondary schools: academic track or technical/vocational track.[3] Many academic track schools offer boarding options, enabling students from anywhere in the country to attend.

Students take two nationally standardized exams during their pre-tertiary years of schooling. At the end of JHS3, students take the Basic Education Certificate Examination (BECE). At the end of SHS3, students take the West African Senior School Certificate Examination (WASSCE). Passing these exams is a requirement to earn the equivalent of a diploma, and scores on the exams determine whether and what kind of additional schooling students can pursue.

During the period under study, both primary and junior high school were tuition-free, but senior high schools still required fees. For the 2016-2017 school year, the approved fees for an entire year at a government senior high schools were GHC551.50 (USD$143) for day students and GHC1494.50 (USD$387) for boarding students.[4] Many government schools unofficially charge additional fees such as parent teacher association dues, teacher motivation fees, infrastructure improvement levies, and exam registration fees.[5] Private schools were free to set their own fee schedule.

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[3]The seven academic programs are Agriculture, Business, General Arts, General Science, Home Economics, Technical, and Visual Arts, and not all schools have all programs.

[4]Charges varied by term. First term allowable charges were GHC405.50 (USD$105) for day students and GHC724.50 (USD$187) for boarding students. For terms two and three, the per-term allowable charges were GHC73 (USD$19) for day students and GHC385 (USD$100) for boarding students. Exchange rate based on the September 1, 2016 exchange rate of 1 GHC/3.8665 USD$. Expressed in 2016 dollars.

[5]Including all school-specific and approved feeds, Duflo et al. (2017) reported per year average annual costs of secondary school of GHC 1921 for the cohort that graduated in 2012, about 30 percent higher than the 2016 boarding allowable charges.

2.2 School Choice System

Students are admitted to at most one secondary school-program pair through a centralized admissions process implemented by the Ghana Education Service Computerised School Selection and Placement System (CSSPS). During the second term of JHS3, students register for the Basic Education Certificate Examination (BECE) and submit the four secondary school-program pairs to which they are applying to the CSSPS. Each student must list four choices.

Rules constrain students' choices. Students can only apply to one program at each school. Each secondary school has an "Option" designation. Options 1 through 3 are public, senior high schools, with option numbers approximately inversely ranked by historic difficulty of admission.[6] Students can list at most one Option 3 school (the most competitive), two Option 2 schools, and four Option 1 schools. Public technical/vocational schools are Option 4, and all private schools (including both academic track and technical/vocational schools) are Option 5. Options 4 and 5 are typically not competitive to enter and very few students list these schools as they can gain entry outside of the centralized allocation system by petitioning schools for admission since these schools often undersubscribed.[7]

A "catchment area option" adds additional complexity. Students who only select schools within 16 km of their JHS can select this option, which can increase their odds of admissions, as each SHS must set aside 30 percent of their seats in each program for students who select this option. In our sample, 14% of students chose only schools less than 16 km from their JHS, and this fraction does not vary by treatment group.

After students have completed the BECE in June, the CSSPS admits each student to at

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[6]The options do not perfectly correspond to recent admissions cut-offs.

[7]In our data only about 1 percent of students listed a private school as one of their choices. Of those who do, they are most likely to list it as choice 4. Private schools are generally considered less desirable than government schools as they are more expensive and have equivalent or worse exit exam scores. In the CSSPS assignment, almost all students admitted to a private school are those with BECE scores below 250, a level considered marginally passing. A separate, elite private school sector that provides an international curriculum and caters primarily to wealthy households and foreign nationals operates outside the CSSPS system. Students in that system typically come from international curriculum junior high schools and do not take the BECE or the WASSCE. About 8 percent of all students listed a technical/vocational school as one of their four choices.

most one school. First, schools submit the number of seats available for first year students in each program. Then, the CSSPS uses a deferred acceptance algorithm to generate a list of students admitted to each school based on the number of seats available in each school, students' test scores, and students' preferences.[8] After all preferences have been considered, students with the highest test scores who were not matched to one of their preferred schools are arbitrarily allocated to schools with remaining seats. Students and schools are told of the matches in September, shortly before the start of the academic year.

Once the school year starts, schools assess how many admitted students failed to matriculate and can fill these seats with students who directly applied to the school. This unofficial second round lasts throughout the first term of secondary school, resulting in students starting school late as they and their parents visit different schools trying to find an available match.[9]

This system of centralized school choice is not unique to Ghana. China, Kenya, Lesotho, Liberia, Mexico, Romania, Trinidad and Tobago, Uganda, and Zambia use similar systems combining students' stated preferences with test scores to determine secondary school assignments. More than 30 countries use a centralized school choice process for primary or secondary school (Neilson, 2019). Further, an analogous system operates in some US school districts for admissions elementary, middle, and secondary schools with assignment through preferences and a lottery. In the US students are often ranked by a lottery instead of test score, but the issues of incomplete information on the part of the student and household are similar.

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[8]The CSSPS considers the first choices of all applicants. It conditionally admits the highest scoring applicants up to each school-program's capacity in the first round. For students not admitted to their first choice, it then considers their second choice. It compares students' scores relative to the scores of the conditionally admitted applicants from the first round, and replaces any conditionally admitted applicants from the previous round with students with higher test scores (i.e., through a deferred acceptance algorithm). These displaced students' second choices are then considered. This process repeats for choices 3 and 4. This algorithm yields an allocation equivalent to a serial dictatorship where students are ranked by descending score and the preferences of higher scoring students have precedence. As students are limited in their choices, this allocation mechanism is not strategy proof, but students should list their choices in order of preference.

[9]Schools are supposed to report unfilled seats to the CSSPS secretariat for a centralized supplementary allocation of students, but this does not happen in practice. Instead, schools use their discretion to admit students through an idiosyncratic process that give families no guarantee of admission to their preferred options.

The centralized admissions process has some beneficial features for students. First, students can apply to any secondary school in the country. Second, by design, admissions to secondary school are based on expressed preferences and test scores, not subject to manipulation based on wealth or family connections.

Unfortunately, the process can be quite daunting for students. Previous research has shown that many students—especially the most marginalized—make their choices with limited information about options, resulting in choice errors (Lucas and Mbiti, 2012; Ajayi, 2013).

3 Inefficiencies and Conceptual Framework

In this section we first describe the inefficiencies that are generated in the low-information setting, then we outline a conceptual framework on how our improved information should remedy some of these issues.

3.1 Inefficiencies

In Ghana, students submit their preferences often with limited knowledge about schools, their admission likelihoods, or how to get the most out of their applications. This information deficit can be more acute among the most marginalized (Lucas and Mbiti, 2012; Ajayi, 2013). Conditional on their own scores, students from lower performing junior high schools apply to and are admitted to less selective secondary schools than equally qualified students from higher performing junior high schools (Ajayi, 2013). In addition to potentially worse matches for students, this lack of information creates wasted resources on a number of margins for both households and the larger schooling sector.

Once students receive their admission decisions, they can deviate from their officially admitted school if another school will admit them. The process through which these deviations happens is very expensive to households in both time and money and in most cases the new

school is one to which the student could have been admitted had it been listed originally.

To deviate from the official admission decision, parents have to travel to the school to appeal directly, in person, to the school principal. School principals maintain waiting lists of students to admit once other officially admitted students do not matriculate. Well into the second month of school, schools do not know which students will matriculate. Some students (4 percent) are forced into this option because they did not correctly fill out their choice forms and are not admitted to any school. Others opt into this method of ex post matching. Of students who are admitted to a senior high school, 37 percent matriculate to a school other than their CSSPS matched school. Based on conversations with students and parents, they would prefer to forgo this ex post matching as it is both costly and risky—students might not be admitted to another school. This ex post matching results in delayed matriculation—only 45 percent of students who are attending senior high school by the second term of the first year started in the first six weeks of school. Students then start school already behind and households must pay the fees associated that first month regardless of when students start. In conversations with senior high school officials, they lamented that students who arrive late are often both behind their peers who started on time and arrive with an attitude not conducive to learning because they delayed school entry to try to matriculate to another school.

Once students matriculate, about 7 percent attend schools where fewer than 25 percent of students who attempt the WASSCE, the senior high school exit exam, pass.

do we have an unconditional number? percent of students who start SHS1 who take the WASSCE.

KA: we don't have any admin data on number of students who START, we only know number admitted and number who take the WASSCE, is it worth trying to report that?

Passing the WASSCE certifies senior high school completion and is used in employment as proof of school completion. Students continue to select these low pass rate schools despite the availability of schools with similar admissions criteria and higher pass rates. Failing the WASSCE means the household wasted three years of school fees and the student incurred three years of opportunity costs without earning the equivalent of a senior high school diploma.

At the sector level, the churn in students that happens in the first term leads to teachers teaching to partially empty classrooms and wastes school administrator time that could be better spent on the educational mission of the school. As the government partially subsidizes school fees and pays teacher salaries, these are additional costs borne by the government. Finally, the government also incurs costs in providing the years of schooling for those students who attend schools in which very few students pass the WASSCE.

In most school choice settings, admissions are a zero-sum game (i.e. when one student is admitted, then another is not). In this setting, given the extensive ex post matching process, students being admitted to their eventual school initially would be pareto improving. Further, what one student perceives as a good match might not be a good match for another student. Therefore, a student could have an improved match by learning more about a school in advance without necessarily making another student worse off. Regardless of quantitative assessments of school quality, students who are more pleased with their matches put forth more effort (Hastings et al., 2012) and students who are better matches with their college majors have higher labor market returns, even if the average return to the major is low (Kirkeboen et al., 2016). Given the delays in matriculation and failure to matriculate at all, substantial scope exists to improve the match between students and schools without necessarily making some students worse off.

3.2   Conceptual Framework

A student's matriculation decision reflects match quality through revealed preference. Our intervention sought to increase the match quality between students and schools, resulting in more students starting secondary school on time in the school to which they were originally admitted, reducing both household and sector inefficiencies and resulting in better longer run student outcomes.

From students considering their choices at the end of JHS3, a number of steps are necessary along the causal chain to ultimately affect their matriculation decision at the start of

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SHS1. In this sub-section we outline the steps of the causal chain and in the next section we explain how our intervention sought to improve each of these steps.

All students in our study, both control and treatment, were enrolled in JHS3, the final year of junior high school, at the start of the study.

Step 1: Students receive information about school choices and how to correctly and strategically apply to senior high schools. During their final year of junior high school, and maybe even before, students receive information of varying quality from peers, siblings, parents, teachers, and other sources. Our intervention increased both the quality and quantity of this information.

Step 2: Students use and internalize the information, potentially changing their preferences over school characteristics and enabling them to make more informed decisions about the program-schools they might select.

Step 3: Students register for the BECE and list their four program-school choices.

Step 4: Students take the BECE. While not designed to impact BECE scores, information about schools could have encouraged students to put forth more effort on the BECE.

Step 5: The CSSPS combines students' BECE scores, stated preferences, and available spaces in each program-school pair to admit each student to at most one program-school pair.

Step 6: Students matriculate to the school to which they were admitted, engage in time intensive ex post sorting and matriculate to another school, or do not matriculate at all.

Our intervention occurred in Step 1 – receiving information. We collected both administrative and survey data as appropriate for each of the subsequent steps. Figure 1 displays this theory of change.

[Figure 1 about here]

4 The Intervention

Given the inefficiencies that inadequate information introduces into the secondary school selection process, we sought to remedy the information deficit to increase the likelihood that students matriculate on time and continue their education. To ensure that our intervention was contextually relevant, we asked students their most important characteristics for school selection. Figure 2 displays their responses. The most important characteristic was academic performance followed by distance and cost. Other important characteristics were admission chances, future success, teacher quality, and whether the school was single sex.

[Figure 2 about here]

The schooling decision often involves the whole household and could also involve school personnel. We asked students who the most helpful person was in making their school choices. Overwhelmingly, students responded their parent or guardian, followed by sibling, head teacher (i.e. school principal), and classroom teacher (Figure 3). The importance of parents was reinforced through focus group discussions with parents and students who stated that one of the reasons students did not attend the school to which they were admitted was because parents did not like it and were not aware that the student had applied until after they were admitted.

[Figure 3 about here]

Based on the important characteristics and decision makers, we created a three-part information campaign: a booklet, a video, and a workshop. We called the package GuIIDE – Guidance and Information for Improved Decisions in Education.

GuIIDE Booklet. First, we created a booklet with information on the CSSPS process and details about each secondary school. The booklet was in English, the official language of instruction in JHS in Ghana. The booklet had two parts: information on application rules

and strategies, and information about secondary schools in the Ashanti Region.[10]

In the first part of the booklet, we provided students with how many choices of each Option they were allowed to list, two simple strategies (do not list more competitive schools after less competitive schools and include a variety of schools in case the student's BECE score is higher or lower than expected), details about the catchment area option, and government approved senior high school fees for both day and boarding students. The section also contained a worksheet for students to calculate their likely raw percentage BECE score. This score is used for admissions, but we learned through piloting that students typically do not think about raw BECE scores.[11] Therefore, the first challenge for students when confronted with historical admission scores is to alter their thinking about their expected score from a 9 (worst) to 1 (best) scale to a 0 (worst) to 100 (best) scale. Figure 4 is the first content page of the booklet, outlining the application process and recommended strategies for selecting schools.

[Figure 4 about here]

The second part, and bulk of the booklet, was devoted to statistics about each secondary school in the Ashanti Region.[12] For each secondary school, we included the official school code that students submit on the CSSPS form; the school name and nickname if relevant (e.g. Opoku Ware Senior High School is more commonly known as OWASS); the school's district and town or neighborhood; whether the school is single gender or mixed; whether

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[10]We limited our intervention to JHS in Ashanti Region and only provided information on secondary schools in Ashanti Region for two reasons. First, Ashanti was the largest of Ghana's 10 regions by population and home to 20 percent of Ghana's population (subsequent to this study, the 10 regions were subdivided into 16 regions, Ashanti was not subdivided and remains the largest by population). Second, historically over 85 percent of students from Ashanti who attended secondary school did so in Ashanti. Students from other regions were more likely to attend secondary school outside their local region.

[11]The BECE consists of nine separate subject exams. Most students think and talk about their aggregate BECE score that appears on their BECE certificate. This reports scores on the four core subjects and two next best subjects, with each subject graded on a scale from 9 to 1 with 1 being best. Therefore, an aggregate score on the BECE of 6, i.e. six scores of 1, is the highest score possible. Admission to secondary schools is instead based on the raw score in which each of the six subject scores is measured from 0 to 100 with 100 being the best. This is equivalent to the percentage correct on each subject exam.

[12]In 2016, Ashanti had 8 Option 3 schools (most competitive), 27 Option 2 schools, and 67 Option 1 schools.

the school is boarding, day, or mixed; and the programs offered. Ghana Education Service (GES), an agency of the Ministry of Education, produced a register of schools with most of this information, except the nickname and town or neighborhood. Each JHS gets one copy available from the district office. Based on conversations with school leaders, many schools do not retrieve this information and others do not pass it along to their students.

We also provided information that was likely not available elsewhere. Based on administrative data from the CSSPS over the last three years, we included two measures designed to capture the competitiveness of admission to a particular school-program pair. First, we included the average BECE score of students admitted to the pair. Second, we included the BECE score of the 5th percentile admitted student–effectively the score threshold for admission.[13] Finally, we included a measure of school quality. At the school level, we provided the number of students who took the WASSCE (year 12 exam) and the overall pass rate. Due to our data sharing agreement, we were unable to include any measures of value added in the booklet. During the intervention school workshops, facilitators encouraged students and parents to consider WASSCE pass rates relative to average incoming BECE scores, effectively value added. The pass rate by program was not available. Figure 5 explains the layout of the school information.

[Figure 5 about here]

The booklet presented data by Option and by district. The full data, including programs and incoming BECE test scores, were organized alphabetically by school within each Option. School level data (code, name, district, gender, boarding, WASSCE performance, and Option) without the programme information were presented in the back, organized by district, enabling students to quickly compare schools in the same district or to find a school's Option (and additional data) knowing only the school's district and name.

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[13]Prior to our developing the GuIIDE booklet, there was no centralized source of information on admission scores. The CSSPS displayed a printed list of admitted students at each SHS, along with admits' raw scores, but did not publish this information centrally, so students would need to collect information directly from each SHS to know all the admission criteria.

GuIIDE Video. The second component of the intervention was a video. Following the example of previous studies using videos to present information (e.g., Dupas (2011); Dinkelman and Martinez (2014); Banerjee et al. (2015)), we wrote and produced this video on the school choice process to make the booklet more salient and memorable to students. In our video, a drama club from an Accra junior high school acted out a dramatized version of students using, understanding, and benefiting from the booklet, leading them to make more informed school choices.[14] The video also modeled how to have a conversation with parents about choices and priorities.[15]

We provided both an English and a Twi (the most common mother tongue in Ashanti) dubbed version of the video. Facilitators asked each head teacher to select which video should be screened in their school.

GuIIDE Workshop. The third component was a workshop. Facilitators distributed the booklet and screened the video during at-school workshops in January, near the start of the second term of the school year. During these workshops, the facilitator was also available to answer questions or do any spot translation into Twi.

Because of the importance of parents in the decision making process, in some schools an additional workshop was held for parents only, at a time and day that the school expected parents to be available. Parents similarly watched the video and interacted with a facilitator.

By providing students, and sometimes parents, additional information and resources on the school choice process, we hoped to assist students in making choices that would better match their preferences, increasing match quality and reducing ex post sorting.

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[14]The plot focused on two students–Serwah and Krampah–and their school choice process, successes, and missteps. Serwah was a diligent student who was not the top in her class but worked very hard and paid attention to the importance of the CSSPS. Krampah had higher test scores on mock BECE exams but did not take the CSSPS process seriously. After the BECE, Serwah was very happy being admitted to her second choice school while Krampah was not sure what he would do for secondary school since he did not have a high enough BECE score to get into his first choice school and had not paid attention to his other choices.

[15]The CSSPS has a video available online that explains the history and purpose of the CSSPS process but does not provide guidance on how to navigate it.

5 Methodology

5.1 Research Design

To test the impact of information on school choice, we conducted a 900-school randomized controlled trial (RCT). We randomly assigned 900 junior high schools in Ashanti to one of three groups: T1) control, T2) information to students and teachers, and T3) information to students, teachers, and parents. Students in T1 schools received no information. We provided students and teachers in T2 and T3 schools with information booklets and screened the video in a workshop during school hours. In addition, in T3 schools, we held parent workshops, providing information directly to parents.

We overlaid this primary randomization with a secondary experiment in which half of each group participated in a baseline survey in January of 2016, prior to any workshops, and half did not. This baseline survey (described in more detail in the Data section) may have prompted students to think more about the application process and encouraged them to seek out more information. By administering this survey in a random subset of schools (T1a, T2a, and T3a), we can measure how this increase in the salience of the applications, independent of the provision of additional information, changed students' knowledge and subsequent decisions.

5.2 Empirical Strategy

The primary conceptual difficulty in ascertaining the effect of information on student choices and subsequent outcomes is the typical non-random allocation of information. To overcome this difficulty, we randomly provided information to students and parents in some schools and not others. The resulting empirical estimation strategy is straightforward:

$$Y_{is} = \alpha + \beta_1 InfoStudents_s + \beta_2 InfoStudentsParents_s + \mathbf{W'_s}\gamma + \varepsilon_{is} \tag{1}$$

where Y_{is} is the outcome for student i in school s, $InfoStudents_s$ is an indicator for whether school s was a school in which only students received information (Group T2), $InfoStudentsParents_s$ is an indicator for whether school s was a school in which both students and parents were targeted to receive information (Group T3), $\mathbf{W'_s}$ is a vector of binary variables representing the stratification bin from which school s is drawn (see more details in the Data section), and ε_{is} is the idiosyncratic error, assumed to be independent across schools but allowed to be correlated within a school.

For our first outcomes we test for effects on student self-reported participation in the workshop and reports of using the information. Second, we test whether this changed self-reported behavior. Third, we test whether students changed their application behaviors. Finally, we test whether the intervention affected secondary school matriculation. We measure these outcomes using a mix of self-reported and administrative data. All self-reported data are from the half of study schools, equally divided among treatment groups, in which we conducted a baseline survey to ensure that we were not conflating priming students to think about their choices with providing information. Because of our research design, we can test the effect of this priming versus information. For estimates with administrative data, we use the entire sample, testing for the differential impact of being surveyed.

5.3   Sample Selection

We selected our sample from the universe of government JHSs listed on the Ghana Education Monitoring and Information System (EMIS) school roster. To be eligible for the sampling frame, a school had to be located in Ashanti, include all junior high school grades (JHS1 through JHS3), have at least one student qualify for secondary school admission in 2014, and be between the fifth and ninety-fifth percentile of JHS3 cohort size in Ashanti. Out of the 30 districts in Ashanti, we excluded one where we piloted the intervention and another with only 5 JHSs. We randomly selected 22 districts out of the remaining 28 for the study.[16]

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[16]We limited the study to 22 districts to reduce travel costs for the intervention.

These selected districts contained 1024 eligible JHSs.

From this sampling frame, we randomly selected 900 schools to participate in the study. We stratified our random assignment of treatment arms by district, ensuring that we had at least one school assigned to each treatment arm in each district. Some schools had more than one section, or stream as they are known in Ghana, of JHS3. For these schools, we randomly selected a single stream to both survey and treat, returning to the same stream for follow-up visits. We describe our survey-collected and administrative data in the next two subsections.

1. are the results the same if we restrict ourselves in the admin data to the treated stream? 2. Should that be our preferred specification? 3. should we run estimates on the non-treated students within a school to show the extent of spillovers?
KA: I think we've run admin data estimates for the surveyed students only and we decided not to have this as the preferred spec because we wanted to use as much data as possible? Maybe we should have another call to discuss this. Looking at spillovers would be interesting though!

5.4 Survey Data

We collected data directly from students in two rounds of surveys, from parents or guardians in another round, and from an informed member of the students' household in the final round.

In January 2016, near the start of term 2 of the 2016-2017 school year, we conducted the baseline student and head teacher data collection in the 450 survey schools. The student survey asked questions about demographic characteristics of the students and their families, their previous educational experiences, knowledge of the application procedures and secondary schools, anticipated application choices, and educational and career ambitions. We also asked for contact information for their parents, older siblings with mobile phones, and other individuals who might know about their schooling outcomes in the future.[17]

KA: Do we want to mention all the data we collected even if we don't use it? Think it might be distracting/confusing. Commented it out for now

Between the baseline and JHS follow-up, enumeration teams administered the intervention to the students or students and parents based on the school's treatment status.

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[17]Because of the high incidence of child fostering in Ghana, we asked for the contact information of parents or guardians and treated them equivalently. For simplicity, we refer to them as parents throughout this paper.

In March of 2016, near the end of term 2, after students submitted their choices to the CSSPS, we returned to the same schools to conduct the JHS follow-up. We attempted to talk to the same students asking similar questions as the baseline. We used our collected contact information to survey via phone a random sample of 20 parents per school. The questions we asked were similar to those in the student JHS follow-up.

In April 2017, during what should have been the second term of secondary school, if students matriculated on time, we again contacted students' households based on our collected contact information. In this round, the SHS follow-up, we asked questions about the student's current schooling or other activities if not enrolled and when the student matriculated or dropped out of schooling. In contacting individuals for this round, we sought to speak with a member of the student's household who knew about the student's current schooling or working activities. This individual was most often the parent, older sibling, or the student themselves.

Figure 6 displays a timeline of fieldwork and student activities. We use these multiple collection rounds to measure changes in information, preferences, and beliefs and to assess whether information changes choices and eventual outcomes.

[Figure 6 about here]

Table 1 contains selected summary statistics and demonstrates baseline balance across the three arms. Of particular note in the summary statistics are parents' education levels–only about 40 percent of fathers and 23 percent of mothers have education beyond JHS with about 12 percent of each not having any formal education. Therefore, most of our sample are first generation secondary school students and cannot rely on previous parental experience with secondary school admissions. These households could find the process especially daunting.

[Table 1 about here]

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5.5 Administrative Data

The CSSPS secretariat provided the administrative data that we used to create the booklet and perform analysis on student outcomes. To create the data for the booklet, we summarized three prior years of admission scores at the school-program level. The West African Education Council provided data on WASSCE pass rates at the school level, which we also included in the booklet. In addition to the data presented in the booklet, we calculated a school-level value added measure. For each SHS, we use the school's residual from a regression of the BECE mean and BECE 5th percentile on the WASSCE pass rate.[18]

For student level outcomes, for all students in Ashanti who completed the CSSPS process we have their name, JHS name, four selected school-program pairs, BECE identification numbers, BECE scores, and the senior high school to which they were admitted. We use their BECE identification numbers to match students across the CSSPS and survey data. We match the remaining students using their names and JHS names, for those with errors in self-reported BECE IDs.

6 Results

Recall the causal chain outlined in Section 3.2. We address each of these steps in turn–receiving information, using and internalizing information, stating choices, taking the BECE, CSSPS admissions, and matriculation.

6.1 Receipt of Information

Students received our intervention, used the provided booklet, and internalized its contents. On average 30 students, all JHS 3 students present on the day of the workshop in the

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[18]On average, Option 3 schools have the highest value added, followed by Option 2, and Option 1. Private schools (Option 5) on average have value added between Options 1 and 2. All four distributions have substantial common support with the exception of some remarkably low value added estimates for some private schools.

randomly selected class, attended the workshop, received the booklet, and watched the video. In the parent treatment arm, 16 parents on average attended the parent workshop.

Table 2 contains results of Equation 1 as a linear probability model with whether, during the first student follow-up, students reported having seen a booklet of school choices or a video about the school choice process. Being in either the treatment that targeted only the students or the treatment that targeted both the students and parents increased the likelihood that a student reported having seen a booklet with information about the school choices and the school choice process by about 14 percentage points (column 1). Over 82 percent of the control group also reported having seen a booklet. This could have been the GES booklet or our booklet borrowed from a friend. The video clearly left a very strong impression on students, increasing the likelihood that students reported having seen a video with information on the school choice system by over 76 percentage points (column 2). Fourteen percent of the control group also reported having seen a video. This could be a combination of being mistaken or having seen a previously produced CSSPS video that explained why the CSSPS was used but did not provide guidance on navigating the process. In both cases we fail to reject that the student only or student plus parents intervention had similarly sized effects.[19]

[Table 2 about here]

6.2 Use of Information

We next test whether students used the booklet as an information source. Students were asked where they got information about the academic quality of secondary schools, selecting as many information outlets as relevant. Based on the results in Table 3, in both treatment arms, students increased the likelihood that they used a booklet for academic information by

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[19]Based on data collected in the parent follow-up and analyzed in Ajayi, Friedman, and Lucas 2017, parents in both treatment arms were about 11 percentage points more likely than the control group to report having seen a booklet. Parents in the parent treatment were further about 10 percentage points more likely than control parents to report having seen a video.

about 17 percentage points (column 1). Even though 82 percent of the control group (Table 2) reported having seen a booklet, only 21 percent reported using a booklet for information, and our intervention almost doubled this likelihood. Students in treatment schools were less likely to report that they received information from the media (column 2), the internet (column 3), what people say (column 4), or another source (column 5). In all cases we fail to reject that the point estimates are the same across the two treatment arms and in almost all cases the point estimates on each treatment are different from 0.

[Table 3 about here]

In addition to information sources changing, parents were more likely to be involved in the process. Our booklet encouraged students and parents to jointly consider options and our video modeled such a conversation. Over 75 percent of parents were already involved, and the intervention increased this likelihood by about 5 percentage points (Table 3, column 6).

The importance of parents in the process was echoed by parents themselves, but only when they were engaged with information directly (Ajayi, Friedman, and Lucas 2017, Table 2). In contrast to the students' responses that parents in both arms were more likely to be involved in the process, analysis presented in Ajayi, Friedman, and Lucas (2017) indicates that parents were only statistically more likely to report being involved when they were directly targeted for information–8 percentage points more likely to report providing help in the selection process and 6 percentage points more likely to be able to report students' selections.

The next step we examine is whether students used this information to adjust what they valued in schools or the schools that they chose. Table 4 shows that the treatment shifted the attributes that students found important towards the information in the booklet. Relative to the control group, students in the student information arm were more than twice as likely (3 percentage point increase on a base of 3 percentage points) to say that admissions chance was the most important (column 1). Students in treatment schools were also more likely to say

the most important factor to consider was distance from home (column 2).[20] These changes represent increases of 77 to 83 percent relative to the control group. Students in student only treatment schools were statistically less likely to consider how the school might affect future success (column 3). Students in both treatment arms were less likely to consider the overall reputation of the school (column 4). Students in the parent arm marginally decreased their consideration of the discipline features of the school, although the point estimates for both treatment arms are similar (column 5). Neither discipline nor reputation were covered in the booklet. The most important consideration continued to be academic quality. We provided data on this margin but did not affect students' prioritization of this school feature (column 6). Overall, students in the treatment arms increased the likelihood that they selected schools based on an attribute we included in the booklet.

KA: @Willa, could you please move admission chances to column 1 in Table 4, so we present results in the order discussed above.

[Table 4 (stated preferences) about here]

6.3   Application Choices

The changes in student preferences were reflected in their choice behavior. For these outcomes we have administrative data from the CSSPS.

Table 5 contains estimates of the effect of treatment on various characteristics of students' official choices. The intervention made students more likely to select schools in Ashanti and those with marginally easier admissions standards. Consistent with distance being a primary consideration, students were 4 percentage points more likely to apply only to schools in Ashanti (column 1).[21]

Recall in the analysis above that students in treatment schools were more likely to state that they considered their admission chances in selecting schools. In columns 2 through 5,

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[20]We did not provide distance from each JHS to each secondary school, instead we included information about the district and neighborhood of each secondary school, more information on location than was otherwise readily available.

[21]Students were also 1 percentage point more likely (off of base of 93 percent) to select at least one school in Ashanti (results not presented).

we estimate the effect of our treatment on the BECE score, as presented in the booklet, of each listed choice. Consistent with being concerned with admissions chances, all point values are negative–indicating schools with slightly lower admissions standards according to the booklet. We find these point values statistically different from 0 for choices 2 through 4 for the parent arm and choices 3 and 4 for students only. For choices 3 and 4, students applied to schools with 0.06 to 0.07 SD lower historical BECE mean scores.

In columns 6 and 7, we test whether students on average applied to schools with higher WASSCE pass rates or value added and find statistically insignificant point values across both measures.[22] While the intervention was designed to shift students away from schools with bad WASSCE outcomes, these findings are consistent with students not changing (or perhaps decreasing) their value of the school's contribution to their future success.

> We need to put something here about how students who received the cross-cutting survey act no differently. Tables in appendix with interactions or of survey sample only.

> I cut the ranking by BECE mean, BECE 5th pctile, same type, and same program because we do not move those. do we want them back?
> KA: I'm fine with leaving them out

[Table 5 (characteristics of choices) about here]

> popularity–what do we want to do with that? not sure we currently measure it correctly
> KA: maybe leave it out for now to keep the discussion focused

6.4   The BECE

Students' admission to secondary school depends on the combination of their BECE score and their listed choices. The intervention was not designed to alter the likelihood that students took the BECE or the effort they put into preparing for and taking the exam. Nevertheless, the extra information we provided students could have changed this behavior. We test for this behavior change in this subsection and present the results in Table 6.

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[22]This is similarly statistically insignificant for each choice separately (results not presented). Because of an agreement with our data providers, the booklet did not present measures of value added. In workshops we encouraged participants to think about WASSCE pass rates relative to incoming BECE scores. We calculated value added using the WASSCE and BECE data from the booklet (see Data Section for more details).

We find that the intervention did not change the likelihood that a student took the BECE as scheduled (column 1). Further, the intervention did not change students' BECE scores (column 2).[23]

[Table 6 about here]

Given the lack of effect on selection into the BECE or a student's actual BECE score, we can interpret any changes in admissions and matriculation as resulting from changes in choices and not test scores or selection into the test.

6.5   Admissions

The intervention changed who participated in students' application processes, what they valued in schools, and their application behaviors. In this sub-section we test whether it changed their CSSPS admissions. Recall that the intervention did not affect students' BECE scores, therefore the results that follow are due to changes in choices not changes in test scores.

Table 7 shows that the treatment did not change the likelihood that a student was admitted to senior high school (column 1) or admitted to a school from their choice list (column 2).[24] The point values are small, 1 to 2 percentage points, and statistically insignificant. About 64 percent of students were admitted to a school on their choice list with an additional 30 percent admitted to a school that they had not listed.

> 93 percent of students are admitted to a school. that feels really high. is that correct?
>
> KA: We were supposed to get additional data on the last batch of administrative assignments but didn't get it before the govt got rid of all our CSSPS contacts.

Across both the treatment and control group, about 26 percent of students are admitted to their top choice school, 14 percent to their second choice school, 10 percent to their third choice school, and 9 percent to their fourth choice school.

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[23] Other observable and self-reported measures of effort or aspirations are similarly unchanged by the intervention–reported absences, present on the day of the follow-up, aspire to at least complete SHS, or aspire to pursue a university degree (results not presented).

[24] Column 1 includes students with sufficiently high BECE scores for secondary school admission who were placed arbitrarily by the CSSPS into a school with empty seats because all of their selected schools were full.

In column 3, we show that our intervention did not change this probability for Choice 1, with similar statistically insignificant effects for other choices.

[Table 7 about here]

We next test whether the intervention changed the characteristics of the school-program pairs or schools to which students were admitted (Table 8). Note this table is limited to students who were admitted to a school, which as shown in Table 7 is not differential by treatment status. Students were 3 percentage points more likely to be admitted to a school in Ashanti (column 1).

Students were admitted to less selective schools, based on the BECE mean presented in the booklet (column 1). Yet, these schools were higher performing based on the value added of the school.[25] For students who are admitted to a school-program pair in their choice set, we can more precisely know the historical BECE score. Students are admitted to school-program pairs with lower historical BECE admissions standards as measured by the mean (column 3) or the 5th percentile (not presented). The incoming test scores were about 7 (student only arm) to 9 (parent arm) percent of a standard deviation lower. These are not worse schools, as students were admitted to higher value added programs in which students were about a percentage point more likely to pass the SSCE than would be expected based on incoming test scores (column 4).

[Table 8 about here]

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[25]For students who are admitted to a school-program pair not in their choice set, our administrative data does not contain the program information. A school-level BECE mean is based on the relative cohort sizes and BECE means of each program.

6.6 Matriculation

Despite indications above that the intervention might have improved match quality due to students making more informed choices and being admitted to marginally higher value added schools, their matriculation decisions were unchanged (Table 9). For these results, we rely on outcomes as reported by informed household members during what should have been the student's second term of secondary school. Sixty percent of control group students were attending secondary school at that time. Students in both treatment arms were no more likely to be attending school (column 1).[26] Further, conditional on attending school, they were no more likely to have started within the first six weeks of school, approximately on time in the Ghanaian context (column 2). They were no more likely to be attending the secondary school to which they were admitted by the CSSPS (column 3) or attending school in Ashanti (column 4). Therefore, by revealed preference, student matches do not appear to have improved.

> did we ask other things, like why are you not in the school in which you were placed?
> KA: We ask this. Don't think we've looked at it yet though

[Table 9 about here]

7 Discussion

The motivation for this research was to reduce inefficiencies and wasted resources at both the household and education sector level that resulted from students ex post sorting. While choice and admissions outcomes changed, the potentially more important matriculation outcomes did not. Below we set out a number of potential hypotheses as to why improved information did not affect those outcomes based on data previously discussed and in-depth interviews with households approximately one year after the conclusion of the intervention.

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[26]Some of the 40 percent of students who were not attending school in this second term might still enroll and complete school in a subsequent year. Duflo et al. (2017) found that 47 percent of qualified students who had not yet enrolled in secondary school as of January (early term 2) of what should have been their first year completed secondary school within seven years. Secondary school typically lasts 3 years.

First, we can rule out the possibility that people did not receive or understand the material or the process. We provided evidence above that intermediate outcomes (i.e., choices and priorities) changed. In in-depth interviews, respondents mentioned that often "parents are too naive" and blame others when "it was their own mistake." One mentioned that she studied the booklet "so when it was time for selecting, I knew what I was doing." Students also noted how important it was to "know your standard and academic performance and compare it with the schools' acceptable grades."

A second concern is that we saturated the geographic area with booklets–all students were effectively treated because they had a friend or relative in a treatment school who let them borrow a booklet. Our 22 study districts contained 1,138 JHSs, and 600 of them, 43 percent, received booklets. As with the prior concern, the possibility of saturation also seems unlikely since we were able to discern differences by treatment status for the intermediate outcomes.

Third, our intervention may not have moved intermediate outcomes enough to change matriculation decisions. Some students may not have been swayed by our intervention because it was too late. Despite working with schools to time the workshops close enough to the decision to be salient, but not too early to be useful, we may have provided information too late. According to our in-depth interviews, several respondents reported "I saw the book but my mind was already made up," "I chose the school I already had in mind," and "the schools that were in my mind, I was determined to attend one of them."

> do we have data on whether students said that they changed their minds or if they changed their minds?
> KA: Don't think we asked this in the quant.

Fourth, while information was a constraint for some households, other considerations might have been paramount for matriculation decisions. For students who either did not matriculate or matriculated to a school to which they were admitted, fewer than 1% stated that disliking the placement was the key consideration–the primary way in which information might improve outcomes.

> did I interpret this correctly?

For students not in school during what should have been the first year of SHS, 76 percent said that fees were the most important barrier. In the qualitative work, students mentioned concerns about schools being "too expensive for you to afford" as a reason for eventual non-matriculation. Even though all government schools had the same official fee schedule, 39% of households whose student was attending a school other than the one to which he was admitted cited cost as a factor. In the booklet we provided the officially approved fees for government schools, but schools often charged additional fees, which were allowed as long as they were "reasonable." Therefore, even though the booklet contained the official fee schedule, students could have encountered unanticipated costs at the school to which they were initially admitted, causing them to seek out an alternative. Alternatively, households could have listed their choices in February subject to an existing budget constraint or a future expected windfall, but an unanticipated shock or lack of windfall between February and October could have altered their realized budget constraint.

Beyond fees, distance from home could have been an important factor. Even though distance was knowable and time invariant, the same unanticipated shocks to income could have altered preferences over distance. For students who were attending a different school than the one to which they were admitted, 24 percent cited distance as the reason for the school change.[27] Approximate distance is something that they could have learned ex ante from the booklet. Overall, the average distance between their JHS is less than the distance to the school that they attend, which is closer than the school to which they are admitted. Figure 7 presents the distribution of distances to admitted schools, attending schools (split by those to which students were and were not admitted), and schools listed for each choice.

[Figure 7 about here]

The distance to the admitted school does predict whether students choose to attend their admitted school. Figure 8 shows the likelihood of attending the admitted school, the

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[27] As all but 5 SHSs in our data have both a boarding and day option, and students can readily switch between these prior to the start of the school year, not having adequate lodging at an SHS should not have been a binding constraint.

likelihood of attending a school to which the student was not admitted, and the likelihood of not attending any school, by distance to the admitted school. Those who were admitted to schools closer to their JHS are substantially more likely to be attending that school, but the relationship is non-monotonic. Almost 70 percent of students admitted to a school within 5 km attend that school. Over 50 percent of students admitted to a school within 15 km attend that school as do students admitted to schools 25, 30, 80, and 85 km away from their JHS.

> are these spikes far out due to some fancy school at that distance from the population center?

> In results not reported, we do not see statistically significantly different effects of the intervention on students with more schools within 2kms or within 10kms. Actually, this isn't really true. We do see some differential effects, just hard to interpret.

> 1. is the second moving home just a zoom of the first? 2. do we want to say anything about how many schools students could choose from within certain distances? 3. is the closest dot ¡ 5, then between 5 and 10?

Taken together, it appears that while students are not consistently choosing only the closest schools, distance is an important determinant of whether and where a student attends.[28]

Consistent with both moving towards home and having fees be an important consideration, in a low-resource setting with frequent unanticipated shocks, knowing school preferences in advance may be impossible. Households may have completed the CSSPS forms intending to adhere to the admissions, but an unanticipated shock could have prevented that realization.

8   Conclusions

As the increase in primary school enrollment and completion of the last 30 years moves into the secondary school sector, and an increasing number of African countries move to make secondary school free, efficiently using available resources is crucial. To improve the efficiency in the transition between junior high and secondary school in Ghana, we provided students and parents with information about the available secondary schools and the centralized sys-

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[28]When considering proximate schools, most students have multiple choices. Based on the location of students' JHSs and SHSs, 42 percent have at least one school within 2km, the average student has 13 SHSs within 10km, and 52 percent of students had 5 or more SHSs within 10km of their JHS.

tem that allocates students to schools. To test the effects of this information, we conducted a 900-school RCT, enabling us to compare outcomes across three treatment groups. For the 300 schools in treatment 1, students alone received information. In the 300 treatment 2 schools, students and parents received information. In a final 300 schools, neither students nor parents received additional information. Based on both survey and administrative data, we found that students and parents wanted and received our information. Further, the characteristics of the schools to which students applied marginally changed, and they were admitted to higher value-added schools. Nevertheless, the improved information did not improve education outcomes – students were no more likely to start school on time or enroll at all. Based on interviews with students after the intervention, many said that they remembered the intervention, especially the video, but that they had either already made up their minds or that they were constrained in their matriculation decisions by distance to schools or lack of resources. The former suggests an intervention earlier in the school year, while the latter points towards a larger issue in the school choice system. Therefore, while allowing universal school choice can benefit students of all socioeconomic backgrounds, those with fewer resources may continue to make constrained choices.

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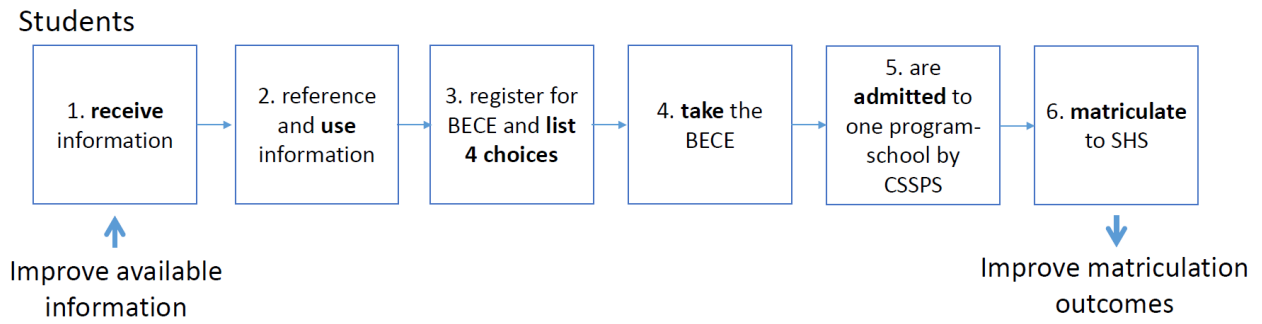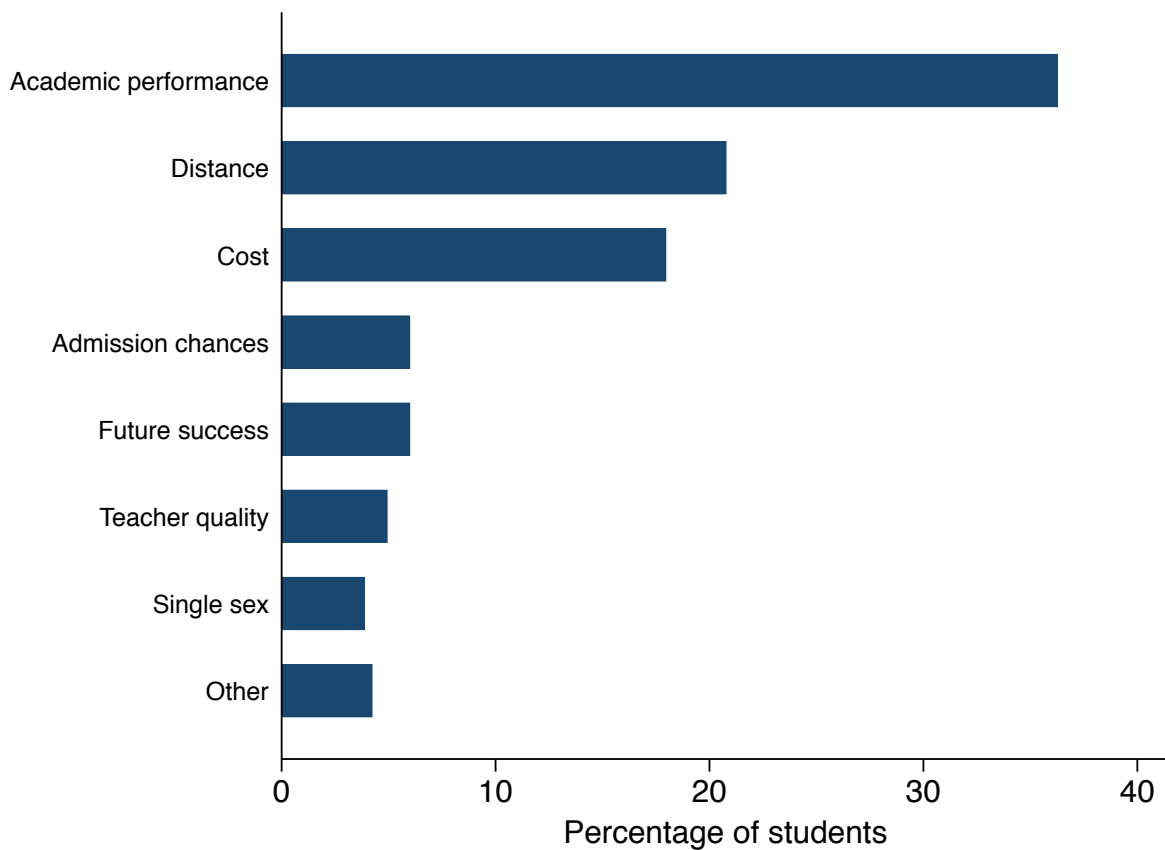
Figure 1: Theory of Change

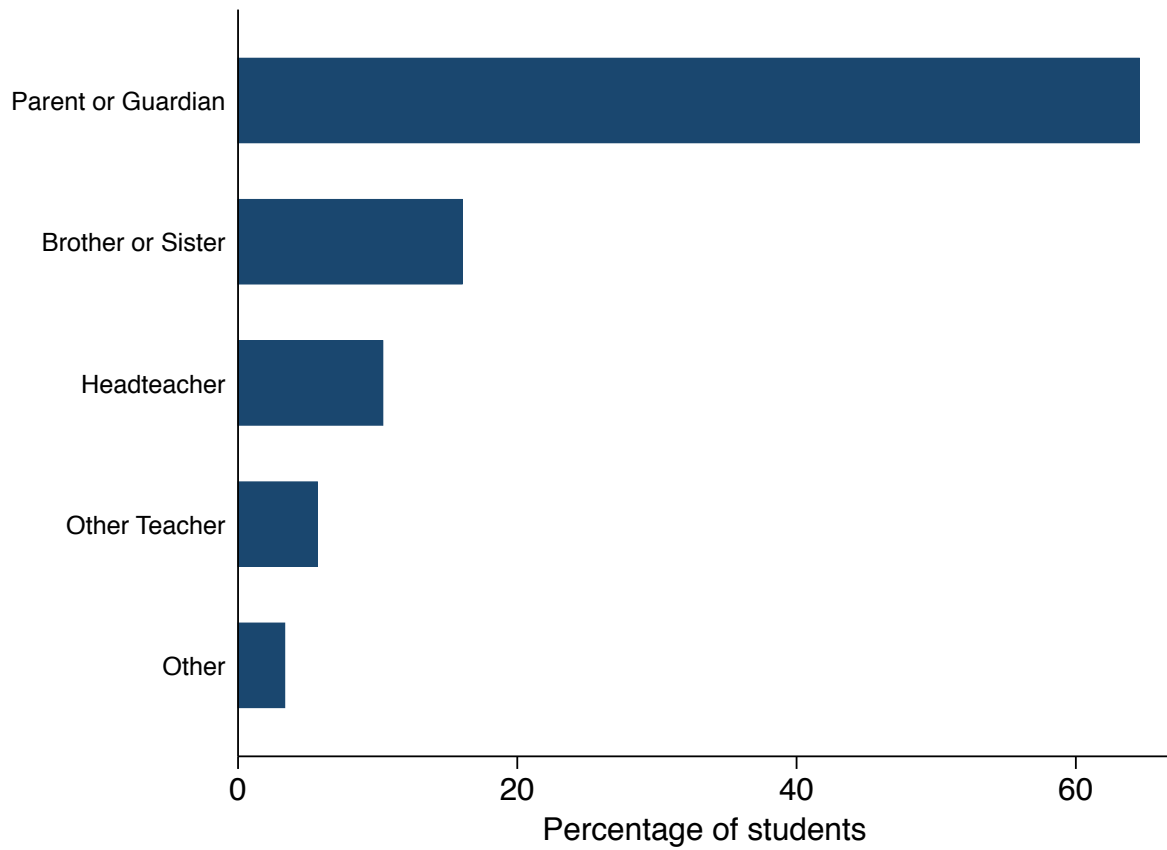Figure 2: Most important characteristic for school selection

Figure 3: Most helpful decision maker

Senior High School Information Booklet

Senior high school choices are important but many students choose schools they do not know much about and are then dissatisfied with their admissions outcomes. Making careful choices is one of the best ways to have a good senior high school experience.

How it works:

You will be selecting four choices from second cycle schools of different options. Each option contains a different set of schools.

OPTIONS:

Options 1, 2 & 3: Public Senior High Schools

Option 4: Public Technical/Vocational Institutions

Option 5: Private Senior High Schools + Private Technical/Vocational Institutions

You must:

1. **Choose four different schools.**

2. **Select a programme and an accommodation for each choice.**

3. **Remember that your choices:**

    * Can include **up to four Option 1** schools
    * Can include **up to four Option 4 or 5** schools
    * Can include **up to two Option 2** schools
    * Can include **up to one Option 3** school

How to make good senior high school choices:

1. What is important to you and your family?

* **Staying close to home?** Only select schools in your region or district. If you want to stay within 16km of your JHS, use the CATCHMENT AREA OPTION.
* **Single sex or mixed?** Some schools are mixed and some are girls or boys only.
* **Boarding or day?** Some schools offer both options but some offer only one.
* **Programme type?** Be sure to choose schools that offer your programme of interest.

2. What was your raw BECE score (out of 600) on your mock exams?

* **Use the worksheet** in this booklet to calculate it.
* Be sure to choose **at least one school** where you have a good chance of being admitted.

3. Pick schools you would actually like to attend!

* You can only list four choices, and most students **do not** get placed in their first choice, so **every choice is important.**

4. List your choices in order of preference.

GUIIDE

Guidance and Information for Improved
Decisions in Education

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Figure 4: Booklet Introduction

How to use this booklet:

This booklet contains information on all senior high schools and technical/vocational institutes in **Ashanti region**, to inform you about your local options. You are free to select other schools outside this region if you would like.

Code: Official school code

District: District and town or neighborhood

Gender: Is school boys-only, girls-only, or mixed

Programme: Programmes offered

Low BECE Score: Score exceeded by 95% of admitted students

Candidates: Total number of WASSCE candidates

Code	School Name	District	Gender	Boarding	Programme	BECE Score of Admitted Students		WASSCE Performance		Option
						Average	Low	Pass Rate	Candidates	
XXXXX	**EXAMPLE** Senior High/Technical School (nickname)	KUMASI METRO Bantama-Kumasi	Mixed	Day / Boarding	Agriculture	339	309	72%	739	1
					Business	368	345			
					General Arts	391	338			
					General Science	403	379			
					Home Economics	376	311			
					Technical	356	328			
					Visual Arts	365	349			

School Name: Official school name and nickname (if any)

Boarding: Is school day, boarding, or **both**

Average BECE Score: Average score of admitted students

Pass Rate: Percentage of students who passed WASSCE core subjects

A NOTE ON BECE SCORES

These scores from students admitted in the last three years give you a rough guide of how likely you are to be admitted. **If your BECE score is far below the low score**, you have a small chance. **If your score is close to or above the average**, you have a high chance. These **scores change every year**, so even getting a BECE score above last year's scores cannot guarantee your admission, but gives a guide of what to expect.

WASSCE Performance is also based on candidates from the last three years (2013 to 2015).

GUIIDE
Guidance and Information for Improved Decisions in Education

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Figure 5: Sample Booklet Page

Fieldwork Timeline

JHS 3

SHS 1

Jan 2016: Baseline Student Survey + Information Interventions	**March 2016:** 1st Follow-Up Student Survey (Reported Beliefs Choices) + Parent Survey	**Oct 2016:** Administrative data: -BECE scores -Ranked choices -SHS placement	**April 2017:** 2nd Follow-Up Phone Survey (Secondary Enrollment)

Student Timeline

Feb 2016: Students submit list of 4 choices for secondary admission

June 2016: Take BECE Exam

Sept 2016: Receive BECE results

Oct 2016: Receive SHS Placement
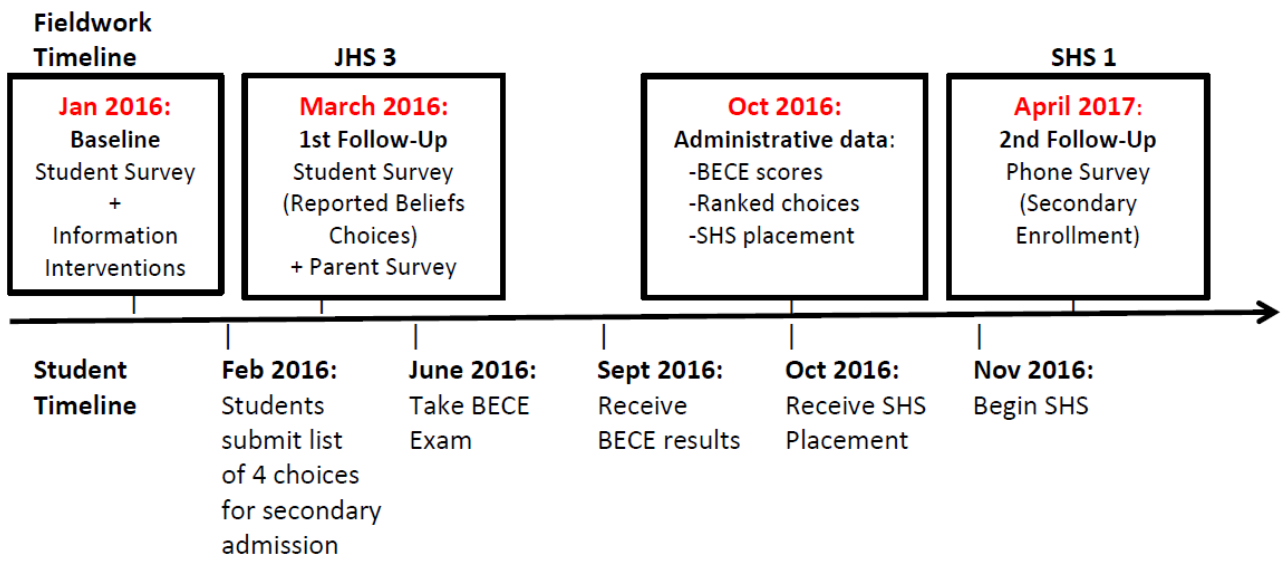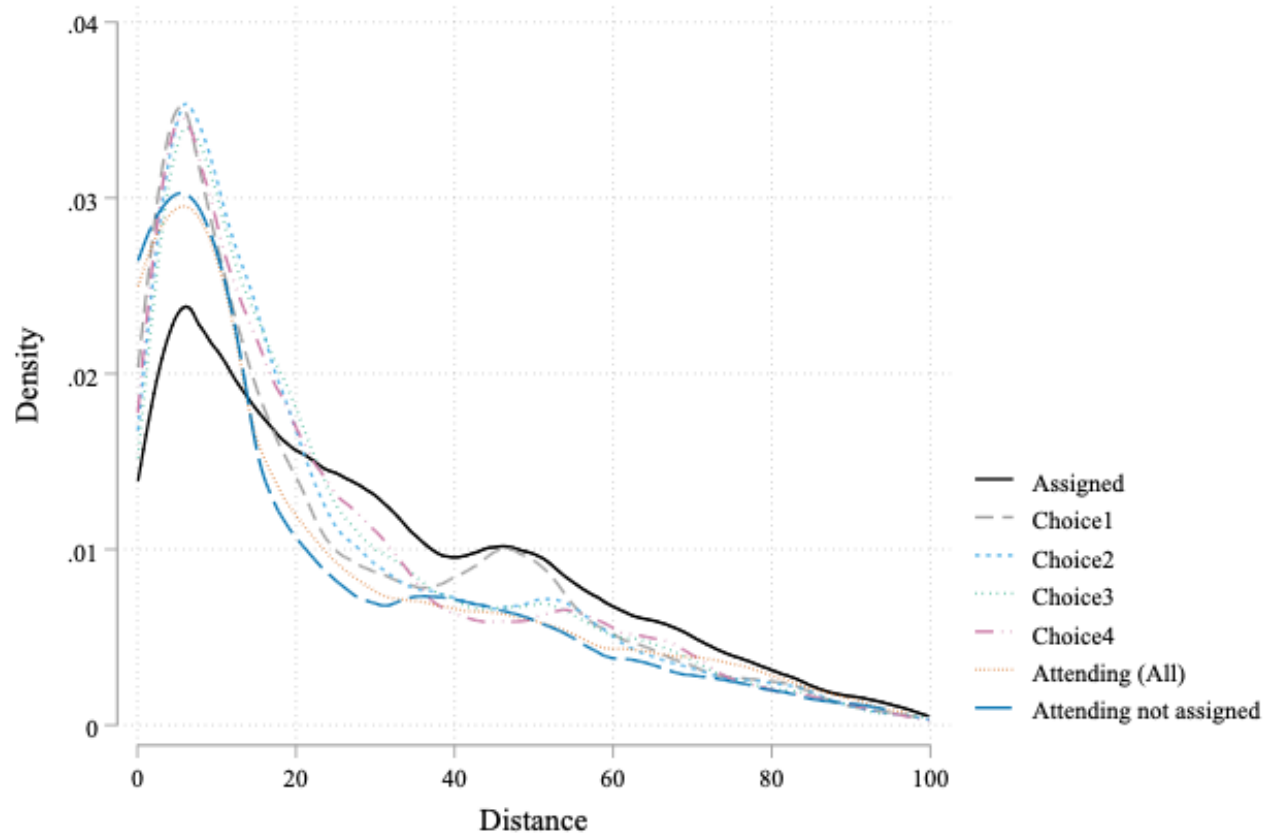
Nov 2016: Begin SHS

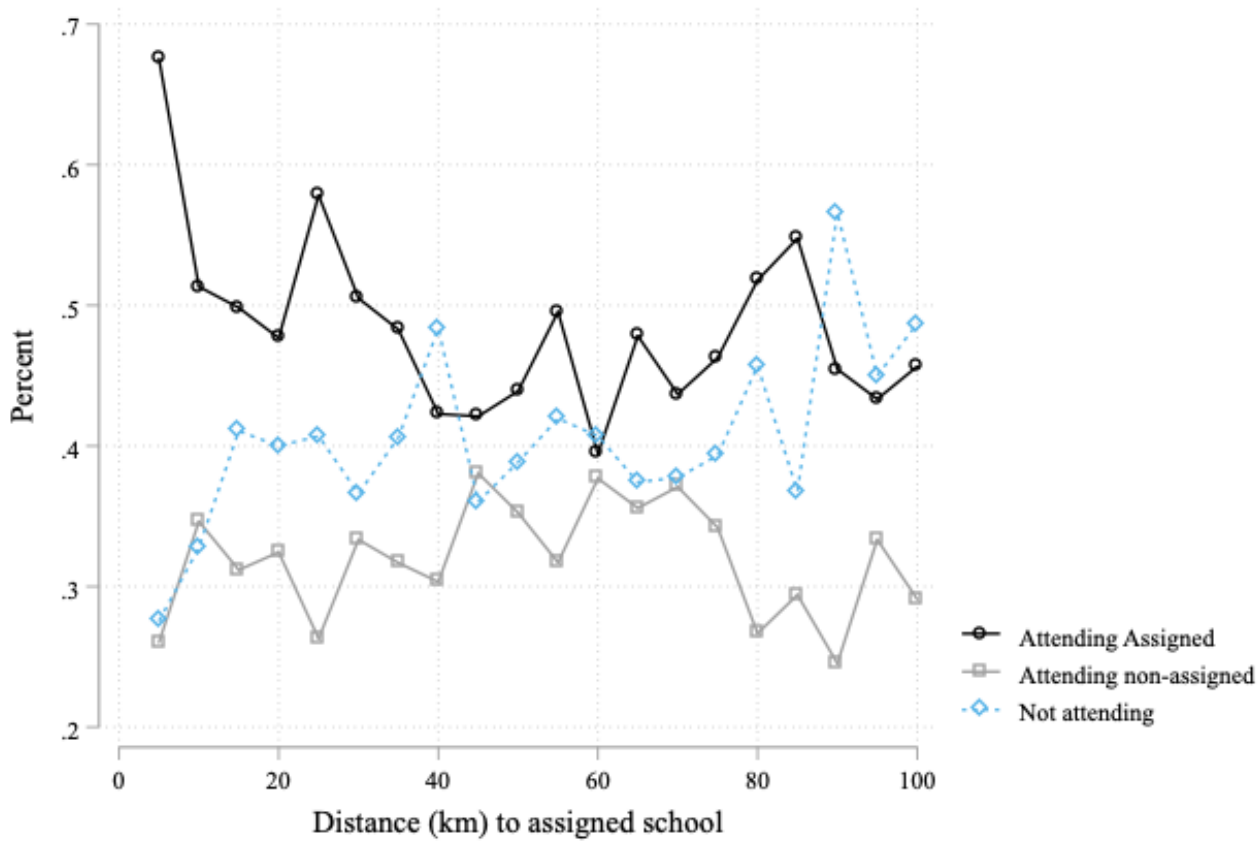Figure 6: Study timeline

Figure 7: Where are schools?

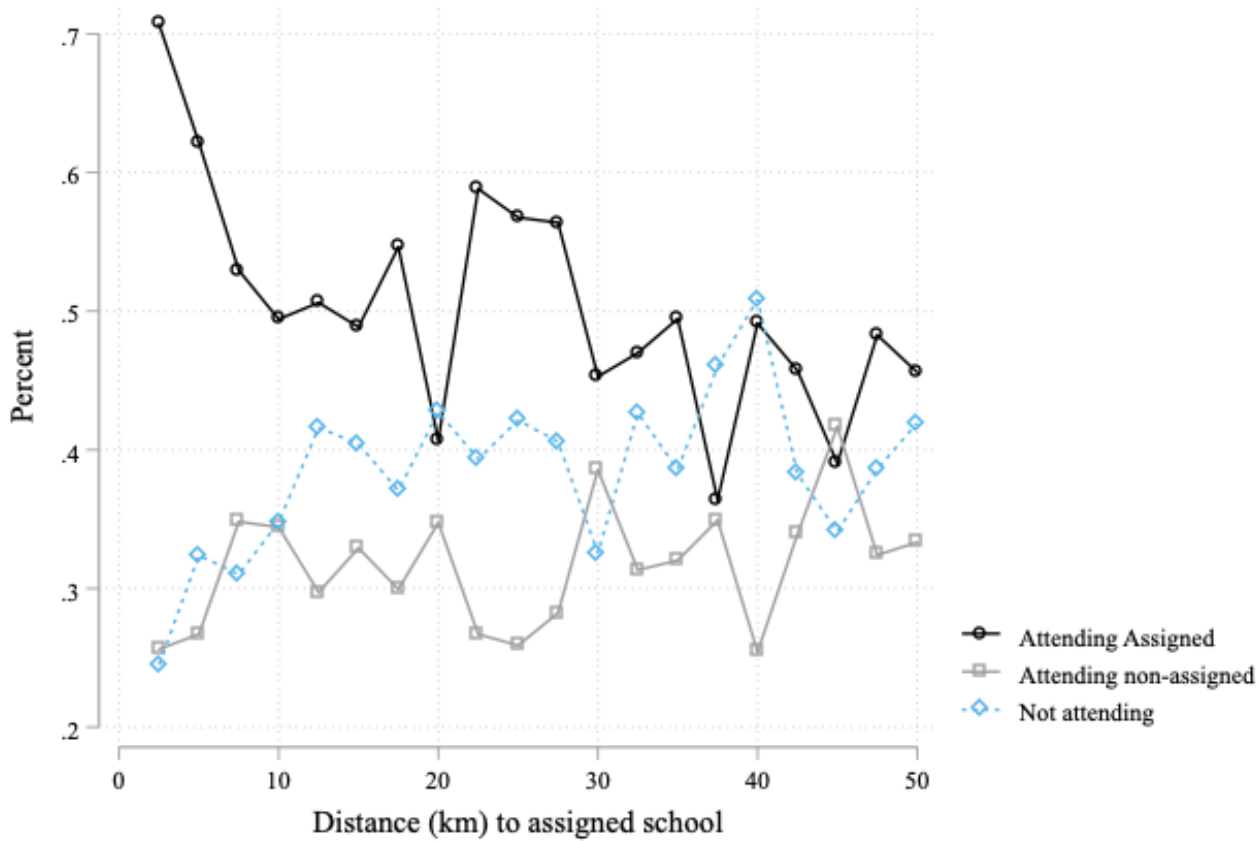Figure 8: Are students moving home?

Figure 9: Are students moving home?

Table 1: Baseline Balance

	Student Info (1)	Parent Info (2)	Control (3)	p-value diff (1) vs (3) (4)	p-value diff (2) vs (3) (5)
Age	15.93	15.81	15.81	0.13	0.13
	(1.44)	(1.42)	(1.43)		
Days Absent	1.66	1.76	1.69	0.53	0.83
	(3.22)	(3.29)	(3.41)		
Taken Mock BECE	0.50	0.49	0.52	0.94	0.75
	(0.50)	(0.50)	(0.50)		
Expected BECE	11.60	11.55	11.57	0.87	0.91
	(4.77)	(4.82)	(4.82)		
Believes CSSPS Fair	0.61	0.60	0.58	0.79	0.43
	(0.49)	(0.49)	(0.49)		
Low Income	0.27	0.26	0.26	0.73	0.74
	(0.44)	(0.44)	(0.44)		
Father Educated Beyond JHS	0.39	0.44	0.41	0.05	0.49
	(0.49)	(0.50)	(0.49)		
Mother Educated Beyond JHS	0.23	0.24	0.23	0.39	0.84
	(0.42)	(0.43)	(0.42)		
Father completed no school	0.12	0.10	0.12	0.29	0.87
	(0.32)	(0.30)	(0.32)		
Mother completed no school	0.17	0.15	0.16	0.29	0.64
	(0.37)	(0.36)	(0.37)		
Observations	3631	3540	3617		

Notes: p-values of differences based on clustering at the level of JSS.

Table 2: Intervention Take-up

	Seen Booklet (1)	Seen Video (2)
Student Info	0.139***	0.779***
	(0.017)	(0.018)
Parent Info	0.153***	0.764***
	(0.017)	(0.020)
Student = Parent p-value	0.076	0.478
Observations	11466	11456
R^2	0.099	0.593
Control Group Mean	0.821	0.142

Note: All outcomes in this table are from the first follow-up survey. These outcomes are based on student self-reports of whether they had seen a booklet/video about the SHS application process. Each column represents one regression, which controls for gender and includes JHS district FEs. All estimates are clustered at the JSS level.

Table 3: Selection Process

| | Self-reported source of information | | | | | Reported parent would Help Choose |
| | Booklet | Radio/TV/Newspaper | Internet | Other people | Other | |
	(1)	(2)	(3)	(4)	(5)	(6)
Student Info	0.163***	-0.065***	-0.032*	-0.052***	-0.009*	0.045***
	(0.021)	(0.018)	(0.017)	(0.013)	(0.005)	(0.014)
Parent Info	0.171***	-0.041**	-0.011	-0.032**	-0.013***	0.054***
	(0.020)	(0.016)	(0.017)	(0.013)	(0.004)	(0.014)
Student = Parent p-value	0.733	0.185	0.216	0.097	0.337	0.467
Observations	11472	11471	11471	11471	11472	11230
R^2	0.054	0.019	0.033	0.026	0.004	0.017
Control Group Mean	0.212	0.681	0.342	0.199	0.032	0.753

Note: All outcomes in this table are from the first follow-up survey. These outcomes are in response to a question of students regarding where they obtained information about the SHS academic quality of secondary schools. Each column represents one regression, which controls for gender and includes JHS district FEs. All estimates are clustered at the JSS level.

Table 4: Stated Preferences

	Distance (1)	How Affect Future Success (2)	Most important factor in selecting schools Teacher quality or School Reputation or Facilities (3)	Discipline (4)	Academic Quality (5)	Admissions Chance (6)
Student Info	0.036***	-0.038***	-0.015	-0.009*	0.005	0.031***
	(0.007)	(0.010)	(0.009)	(0.005)	(0.021)	(0.009)
Parent Info	0.039***	-0.013	-0.020**	-0.011**	0.013	0.009*
	(0.007)	(0.011)	(0.009)	(0.005)	(0.019)	(0.005)
Student = Parent p-value	0.749	0.012	0.518	0.720	0.655	0.017
Observations	11454	11454	11454	11454	11454	11454
R^2	0.014	0.009	0.018	0.005	0.037	0.012
Control Group Mean	0.046	0.115	0.093	0.036	0.539	0.028

Notes: All outcomes in this table are from the first follow-up survey. These are responses to: "What is the most important factor you think about when selecting schools." The options were: Distance from home; Cost; Chances of being admitted; Academic performance of the school; (any of) Teacher quality, Reputation of the school, Facilities and resources; Boys or girls only; Religious affiliation; Family member attended; How it might affect my future success; Discipline or behavior of past students. Each column represents one regression, which controls for gender and includes JHS district FEs. All estimates are clustered at the JSS level.

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Table 5: Characteristics of Application Choices

	Applied only Ashanti (1)	1st Choice BECE mean (2)	2nd Choice BECE mean (3)	3rd Choice BECE mean (4)	4th Choice BECE mean (5)	Mean SSCE Pass Rate All SHS Applied (6)	Value Added All SHS Applied (7)
Student Info	0.040***	-0.011	-0.028	-0.040	-0.050	-0.261	-0.001
	(0.014)	(0.030)	(0.026)	(0.028)	(0.031)	(0.787)	(0.036)
Parent Info	0.035***	-0.026	-0.055**	-0.061**	-0.051*	-0.468	-0.005
	(0.014)	(0.028)	(0.024)	(0.025)	(0.028)	(0.734)	(0.034)
Student = Parent p-value	0.752	0.612	0.289	0.442	0.975	0.793	0.921
Observations	40739	37197	37467	37733	38036	42104	40152
R^2	0.095	0.179	0.178	0.172	0.182	0.189	0.174
Control Group Mean	0.708	0.715	0.556	0.472	0.374	58.916	0.000

Notes: *Applied only Ashanti* is an indicator for whether all of the schools to which the student applied are in Ashanti. Columns 2-5 represent the mean incoming BECE score in the booklet of their 1st-4th choice schools in 2013. *Mean SSCE Pass Rate All SHS Applied* is the average SSCE pass rate among all schools to which they applied. *Value Added All SHS Applied* is the average value-added score across all schools to which they applied. Each column represents one regression, which controls for gender and includes JHS district FEs. All estimates are clustered at the JSS level.

Table 6: BECE

	Took BECE (1)	BECE score (2)
Student Info	-0.004	-0.012
	(0.008)	(0.080)
Parent Info	-0.007	-0.045
	(0.008)	(0.074)
Student = Parent p-value	0.777	0.655
Observations	42228	41159
R^2	0.037	0.116
Control Group Mean	0.979	0.005

Notes: All outcomes in this table are from the CSSPS administrative data. Each column represents one regression, which controls for gender and includes JHS district FEs. All estimates are clustered at the JSS level.

Table 7: Admissions

	Admitted Any School (1)	Admitted Any Choice (2)	Admitted 1st Choice (3)
Student Info	0.011	0.007	-0.001
	(0.018)	(0.020)	(0.014)
Parent Info	0.019	0.027	0.001
	(0.015)	(0.021)	(0.014)
Student = Parent p-value	0.607	0.322	0.922
Observations	42228	42228	42228
R^2	0.318	0.180	0.120
Control Group Mean	0.840	0.526	0.198

Notes: All outcomes in this table are from the CSSPS administrative data. Each outcome variable is an indicator for whether the student was admitted to any school, admitted to any of their four ranked choices, and placed in their 1st choices. Each column represents one regression, which controls for gender and includes JHS district FEs. All estimates are clustered at the JSS level.

Table 8: Admissions Characteristics

	Assigned Ashanti (1)	Assigned SHS BECE mean (2)	Assigned SHS Value Added (3)	Assigned Program BECE mean (4)	Assigned Program Value Added (5)
Student Info	0.028	-0.054*	0.037	-0.066*	0.058
	(0.019)	(0.032)	(0.025)	(0.037)	(0.035)
Parent Info	0.043***	-0.070**	0.080***	-0.089**	0.098***
	(0.015)	(0.033)	(0.024)	(0.036)	(0.034)
Student = Parent p-value	0.346	0.604	0.074	0.509	0.219
Observations	42228	28147	27896	19751	19297
R^2	0.223	0.051	0.075	0.133	0.098
Control Group Mean	0.750	0.016	-0.000	0.157	0.000

Notes: Columns 1, 2, 3, and 4 are at the SHS level for the assigned school. Column 1 is whether the student was assigned to a school in Ashanti, conditional on having been assigned anywhere. Column 2 is the average of all of the booklet-reported BECE scores in the booklet. Column 3 is the residual from a regression of the school's booklet-reported SSCE pass-rate on the booklet-reported incoming BECE means and 5th percentiles in each program. Missing incoming scores (for example, if a school does not offer a program) are included with the mean for that program across schools and an indicator for missing that variable. Columns 4 and 5 are at the program level. In column 4, the outcome is the booklet-reported BECE mean for the program to which a student applied. Column 5 is the residual of a regression of the school's booklet-reported SSCE pass-rate on the booklet-reported incoming BECE mean and 5th percentile in their chosen program. Each column represents one regression, which controls for gender and includes JHS district FEs. All estimates are clustered at the JSS level.

Table 9: Matriculation

	Currently attending SHS (1)	Started on time if attending (2)	Attending assigned SHS (3)	Attending SHS in Ashanti (4)
Student Info	-0.008	-0.018	-0.003	-0.008
	(0.023)	(0.024)	(0.018)	(0.024)
Parent Info	-0.024	-0.040	0.033	-0.015
	(0.022)	(0.025)	(0.020)	(0.023)
Student = Parent p-value	0.516	0.397	0.088	0.760
Observations	7654	3751	7087	7654
R^2	0.062	0.066	0.032	0.067
Control Group Mean	0.599	0.443	0.229	0.514

Notes: All outcomes in this table are from the SHS follow-up survey. *Currently attending SHS* is an indicator for reporting that they are currently in school at the time of the second follow-up. *Started on time if attending* is an indicator for whether the student reported having started SHS by October 2016 if they are attending at all. *Attending assigned SHS* is an indicator for whether the student reported that they were attending the school to which they were assigned at the second follow-up. *Attending SHS in Ashanti* is an indicator for whether they are currently attending SHS in Ashanti. Each column represents one regression, which controls for gender and includes JHS district FEs. All estimates are clustered at the JSS level.

Table 10: Mean Effects

	Family 1: Exposed (1)	Family 2: Info Sources&Priorities (2)	Family 3: Application (3)	Family 4: BECE (4)	Family 5: Admissions (5)	Family 6: Matriculation (6)
Student Info	1.817***	0.405***	0.092***	-0.033	0.069	-0.022
	(0.050)	(0.035)	(0.029)	(0.065)	(0.043)	(0.044)
Parent Info	1.814***	0.328***	0.109***	-0.063	0.114***	-0.021
	(0.053)	(0.036)	(0.030)	(0.064)	(0.037)	(0.044)
Student = Parent p-value	0.940	0.040	0.573	0.684	0.238	0.980
Observations	11483	11483	42220	42228	42228	7654
R^2	0.542	0.041	0.155	0.036	0.276	0.046
Control Group Mean	0.000	0.000	-0.000	0.000	-0.000	-0.000

Notes: Each column represents one regression on the mean effect for a family of outcomes. Family 1 is whether the student reported having seen the video (corresponding to outcomes in Table 2). Family 2 includes whether the student reported getting information from a booklet, and whether they did not report getting information from radio/TV/Newspaper, the internet, other people, or other (corresponding to outcomes in Table 3) and whether the student prioritized information in the booklet (distance, academic quality, and admissions chances) and not those not in the booklet (how affect future success, teacher quality or school reputation or facilities, discipline) (corresponding to outcomes in Table 4). Family 3 is whether the student applied to only Ashanti, the reverse of the mean reported BECE scores in their 1st, 2nd, 3rd, and 4th choice schools, the mean SSCE pass rate and value-added at all the schools to which they applied (corresponding to outcomes in Table 5). Family 4 is whether the student took the BECE, and their BECE score (corresponding to outcomes in Table 6). Family 5 includes whether they were admitted to any school, admitted to any of their choices, and admitted to their first choice (corresponding to outcomes in Table7), whether they were assigned to a school in Ashanti, the reverse of the assigned SHS BECE mean, the assigned SHS value-added, the reverse of the assigned program BECE mean, and the assigned program value added (corresponding to outcomes in Table 8). Family 6 includes whether they are currently attending an SHS, whether they started on-time, whether they are attending the SHS to which they were assigned, and whether they are attending an SHS in Ashanti (corresponding to outcomes in Table 9). All estimates control for gender and includes JHS district FEs. All estimates are clustered at the JSS level.