CAN INFORMATION AND COUNSELING HELP STUDENTS FROM POOR RURAL AREAS GO TO HIGH SCHOOL? EVIDENCE FROM CHINA

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Abstract:

Recent studies have shown that only about two-thirds of the students from poor, rural areas in China finish junior high school and enter high school. One factor that may be behind the low rates of high school attendance is that students may be misinformed about the returns to schooling or lack career planning skills. We therefore conduct a cluster-randomized controlled trial (RCT) using a sample of 131 junior high schools and more than 12,000 students to test the effects of providing information on returns or career planning skills on student dropout, academic achievement, and plans to go to high school. We find that neither information nor counseling have significant effects on these student outcomes. In our analysis of the causal chain, we conclude that financial constraints and the poor quality of education in junior high schools in poor, rural areas may prevent information and counseling from having larger impacts.

JEL: I20, 015

Keywords: junior high school students, randomized controlled trial, information, counseling, dropout, educational attainment, high school, rural China

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1. Introduction

To sustain its economic growth in the coming years, China will have to increase the country's supply of skilled labor by enabling its workforce to attain to higher levels of formal education. The Chinese economy is projected to experience strong growth through the next decade (Perkins, 2008). Wages, already rising, will continue to increase (Ge and Yang, 2012). The demand for skilled labor will outpace that for unskilled labor as the economy shifts from one based on low-wage industries towards one based on higher-valued industries and services (Zhang et al., 2011). If an individual wants to hold a stable and high wage job in the coming decades, he/she will need to acquire skills (Zhang et al., 2011). To meet this challenge, individuals will need to be equipped with higher levels of schooling.

Unfortunately, when children in poor, rural areas today grow up, they may not be able to enjoy China's future economic prosperity because of their low levels of education. Recent studies have shown that only about two-thirds of the students from poor, rural areas in China finish junior high school and enter high school (Yi et al., 2011; Loyalka et al., 2011). Instead of continuing their education, most of these children enter the labor market and take unskilled jobs. The low rates of high school matriculation have occurred in spite of the efforts of policymakers to ensure that students from poor, rural areas continue on to high school (MOF and MOE, 2010).

There are a number of reasons why students from developing countries (especially those from poor, rural areas) may attain such low levels of education. Credit

constraints combined with the high cost of attending school can induce students from economically disadvantaged households to prematurely leave school (Banerjee et al., 2000). Even when schooling is free, there may be high opportunity costs of going to school (Angrist and Lavy, 2009). The highly competitive nature of education systems in many developing countries can also discourage students in poor, rural areas from continuing their education (Glewwe and Kremer, 2006; Clarke et al., 2000).

Misinformation about the returns to schooling is another important, but less researched, factor that may undermine the likelihood that students continue school. Economists argue that individuals make educational choices based on perceived, rather than actual, economic returns to schooling (Manski, 1993). However, perceived returns may differ from actual returns if individuals have limited or imperfect information. With imperfect information about the returns to schooling, students may choose not to enroll in high school (or their family may choose not to support them) even though increasing levels of schooling will better prepare them to participate in the future economy.

Individuals living in poor, rural areas often are thought to have imperfect information about the returns to schooling because locating reliable information tends to be relatively costly or impossible (Jensen, 2010; Nguyen, 2008). In such circumstances students generally obtain information about the returns to schooling by observing their parents and other members of the community (Jensen, 2010). However, in poor, rural areas parents and community members tend to have relatively low levels of education and work in low skilled industries. As a consequence, students in poor, rural areas tend to underestimate the actual returns to higher levels of schooling, ultimately leading them to leave the educational pipeline early on (Jensen, 2010; Nguyen, 2008).

Imperfect information about the returns to schooling, however, may only be part of the problem. There may be a number of other constraints. First, even if students understand that there are high returns to high school, they may not know how to prepare for high school. For example, students may not know the entrance requirements for attending high school and which types of high schools are available. Second, beyond economic returns, students may not see the links among their own interests and aptitudes, going to high school and the careers options available to them. We use the term *career planning skills* to refer to the knowledge about *how* to attend high school (requirements, options, planning, etc.) and the awareness of the links among one's own interests and aptitudes, high school and future career options.

Unfortunately, students in developing countries rarely have been taught career planning skills. They may, therefore, lack an understanding of their own interests and aptitudes, education and employment options, and an ability to plan for their future (Whiston, 2003; Savickas, 1999; Parsons, 1909). They may also be unsure how to navigate transitions from one level of education to another (Valentine et al., 2009; Vargas, 2004). Students from low-income backgrounds, especially, may not understand how to make the most out of their (often more limited) education and career opportunities (McSwain and Davis, 2007; McDonough, 2004). Because of these reasons, the lack of career planning skills may lead students to discontinue their schooling even if they know the returns to high school are relatively high. If attending high school requires complicated advance planning and preparation, students who know the value of high school may still be overwhelmed by the process and ultimately decide not to attend (or may not be motivated to become engaged in planning and preparation).

Studies from several countries—outside and inside of China—show that providing information about the returns to schooling or teaching career planning skills can be a cost-effective solution to improving the educational outcomes of students. For example, in the Dominican Republic students that received information about the returns to schooling went to school longer (Jensen, 2010). Students in Madagascar that received information on the returns to schooling scored higher on achievement tests (Nguyen, 2008). When Chinese high school students from poor, rural areas were given information about the college tuition prices and the availability of financial aid, they were more likely to go to college and take advantage of financial aid programs (Loyalka et al., 2009). Career counseling interventions in the United States have been shown to increase school enrollment rates among low-income students, improve their ability to secure financial aid and encourage them to attend more selective colleges (Castlemana et al., 2011; Koivisto et al., 2010; Whiston et al., 1998; Oliver and Spokane, 1988). In spite of this evidence, no study has, to our knowledge, discussed the impact of offering information on the returns to schooling or teaching career planning skills on the educational attainment/academic achievement of junior high students in China. Furthermore, there have been no known studies in China exploring conditions under which providing information might affect educational attainment and achievement.

The main purpose of this study is to measure the impact of offering information or teaching career planning skills on dropout, academic achievement, and plans to go to high school among grade 7 students in poor, rural areas in China. To meet this overall goal we have three specific objectives. First, we determine the extent to which students are misinformed and lack career planning skills. Second, we analyze the impact of

information about returns to schooling and career planning skills on dropout rates, academic achievement, and plans of students to go to high school. In pursuit of this objective, we also seek to determine if there are heterogeneous effects of the interventions on low-achieving, male, or poor students. Third, we explore why information about returns to schooling and career planning skills may or may not be affecting student outcomes in the context of junior high schools in poor, rural counties in China.

To meet these objectives, we conducted a baseline survey of more than 12,000 grade 7 students in rural, public junior high schools in Hebei and Shaanxi provinces. In the survey we documented the poverty levels of students, their academic (math) achievement levels, their future education and occupational plans, as well as various other factors that potentially shape their future plans, including their perceptions of the net returns (wages minus the costs) associated with different levels of education.

Using the information from the baseline survey, we conducted a cluster-randomized controlled trial among 131 schools, which were assigned to either one of two treatment arms or to a control arm. In the first treatment arm, professional counselors trained grade 7 teachers how to provide students with information on the net returns associated with different levels of schooling (henceforth called the *information intervention*). In the second treatment arm, professional counselors trained grade 7 teachers how to provide a more comprehensive program on career planning skills (the counseling intervention—which expands on the information intervention) to their students (henceforth called the *counseling intervention*).

Our analysis focuses on the impact of the information and counseling interventions on several outcomes: dropout; academic achievement as measured by scores on a standardized math exam; and self-reported plans to go to academic high school, vocational high school, or the labor market (henceforth called *plans to go to high school*). Since, according to our analysis, we find that the information and counseling interventions have few significant effects on the outcome variables, we try to identify why these treatments have small or negligible effects. We conclude that financial constraints and poor educational quality prevent information and counseling from having larger impacts on dropout rates, academic achievement, and plans to go to high school among students in poor, rural areas.

The rest of the paper is organized as follows. Section 2 explains why information about the returns to schooling and career planning skills are particularly needed in poor, rural areas in China. Section 3 describes our experimental research design, interventions, data collection process and statistical approach. Section 4 presents descriptive statistics on the current state of student information about returns to schooling and career planning skills. Section 4 also presents the results of the multivariate analysis of the impact of the information and counseling interventions on dropout rates, academic achievement, and future plans to go to high school among poor, rural grade 7 students in our sample schools. We also examine if the impacts of the interventions differ for low-achieving, male, or poor students. Section 5 describes our analysis of the causal chain (that is, why we may not be observing any effects of the interventions). We summarize and discuss the research and policy implications of our findings in Section 6.

2. Background: The Lack of Information and Career Planning Skills in China

The absence of access to good information about the returns to schooling and the absence of career planning skills are of particular concern for policymakers in China who are aiming to improve high school matriculation. Indeed, in poor, rural areas of China, there are at least three reasons why misinformation and poor career planning skills must be tackled as early as grade 7 (the first year of junior high). First, youth in poor, rural areas of China are dropping out before they even reach the stage of applying for high school (Yi et al., 2011). They may be leaving because of imperfect information about the net returns (the wages minus the costs) associated with going to higher levels of schooling (Loyalka et al., 2009; Liu et al., 2008). For example, tempted by rising wages for unskilled labor in the short-term, junior high students may decide not to continue to high school. Unfortunately, students are not aware that the wages of individuals with lower levels of education will on average rise more slowly over the course of a lifetime compared to the wages of individuals with higher levels of education (Cai, 2009). This problem is exacerbated by the fact that some companies, short on unskilled labor, aggressively recruit junior high school students and graduates (Yi et al., 2011). Students might also be less likely to attend high school if they overestimate the cost of going to school, including the level of net tuition (the level of tuition minus financial aid) associated with going to high school.

Second, China's competitive education system means that students need to have career planning skills relatively early in their academic life—as early as grade 7. Students must take a high-stakes high school entrance exam at the end of junior high school (at the end of grade 9) to qualify for entrance into academic high school (Loyalka et al., 2011). If students do not recognize the importance of the high school entrance exam in grade 7,

they may not be fully motivated to prepare for this exam. Similarly, students may not be aware of additional entrance requirements for academic or vocational high schools. However, if students make the decision to attend high school in grade 9, they may not have enough time to make the necessary preparations.

Third, students need to have clear plans as early as grade 7 to effectively choose among their future options, as compulsory education ends after junior high school. Upon graduating from junior high school, students have to make a decision to follow one of three tracks: a) pay to enter academic high school (the primary gateway to college); b) pay to enter various types of vocational high school (albeit at lower rates than those for academic high schoo1 and without the need to pass an entrance exam); or c) enter the labor market. In addition to keeping their grades sufficiently high, students who wish to continue their education beyond junior high must plan ahead to apply for the right type of academic or vocational school or risk attending a subpar school. Unfortunately, poor information about returns to schooling and poor career planning skills can impair the ability of grade 7 students to make and act on their plans. Without sufficient planning or an adequate understanding of how to choose and matriculate a particular high school, students in poor rural areas may ultimately opt for the most readily available option: entering the labor market.

3. Research Design, Interventions, Data and Statistical Approach

We conducted a cluster-randomized controlled trial (RCT) to estimate the impact of our information and counseling interventions among 12,786 first-year students in 131 rural, public junior high schools located in 15 nationally-designated poor counties in

Hebei and Shaanxi provinces. In Hebei our sample covered 10 poor counties, 60 junior high schools, 153 grade 7 classes and 6,491 students. In Shaanxi the sample covered 5 poor counties, 71 junior high schools, 153 grade 7 classes and 6,305 students. We chose Hebei and Shaanxi provinces because they differ in terms of location and geography, allowing us to make broader inferences from our data.

Using official records, we first created a sampling frame of all rural, public junior high schools in the sample counties. A total of 150 schools were identified (71 in Shaanxi and 79 in Hebei). We sampled all of the schools in Shaanxi, 71 (out of 71) schools. In Hebei, we sampled 60 (out of 79) schools. We excluded the 19 schools in Hebei because the number of grade 7 students in the schools was under 50. These schools were excluded on the basis of enrollment because smaller schools were likely to be closed as a part of a government school merger program. On average, there were 42 grade 7 students in each sampled class. In our baseline survey, we surveyed all students in all 306 grade 7 classes in all 131 schools. Hence, our sample is roughly representative of rural, pubic junior high schools in nationally designated poor counties in provinces like Shaanxi and Hebei.

The next step of our study was to conduct a baseline survey at the beginning of the school year in October 2010. In the survey we collected data from all grade 7 students, grade 7 homeroom teachers, and school principals. We further asked each student to take a standardized mathematics examination (for more information, see “Data Collection” below).

After the baseline examination, we stratified the 131 sample schools into roughly 22 equal size blocks of six schools to increase the statistical power of our analyses (see Imai et al., 2009). The blocks were created by first ranking schools by grade 7

enrollments within each province (from lowest to highest), then choosing the first six schools for the first block, the next six schools for the second block, and so on.[i]

After blocking, our research team randomly assigned two schools in each block to one of two experimental arms and a control arm (described below under "Experiment Arms/Interventions"). In total, 44 schools were assigned to the information intervention, 43 schools to the counseling intervention, and 44 schools to the control arm. Thereafter, we randomly selected half of the grade 7 homeroom teachers (and their respective classes) from the sample schools in the information and counseling intervention arms to attend a training program that was taught by professional counselors in November 2010. If a school had an odd number of grade 7 homeroom teachers, we randomly selected (N-1)/2 homeroom teachers to participate in the training program, where N equals the total number of grade 7 homeroom teachers in the school. These teachers then went back to their schools and, depending on their respective treatment arm, implemented either the information or counseling interventions with the students in their own classes in December 2010. Figure 1 depicts the flow of participants through each stage of the study, as well as the project timeline.

The use of our baseline data and the approach to random assignment (and blocking) successfully created a sample that was balanced across a large number of variables. To test for balance, we ran regressions of various baseline covariates on the binary treatment indicators (information and counseling). We find that students in the counseling treatment arm are not statistically different (at the 10% level) from students in the control arm on a variety of covariates, such as gender, age, baseline academic (math) achievement, self-reported plans to go to high school (using data from the baseline

survey), the number of siblings of each student, the education levels, and migration status of the parents of students and a dummy indicator of the health status of each student's parents (Table 1). While there do appear to be some discrepancies between the characteristics of students in the information treatment arm—namely gender, number of siblings, and the likelihood of mother's migration—the magnitude of these discrepancies is small. To increase statistical efficiency and ensure that these small discrepancies do not influence our results, we control for all of the covariates in our analysis (see "Statistical Analysis" below).

3.1 Experiment Arms/Interventions

Our experiment randomly assigned the 131 junior high schools in our sample to one of three groups: an information intervention arm, a counseling intervention arm or a control arm. Using estimates from pilot studies, we calculated that we required at least 70 individuals per school and 40 schools per arm to detect a standardized effect size for the academic achievement outcome of .25 with 80 percent power at a five percent significance level. We conservatively assumed an intra-cluster correlation of 0.20, a pre- and post-intervention correlation of 0.6, and a ten percent loss to follow-up. The following section details the three experiment arms.

3.1.1 The information intervention arm

In schools that received the information intervention, grade 7 homeroom teachers and their principals came to a central training location (in either Shaanxi or Hebei province). At each location a professional counselor conducted a scripted, half-day training for the teachers and principals. The participants, in turn, learned how to give a

scripted 45-minute lesson to their grade 7 students. At the end of the training, each teacher received a teacher's manual with the standardized lesson script, a DVD of the professional trainer giving the lesson, and sufficient student workbooks for all the students in their grade 7 classes. Teachers agreed to conduct the training lesson (that is, the information intervention) with their students during the week of December 20-24, 2010.

The information intervention presented statistics on the net returns (wages minus costs) associated with different levels of schooling in simple graphical and tabular forms. First, the lesson shared information on the average wage levels of graduates from different levels of schooling (junior high schools, high schools, three-year vocational colleges, four-year universities, and graduate schools). Second, students were taught about the wage differences between high school and junior high school graduates in percentage terms.[ii] Specifically, students were provided with national-level statistics for the entire population, for urban and rural subpopulations separately, for female and male subpopulations separately, and for the migrant worker subpopulation only. Students were also provided with provincial-level statistics (for the population in their home province) on the average wage levels and wage differences associated with different levels of education. The above information on average wage levels and wage differences was provided in a format similar to that of Jensen (2010). Finally, students were taught the levels of tuition (the costs) that students from Hebei or Shaanxi would pay for attending different levels of schooling and different types of schools within each level of schooling.[iii]

3.1.2 The counseling intervention arm

In schools that received the counseling intervention, grade 7 homeroom teachers and their principals came to a central training location in either Shaanxi or Hebei province. At each location a professional counselor gave the teachers and principals a scripted training. The training in this case lasted a day and a half, substantially longer than the training for the information intervention.

During the counseling training, participants learned how to give four scripted 45-minute lessons to grade 7 students. The first lesson was entitled “The world of work and knowing your place in it.” The second was entitled “An overview of careers and career planning.” The third was identical to the information intervention lesson described above. The fourth and final lesson was entitled “Making educational choices after junior high school.” Each teacher received a teacher’s manual with standardized lesson scripts, a DVD of a professional trainer giving the four scripted lessons, and enough student workbooks with accompanying lesson materials for all students in their grade 7 classes. Finally, teachers agreed to conduct one lesson each week (in the predetermined order) over four consecutive weeks in December 2010.

The career counseling lessons were developed over a period of five months by our research team in consultation with a number of career counseling experts. One of our initial steps was to refer to education and career counseling and development curricula and guidelines from the United States, Canada and Australia (e.g., material from the US Department of Education, different state education departments, and not-for-profit organizations). We also relied heavily on the research literature on career counseling and developmental and vocational psychology (including but certainly not limited to recent annual reviews in *Career Development Quarterly*).

We took care to adopt the materials so that they were appropriate for junior high students in China. We piloted the materials multiple times with different sets of grade 7 students in China. In a number of cases, we modified the materials based on the feedback we received from principals, teachers and students in pilot schools in Hebei and Shaanxi. Finally, a professional design company helped us to arrange and design the materials that would be used by teachers and students (to make them attractive to students and better command their attention). Details about the content of each lesson are given in Appendix A below.

3.2 Data Collection

We collected student information on three primary outcome variables in our evaluation survey in May 2011. The three outcome variables, which are used in our subsequent analyses, are: (a) student dropout (a binary variable equal to one if students dropped out and zero otherwise), (b) academic (math) achievement (a continuous variable that is normalized) and (c) plans to go to high school as measured at the end of grade 7 (three binary variables, respectively equal to one if students indicated planning to attend academic high school, vocational high school, or any high school and zero otherwise).

Considerable effort was made during the evaluation survey to find out which students had dropped out of grade 7. We asked both teachers and classmates to confirm the dropout status of students that were present in the baseline survey but were missing during the evaluation survey. In cases where the dropout status was unclear, we called the students (or their families) using contact information we collected from the baseline survey.

Academic achievement was measured using a standardized math exam that was administered during the evaluation (May 2011) and baseline (October 2010) surveys. Students had to finish the math exam within 30 minutes. Our enumerators strictly enforced the time limits and students were closely proctored to minimize cheating.

We also used item-response theory (IRT) to calibrate the scores from the math exams. To do so, we first piloted (before the baseline survey) math exam items that would be used to construct the baseline and evaluation math exams with over 300 students. We then aligned the two exams on the same difficulty scale using a procedure suggested by Kolen and Brennan (2004). This procedure allows us to directly compare student baseline and evaluation scores (and thus look at student learning gains). Finally, the IRT-scaled scores were scaled into z-scores by subtracting the mean and dividing by the standard deviation (SD) of the IRT-scaled score distribution. These IRT-scaled and normalized scores are used as our key measure for academic achievement.

Students were asked about their educational plans in the evaluation and baseline surveys. In particular, we asked students which educational track they planned to choose after junior high: academic high school, vocational high school, or the labor market. We allowed the student to say that he/she was undecided. We also asked the student to identify factors (such as family financial constraints or poor academic achievement) influencing their decision. We asked students who had the greatest decision-making power: themselves, their parents, their classmates, their teachers, their principal or others. In addition, we asked students to provide their best guess as to the total cost of attending academic high school, vocational high school, and college. Finally, we asked each student to predict the monthly wage that he/she expected to earn after graduating from academic,

high school, vocational high school, or entering the labor market directly after junior high.

We used other information from our baseline survey to document starting values of the outcome variables and to generate a set of control variables that are used in the analysis. One part of the student baseline survey collected data about the basic background characteristics of all students and their families. This part of the survey included data on each student's gender, age, and contact information. We also collected information about each student's family characteristics, such as number of siblings (of each student), the health status of parents (as perceived by the student), whether parents had completed primary school, and whether parents had ever migrated. Similar variables have been used in previous studies to explain differences in educational outcomes among students (e.g., Behrman and Rosenzweig, 2002; Coleman, et al., 1966; Currie and Thomas, 1995).

Another part of the student survey asked students about their household assets. A monetary value was assigned to each asset based on the National Household Income and Expenditure Survey (NBS, 2007). We then generated an estimate of the value of household assets by aggregating the individual asset values. This household-asset-value variable serves as an indicator of the poverty level of the household (*Poverty Indicator*).

We also collected information on homeroom teacher and school characteristics during our baseline surveys. Homeroom teacher characteristics included each teacher's gender, experience (in years), ranking (as per China's system of ranking teachers), whether the teacher had earned awards for teaching, and whether he/she would be somehow rewarded if his/her students performed well (a common practice in some

China's schools). School level characteristics were gathered in the principal surveys and included school finances, facilities, and enrollments.

3.3 Statistical Approach

We use unadjusted and adjusted ordinary least squares (OLS) regression analysis to estimate how dropout, academic achievement, and plans to go to high school changed for students in the information and counseling intervention arms relative to students in the control arm. Our unadjusted analyses regresses the outcome variables on the two treatment dummy variables: whether schools received the information or counseling interventions or not. The basic specification of the unadjusted model is:

$$Y_{ij} = \beta_0 + \beta_1 I_j + \beta_1 C_j + v_b + u_{1ij} \quad (1)$$

where Y_{ij} represents the outcome variable of interest of student i in school j. I_j is one of the two treatment variables, taking on a value of 1 if the school that the student attended was in the information treatment arm and 0 if the school that the student attended was not in the information treatment arm. The variable C_j is the other treatment variable, also a dummy variable that takes a value of 1 if the school that the student attended was in the counseling treatment arm and 0 if the school the student attended was not part of the counseling treatment arm. We also adjusted for the blocking of schools by adding dummy variables for each block v_b. u_{1ij} is a random error term.

We conducted "adjusted analyses" which control for baseline variables:

$$Y_{ij} = \alpha_0 + \alpha_1 I_j + \alpha_2 C_j + X_{ij}\alpha + v_{2b} + u_{2ij} \quad (2)$$

where the additional term X_{ij} in equation (2) represents a vector of variables that includes control variables for student *i* in school *j*. Specifically, this vector includes the student's expected plans as measured during the baseline survey (two indicator variables for

whether the student expected to go to academic high school or vocational high school, respectively), poverty indicator, baseline academic achievement, gender, age, and family characteristics (whether the student has siblings, the education levels of the student's father and mother, whether the father and mother are migrants, whether the father and mother are healthy). Furthermore, in all regressions, we accounted for the clustered nature of our sample by constructing Huber-White standard errors corrected for school-level clustering (relaxing the assumption that disturbance terms are independent and identically distributed within schools).

We also conducted a third analytical exercise to account for the fact that about 9% (or 482) of the students assigned to the information and counseling interventions did not attend the information and counseling lessons.[iv] Although the proportion of students not attending the lessons is small, the OLS estimates from equations 1 and 2 measure the impact of being assigned to the information and counseling treatments (intention to treat or ITT estimates) rather than the impact of attending information and counseling lessons (average treatment effect estimates). As such, the ITT estimates may underestimate the impacts of the information and counseling interventions on students who attended the lessons.

There are two naïve estimation strategies for evaluating the impact of attending information and counseling lessons on student outcomes (see Imbens and Rubin, 2009). The first naïve estimation strategy assumes that students who attended the information and counseling lessons were randomly selected to attend. Under this strategy, an OLS regression of outcomes on information and counseling attendance would generally result in biased causal estimates:

$$Y_{ij} = \partial_0 + \partial_1 W_{ij}^I + \partial_2 W_{ij}^C + X_{ij}\partial + v_{3b} + u_{3ij} \quad (3)$$

where W_{ij}^I and W_{ij}^C are dummy variables that indicate a student attended the information and counseling lessons respectively. The second naïve estimation strategy discards the 9% of students who did not attend the information and counseling lessons and runs the OLS regression analyses with the remaining students that did comply with the treatment assignment as in equations 1 and 2. The second naïve estimation strategy also tends to result in biased estimates.

We instead conduct an instrumental variable (IV) analysis to examine the impact of attending the information and counseling lessons on student outcomes. We fulfill one of the two main assumptions of the IV approach (see Imbens and Rubin, 2009)—that the assignment to treatment is unconfounded (or uncorrelated with pretreatment covariates)—by using random assignment to the information or counseling interventions (I_j and C_j in equation 2). Assignment to the treatment conditions is used as an instrumental variable for attending the information and counseling lessons (W_{ij}^I and W_{ij}^C in equation 3). We also assume that treatment assignment has no effect on the outcomes of students in the information and counseling intervention schools who did not attend the lessons (thus fulfilling the second key "exclusion restriction" assumption, see Imbens and Rubin, 2009). Under the unconfoundedness and exclusion restriction assumptions, we can estimate unbiased average treatment effect of attending the information and counseling lessons for the subpopulation of students who complied with the treatment assignment (Imbens and Rubin, 2009).

Our fourth (and final) analytical exercise to run heterogeneous effects analyses examines whether the information and counseling interventions affected certain

subgroups of students (namely, low-achieving students, female students, and economically disadvantaged or poor students) more than others. We ran adjusted OLS regressions that interacted the information and counseling assignment variables in equation 2 with a student background indicator (for example, an indicator for whether the student was in the lowest one-third of the achievement distribution, an indicator for female, and an indicator for whether the student was in the bottom one-third of the poverty distribution). We also ran IV regressions with these interaction terms to estimate the impact of attending the information and counseling lessons on different types of students.

4. Results

4.1 Descriptive Results

According to our descriptive analysis, students have imperfect information about the returns to schooling. First, students seem to have incorrect estimates about the wages associated with different levels of schooling. Although students do perceive that higher levels of schooling lead to higher wages, there is substantial variation among students in perceived wages for each level of education (Table 3). For example, student estimates for wages earned by university graduates range from 1300 to 13000 yuan per month. While it is true that part of this variation indicates students, in fact, will earn wages that will differ from individual to individual, the considerable variation almost certainly cannot be explained by this fact alone. The considerable range in estimates also may be suggestive that students do not have complete information about returns to schooling (Nguyen, 2008).

Second, students revealed their lack of understanding about the returns to high school by overestimating the costs of attending vocational school. In our baseline survey students expected that vocational high school would cost 5,000 yuan/year (at the median—Figure 2). The median expectation is 2,000 yuan higher than the actual net cost, 3,000 yuan/year.[v] Furthermore, more than 25 percent of students believed that attending vocational high school would cost 10,000 yuan/year or more. This is 7,000 yuan (or more than two times higher) than the actual net cost. In nationally designated poor counties where the average annual per capita income for rural households in 2008 was approximately 2,600 yuan (State Council's Leading Group Office of Poverty Alleviation and Development, 2010), these substantial overestimates of schooling costs might discourage students from attending high school.

In addition to having imperfect information about the returns and costs of high school, students also demonstrated poor career planning skills. First, students entering grade 7 demonstrated unrealistic expectations about their plans to go to high school. In the baseline survey 52% of grade 7 students believed they would attend academic high school. In contrast, only 14% of the students during the baseline survey said that they planned to attend vocational high school. In actuality, the numbers of enrollments in academic and vocational high schools are approximately equal in poor, rural areas (Yi et al., 2011). Students may be overestimating the likelihood of going to academic high school if they are not aware of the requirements and realities associated with attending academic high school. The low share of students planning to attend vocational high schools also may suggest that students do not realize the benefits of attending vocational school.

Third, students also displayed unrealistic expectations regarding their time of entry into the labor force. According to our baseline data, only 5% of students planned to forgo high school and enter the labor market (Table 2, last column). However, in recent years only about two-thirds of poor, rural students entering grade 7 ultimately continued their schooling after grade 9 (Yi et al., 2011; Loyalka et al., 2011). Hence, if students in our sample are similar to those in the recent cohorts, their expectations at the beginning of grade 7 are not consistent with the paths that they most likely will follow during or immediately after junior high.

Fourth, student plans for high school change dramatically between the beginning and end of grade 7, also suggesting that student likely have poor career planning skills. A large proportion of students (39%) who had initially (during the baseline survey) planned to go to vocational school at the start of grade 7 had already changed their mind by the end of the year. Instead, students (a) planned to enter the labor market (b) became undecided about what they were planning on doing; or (c) dropped out of school by the end of grade 7 (Table 2, row 2).[vi] Likewise, a considerable proportion of students (59% or the sum of columns 1, 4 and 5 in row 4 in Table 2) that were undecided at the start of grade 7 either a.) remained undecided (which continues to suggest their lack of career planning) b.) planned to enter the labor market; or c.) dropped out of school by the end of grade 7 (Table 2, row 4). Finally, even though only 5% of students wanted to enter the workforce at the start of grade 7, in actuality, almost three times the number of students (8%+6%=14%) either dropped out (8%) or reported plans to enter the labor force (6%) after the completion of grade 7. In short, student plans as reported during the baseline

survey were changing over the first year of junior high school, suggesting that they had not thought through their plans thoroughly.

Taken together, this evidence suggests that grade 7 students in poor, rural areas of China are misinformed and lack career planning skills. First, students lack information on the wages and costs associated with different levels of schooling. Second, students have unrealistic expectations about their plans to go to academic high school, vocational high school, or the labor market at the start of grade 7. Third, students frequently change their expected plans between the start of grade 7 and the end of grade 7. Perhaps most disconcerting, although at the beginning of grade 7 only a small share (5%) of students believe they will be entering the labor market at some time during their grade 7 year of school, by the end of the year, nearly three times as many (14%) plan to drop out of school and enter the labor market.

4.2 Impacts of Information and Counseling on Student Outcomes

Although students in China poor rural junior high schools have imperfect information about the returns to schooling, students receiving the information intervention demonstrated no discernible differences in dropout rates, academic achievement, or plans to go to high school at the end of grade 7 compared with students in the control schools. Looking at the descriptive statistics (Table 4, columns 3, 4, and 6), we see that the average outcomes measured in the evaluation survey are not statistically different between the information intervention and control arms. Similarly, the multivariate results from the adjusted model in Table 5 show that the coefficients of the information treatment variable are small in magnitude and not statistically significant at the 5% level (columns 2, 4, 6, 8, 10, row 1). Thus, there appears to be no statistically

significant effect of the information treatment on student dropout, academic achievement, or plans to go to high school.

The results of the descriptive and multivariate analysis of the impact of the counseling treatment on the study's outcome variables are similar to those for the information treatment: there is no positive effect. When looking at the descriptive statistics, we in fact see that the dropout rate is 2 percentage points higher and academic achievement is .14 SDs lower in the counseling arm compared to the control arm (Table 4, columns 2, 4, and 5). The percentage of students with plans to go to any high school, academic high school, and vocational high school are roughly the same between the counseling and control arms (Table 4, columns 2, 4, and 5). The coefficients of the counseling treatment variable in the adjusted model are generally smaller in magnitude and/or not statistically significant at the 5% level (Table 5, columns 2, 4, 6, 8, 10, row 2). In particular, the adjusted estimates suggest that the counseling treatment has a negligible effect on academic achievement or plans to go to high school.

Although the impact is rather small, the adjusted estimates from Table 5 suggest that the counseling intervention may even encourage dropout. According to the adjusted estimates, students in schools that received the counseling intervention were 1 percentage point more likely to dropout (Table 5, Row 2, Column 4). While this effect is minor, the negative result is statistically significant at the 5% level. One explanation may be that some of the students that attended the counseling lessons concluded that the requirements to enter academic high school and college were too difficult. If these students did not perceive the returns to vocational school as being particularly high (or if they were not interested in attending a vocational school) they may have felt it more prudent to enter

the labor market early on. However, we do not know for certain why the counseling intervention led to this result. In fact, the effect size is minor and the result could be due to chance.

In contrast to the results of the descriptive and multivariate (OLS) analyses above, the results of the IV analyses indicate that counseling may have had some small positive impacts on the outcomes of students who attended counseling lessons (Table 6). The counseling intervention reduced the likelihood that students who attended the counseling lessons dropped out by about 1 percentage point (Table 6, Column 1). However, this effect is only statistically significant at the 10% level. The counseling intervention also increased the likelihood that students who attended the counseling lessons planned to go to academic high school by about 3 percentage points (Table 6, Columns 4). This positive effect is also only statistically significant at the 10% level. While the IV analyses do not reverse the negative results of counseling on the academic achievement of students who attended, the magnitude of negative impact falls to 0.1 standard deviations. This result also continues to be statistically significant at the 5% level.

The reversal of estimated impacts from the unadjusted and adjusted to the IV models is likely because students who were not attending courses were also likely to drop out. Our unadjusted and adjusted models likely underestimated the impact of the information and counseling interventions by failing to account for these students. Taking the evidence from all three models together, it appears that both the information and counseling interventions had negligible to small effects on the outcomes of students who attended the information and counseling lessons, but a slight negative effect on student academic achievement.

4.3 Missing Data Analysis

To test the robustness of the above results, we examine how sensitive our impact estimates are to missing data. Data are missing for two of our outcomes (academic achievement and plans to go to high school at the end of grade 7) because approximately 8% of students in our baseline survey dropped out before the evaluation survey. To examine if this affected our findings, we first compare the baseline covariates of both "non-missing" cases (those that did not drop out and are in the evaluation survey) and "missing" cases (dropouts) across treatment and control arms. We find that there is little imbalance between treatment and control arms for both of these subgroups (see Tables 7A and 7B as well as Appendix B). We also reran our impact analyses after using multiple imputation for the missing data and did not find any substantive differences with the main results above.[vii] Details of this analysis are in Appendix B.

4.4 Heterogeneous Effects Analysis

Although on average the results were negligible to small for our entire sample, certain subgroups of students may have benefitted. As such, we sought to understand whether (a) low-achieving, (b) male or (c) poor students experienced differential impacts. According to our heterogeneous effects analyses, the information and counseling interventions continue to have small effects among different subgroups. In general, the OLS results show that assignment to the information and counseling interventions increase dropout rates among low-achieving students and boys. By contrast, the IV results, indicate that there are some positive, albeit small effects from attending the counseling intervention on dropouts and plans to go to high school for girls and poor students, but no effects from attending the information intervention.

Low-achieving students (those who scored in the bottom 33% of the score distribution of our baseline math exam) were not positively impacted by the information and counseling interventions. According to our OLS results, low-achieving students in schools that received the information intervention were slightly more likely (3%) to drop out by the end of grade 7 (this effect is statistically significant at the 10% level—Table 8A, Column 2). The negative result might have been due to the existence of a small proportion of low-achieving students that tended to overestimate the wages and/or underestimate the costs associated with higher levels of schooling. These low-achieving students would then be less inclined to stay in school longer after receiving more accurate information that reduced the wages and increased the costs they associated with higher levels of schooling.[viii] The negative result could also be due to chance. Indeed, students who were assigned to the counseling intervention were also exposed to the exact same information but were not similarly affected. The IV results also show that there is no statistically significant impact of information and counseling on low-achieving students who actually attended the information and counseling lessons (results omitted for the sake of brevity).

Male students were only slightly affected by the information and counseling interventions. In particular, the OLS results show that the counseling intervention negatively affected the rate at which boys dropped out of junior high school (by 3 percentage points—the result is statistically significant at the 5% level—Table 8B, Column 1). Boys are already at a higher risk of dropping out of school because they respond more to family financial difficulties and higher opportunity costs (Yi et al., 2011). As with low scoring students, it may be that access to more complete information served

as something of a wake-up call and hastened the decision of those already at high risk of dropping out. According to the IV analyses, however, we find no statistically significant effects of the information and counseling interventions on dropouts for boys (tables omitted for the sake of brevity).

The IV analyses instead show some positive, albeit small effects of attending counseling lessons on female students (results omitted for the sake of brevity). Female attendees were 5 percentage points more likely to plan to attend any high school and 2 percentage points less likely to drop out as a result of the counseling intervention. These results, which are significant at the 1% level, indicate that female students may benefit more from opportunities to improve their career planning skills. This finding accords with the general trend that female students drop out of junior high school and pursue vocational high school less frequently than male students (Yi et al., 2011). We do not find heterogeneous effects of the information intervention on female students, however.

The interventions also appear to slightly improve the educational outcomes of relatively poor students (those who were among the 33% poorest students, according to our poverty indicator). On the one hand, the OLS estimates of interaction effects from Table 8C are small in magnitude and are not statistically significant at the 5% level.[ix] According to the IV results, however, the counseling intervention increased the likelihood that poor students who attended the counseling lessons planned to go to any high school by about 6 percentage points and vocational high school in particular by about 4 percentage points (tables omitted for the sake of brevity). The effects are statistically significant at the 5% level. From among all the results in this study, this result may be the most encouraging. As stated at the outset, our goal is to explore ways of helping students

remain in school longer. Since poor students are typically at higher risk of dropping out, seeing a change in their plans to go to high school is a step in the right direction. Though the effect is not large, the counseling intervention causes 6 out of 100 more poor students to plan to go to high school instead of the labor market. By contrast, the information intervention did not have any effects on the outcomes of students from poor backgrounds.

When assessing the body of analysis on the impact of the information and counseling interventions, there is one general conclusion. The treatments had almost no significant or substantial positive impacts on any of the outcomes, including dropout, academic achievement or plans to go to high school. There also were few significant or substantial positive impacts on any student subgroups, including low-achieving, male, and poor students. Moreover, the statistical power calculations (presented above) give us confidence that we are indeed finding little or no effect of the information and counseling interventions. That is, the absence of positive results is not due to insufficient power in the RCT design.

As such, the overall lack of significant results (and the presence of a negative result) is somewhat surprising. According to the descriptive analysis above, many students in our baseline sample overestimated the costs of vocational high school and also had inaccurate information about the wages associated with different levels of schooling. Because of this we might have expected that information would have had an effect. The small (even negligible) effects of the counseling treatment are equally surprising. The counseling intervention contained more comprehensive content and was also substantially longer in duration. In the following section, we examine the causal chain to delineate potential reasons for why we find no significant results.

5. Exploring the Causal Chain

The absence of positive treatment effects for all students and for different subgroups of students leads us to explore why information and counseling may not work in the context of grade 7 classrooms in poor, rural China. In this section, we look at a number of factors that may explain why the information and counseling interventions, as implemented, have few if any effects on dropout rates, academic achievement, or plans to go to high school. To accomplish this objective, first, we discuss the appropriateness of targeting information and counseling interventions to grade 7 students (as opposed to their parents or older students). Second, we investigate whether teachers in the information and counseling intervention schools actually gave their assigned lessons and whether students attended these lessons. Third, to understand whether the intervention was of sufficient quality, we examine the perceived quality of the intervention as reported by students. After that, we discuss two fundamental prerequisites for the interventions to have an impact in poor, rural junior high schools: (a) first, the degree to which different types of students are making achievement gains in seventh grade classes and (b) second, the financial constraints facing students and their families. That is, if students do not have meaningful achievement gains in the grade 7 classes or face serious and immediate financial constraints, information and counseling may have less of an impact on student outcomes.

5.1 Are the Information and Counseling Interventions Targeted Appropriately?

Information and counseling may not affect student outcomes if they are not targeted at the appropriate audience. As such, we first explore whether it is appropriate to

provide information and counseling to grade 7 students, rather than to their parents. Our data demonstrates that the students believe that they are the ones (the students themselves; not others) making the decision to go to high school. Students report that parents play less of a role in making the decision for the student to go to high school. Specifically, among students who planned to enter either academic or vocational high school, roughly 60% indicated they would make the decision on their own (table omitted for the sake of brevity). Only 35% said their parents would make the decision. Among the students who planned to go into the labor market, almost three quarters (74%) said they would make this decision themselves. Less than 25% of the students said that their parents would make the decision. Interestingly, teachers (and others—e.g., friends or relatives), at least in the minds of students, have little impact on the decision to continue with schooling after grade 9. If, as these results indicate, most students in poor, rural areas are indeed the primary decision-makers when it comes to future schooling, targeting information and counseling at them is indeed appropriate.[x]

Next we explore whether it is appropriate to provide information and counseling to grade 7 students, rather than to older students. Grade 7 students (typically 13 to 14 year olds) may arguably find it difficult to process information about future education and career opportunities. The literature suggests, however, that counseling has substantial impacts on students in junior high school (Whiston, Sexton and Lasoff, 1998; Oliver and Spokane, 1988). Two major studies from developing countries find positive results from targeting wage information at primary and secondary school students (Nguyen, 2008; Jensen, 2010). Given that 8% of students in our survey dropped before even completing grade 7 and that the three year cumulative dropout rate in poor, rural counties are

reportedly as high as 25% (Yi et al., 2011), targeting information and counseling at students in grade 7 (or earlier) seems critical.

5.2 Administration of the Information and Counseling Interventions

Another reason that we may not have found an impact of the intervention is that the impact of the information and counseling interventions might be diminished if teachers (and their supporting trainers) did not properly administer the lessons. According to our data, the teachers did, in fact, execute the training sessions in a timely manner. Our research team established fixed times for the delivery of the teacher trainings (trainers training teachers) and the information and counseling lessons (teachers training students). In reviewing training and lesson logs for each of these fixed times, we find that trainers and teachers did, in fact, give the program interventions according to our schedule.

5.3 The Quality of the Interventions: Participant Feedback

Another possible factor that could have undermined the impact of the information and counseling treatments is that students may have perceived the interventions to be of low quality. Here, we define low quality by student perceptions of whether the training was boring and/or useless. Using information on student feedback forms that were filled out after each lesson, we found that over 80% of the attendees found the lessons "very useful" (as opposed to "useful," "somewhat useful" and "not so useful"—Table 9, Row 1). More than 85% of the attendees also stated that they would study harder and stay in school longer as a result of the lessons (Row 2). Attendees further felt that the lessons were presented clearly (75-80%), that accompanying class discussions were helpful (82-87%) and that the duration of the lesson was appropriate (89-92%—Rows 5-7). In summary, the large majority of attendees at least stated on the survey form that they had

positive reactions to the program lessons. The information and counseling interventions thus seem to have been of sufficient quality (not perceived as boring or useless) to impact student outcomes.

5.4 Are Students Learning Anything at School?

One reason why students in poor, rural junior high schools may not respond to the information and career counseling interventions is that the quality of schooling could be poor. In particular, if grade 7 students do not make gains in academic achievement in school, they may be less likely to plan to go to high school, regardless of what type of information or career planning skills they receive. That is, making little to no gains in academic achievement severely reduces individual students' academic self-efficacy. Here, academic self-efficacy refers to student perceptions that they can tackle future academic challenges and tasks. Researchers have shown that students with high levels of academic self-efficacy tend to perform well on math achievement tests (Hailikari et al., 2007; Pietsch et al., 2003). Performing well on these achievement tests also reciprocally increases student feelings of self-efficacy (Williams and Williams, 2010). Students with higher levels of self-efficacy have also been shown to attain higher levels of education (Zimmerman et al., 1992).

We find that academic achievement is a key factor in how students make future plans. In our baseline survey, over half of the students that planned to attend vocational high school (52%) cited poor academic achievement as the main reason (table omitted for the sake of brevity). By the end of grade 7, a full 60% of students who planned to attend vocational high school attributed their choice to poor academic achievement. Likewise, among students that planned to enter the labor market at the time of the baseline survey,

more than a quarter (27%) attributed their decision to not liking school. By the end of grade 7, this number had jumped to 39%. Clearly then, academic achievement is an important determinant for whether students will attend high school. We suspect the same is true for whether they will continue making gains in academic achievement and/or drop out of school.

As such, minimal gains in student learning may be another contextual factor that is limiting the effect of the information and counseling programs from reducing dropout rates, increasing academic achievement and encouraging plans to go to high school. Our data reveal that a large proportion of students had zero or negative gains in academic (math) achievement from the start to the end of grade 7 (regardless of whether they were in the treatment or control arms—Figure 3A). The average gain in academic achievement among the 92% of students that had not dropped out was only .02 standard deviations—surprisingly close to zero (table not shown for the sake of brevity). Moreover, students that planned to go to the labor market, vocational school, or who were undecided at the start of grade 7 all had negative achievement gains on average (Figure 3B). Although the students that chose to go to academic high school had positive gains, the average gains were also quite small (.04 standard deviations).

In sum, minimal academic gains among grade 7 students may be a major reason why the information and counseling interventions had small and often negligible effects on student outcomes. As discussed, minimal academic gains may depress academic self-efficacy. However, academic self-efficacy is an important mediating factor in determining the effectiveness of career counseling interventions (Koivisto et al., 2011; Creager, 2011). If students do not feel they are “good at school” (i.e. have low academic

self-efficacy), information and counseling may have little ability to affect their plans to go to high school.

5.5 Financial constraints

Another reason that we may not be observing an impact of the information and treatment interventions is that the families of students are financially constrained. It may be that students in households where additional schooling is unaffordable are unlikely to attend even when they see high returns to schooling. About 40% of students that stated that they planned to enter the labor market or that were undecided about their future plans in our baseline and evaluation surveys said they made this decision because of financial difficulties. In contrast, about 10% of the sample students stated that they would like to enter the labor force because of the opportunity to immediately earn relatively high wages (table omitted for brevity). Thus, some students do seem to be making decisions about their educational/work future while facing financial constraints.

If financial constraints are forcing kids to alter their educational plans, then information and counseling interventions may not be enough to improve educational outcomes. In fact, conditional cash transfers, which directly address these financial problems, are proven approaches to helping junior high school students in poor, rural China continue on to high school (Liu et al., forthcoming; Mo, 2011). In the Liu et al. paper, it is shown that vouchers, which are designed to cover the tuition costs of three years of high school, increase the likelihood that poor, rural students will go to high school by roughly 9 percentage points. Providing cash transfers to grade 7 students, conditional that they stay in school, also reduces dropout rates in poor, rural counties by 13 percentage points or about 60% (Di et al., 2011). If these studies are representative of

the situations in other poor areas in China, it might be concluded that direct financial incentives have a stronger impact on student plans than receiving more information or counseling. When grade 7 students are from families that face financial constraints, information and counseling interventions may simply not be addressing the fundamental causes behind dropout, poor academic achievement, or the absence of plans to go to high school.

6. Discussion and Conclusion

Our study indicates that students from poor, rural junior high schools in China lack information about the returns to schooling and career planning skills. Given the often-cited positive impacts of information and counseling (Jensen, 2010; Nguyen, 2008, Castlemana et al., 2011; Koivisto et al., 2011; Avery, 2010; Whiston et al. 1998; Oliver and Spokane, 1988), it seemed feasible that interventions like the ones we undertook in this study would increase grade 7 students' willingness to stay in school, their academic achievement, and their plans to go to high school. Evidence from our cluster-RCT, however, suggests that information and counseling have negligible to quite small impacts on the outcomes of the average junior high school student in poor, rural areas.

The lack of significant results from providing information about the returns to schooling stands in stark contrast to the positive effects of providing information about the returns to schooling in developing countries such as the Dominican Republic (Jensen, 2010) and Madagascar (Nguyen, 2010). Changing economic conditions in the last few years in China—in particular, the recent shortage of rural to urban labor which has led to a steep increase in unskilled wages—may make the provision of information on returns

less effective than in countries that are not going through a similar economic transition. During an economic transition, students may instead receive contradictory information about the differences in wages between skilled and unskilled workers (that they are relatively small). They may thus be less likely to believe that going to higher levels of schooling will substantially impact their long-term economic returns, even with an information or counseling intervention.

Despite the ineffectiveness of the information intervention in poor, rural areas in China, there were small, positive impacts of the counseling intervention among low-income and female students. Given these results, policymakers may consider integrating a short counseling module into their standard junior high curricula. This is especially true if the counseling intervention can be implemented in a relatively high-quality, low-cost fashion, similar to our own implementation of these programs.

However, providing information and counseling may be less important than improving education quality and ensuring the ability of students to pay for further schooling. Our math achievement data hints that students in our sample received a relatively low-quality education during grade 7 (Figures 4A and 4B). Many students scored the same or even worse on the math exam administered at the end of the year compared to the test administered at the start of the year. If indeed students are really not learning very much in their first year of junior high school, they will gradually lose their confidence in the school system as a whole as well as their sense of academic self-efficacy (i.e. their belief in their ability to do well academically). This in turn would decrease the willingness of students to study hard and stay in school.

The economic situation facing families in poor, rural areas in China is also likely a critical factor in explaining the lack of positive impacts of the interventions. Immediate credit constraints could certainly encourage students to enter the labor market, even after becoming aware of the relatively high wages and low net tuition costs (i.e. tuition prices minus financial aid) associated with higher levels of schooling. In the end, the relatively high tuition fees associated with high school were also a consideration, as attested by studies that found conditional cash transfers increased the likelihood that students would stay in junior high school as well as choose to go to high school (Liu et al, forthcoming and Di et al., 2011).

Although more research is needed, our main finding is that information and counseling are of limited effectiveness at reducing dropout, increasing academic achievement, and changing student future plans among grade 7 students. Our main finding suggests that policymakers may best address the problem of low high school attendance in poor, rural areas by focusing on two basic facets of education: quality and cost. First, they might consider improving the quality of the schools accessible to youth from poor, rural areas. Improving the quality of education can have long-term benefits on encouraging students to stay in school, raising their human capital, and increasing their feelings of self-efficacy. Second, policymakers could consider offering conditional cash transfers to students from poor, rural areas with the condition that they stay in junior high school or continue on to high school (either academic or vocational). It is in the context of sufficiently affordable and quality schooling that providing information and counseling may also have more potential to improve student outcomes.

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Appendix A: Lesson content in the counseling intervention:

As mentioned in Section 3 (under "Interventions"), the counseling intervention consisted of four 45-minute lessons. The first lesson invited students to learn about (a.) the general meaning of work, (b.) how occupations and wages would change and grow in China's -rapidly transitioning economy, (c.) how higher wage occupations would require relatively higher skills and corresponding levels of education, (d.) the factors behind successful careers, (e.) the importance of finding relevant information when making career choices, as well as a (f.) the social values that students might pay attention to when choosing a career.

The second lesson focused on identifying students' career interests by asking them to first participate in and discuss the results of the Holland Interest Inventory self-assessment exercise. This is a widely used self-assessment tool in career counseling which helps individuals think about their interests, personalities, and skills and how these fit with certain occupational themes or categories (see Holland, 1985). We thank Professor Junqi Shi at the Psychology Department in Peking University for providing us with the Chinese version of the Holland Interest Inventory. The second lesson then further discussed (a.) the importance of being conscious of one's interests and abilities when choosing occupations and planning a career, (b.) basic information about industries and occupations in China and the relative wages across industries, (c.) the types of information that one should inquire about when choosing a job, and (d.) avenues students could use to find more information about occupations and careers. Finally, the lesson also asked students to think about and discuss the educational and skill requirements of their ideal occupation.

The third lesson was identical to the information intervention described in Section 3 (under "Interventions") above.

The fourth lesson covered the types of choices that students could make after junior high, how to transition from junior high to vocational or academic high school, the financial aid options available in vocational and academic high school, the financial aid options available in college, and how to make personal plans to attend higher levels of schooling given the above information.

Appendix B: Sensitivity to Missing Data

How sensitive were the results in Section 4 to missing data? Table 7A first shows that the balance in baseline covariates is maintained fairly well between each treatment arm and the control arm for the 8% of students who dropped out of school by the time of the evaluation survey. Looking at the baseline covariates of these "missing cases" only (row 1), we see that there is no obvious imbalance between the counseling and control arms. We do find some imbalance between the information and control arms in that students in the information arm are more likely to have mothers and fathers who are migrating (row 3, column 9 and 10) as well as mothers and fathers who are in better health (row 3, columns 11 and 12). Again the average difference between the information and control arms is rather small in these four variables.

Table 7B shows that the balance in baseline covariates is maintained fairly well between each treatment arm and the control arm for the 92% of students who remained in school at the time of the evaluation survey. We do find some imbalance (at the 5% statistical significance level) between the information and control arms in the female and father's education level covariates, but again the difference is quite small.

The impact evaluation analyses in Section 4 were conducted without making any missing data adjustments. This was a "listwise deletion" approach which is only viable under the missing completely at random assumption (Schafer and Graham, 2002). It is possible, however, that the students we could not find are missing non-randomly because of certain factors that simultaneously affect the treatment assignments and the student outcomes. We therefore test the robustness of our results after imputing the missing data using multiple imputation (see Schafer and Graham, 2002). In the end, we find that our results our substantively the same even after conducting analyses using multiple imputation (results not shown).

Figure 1:

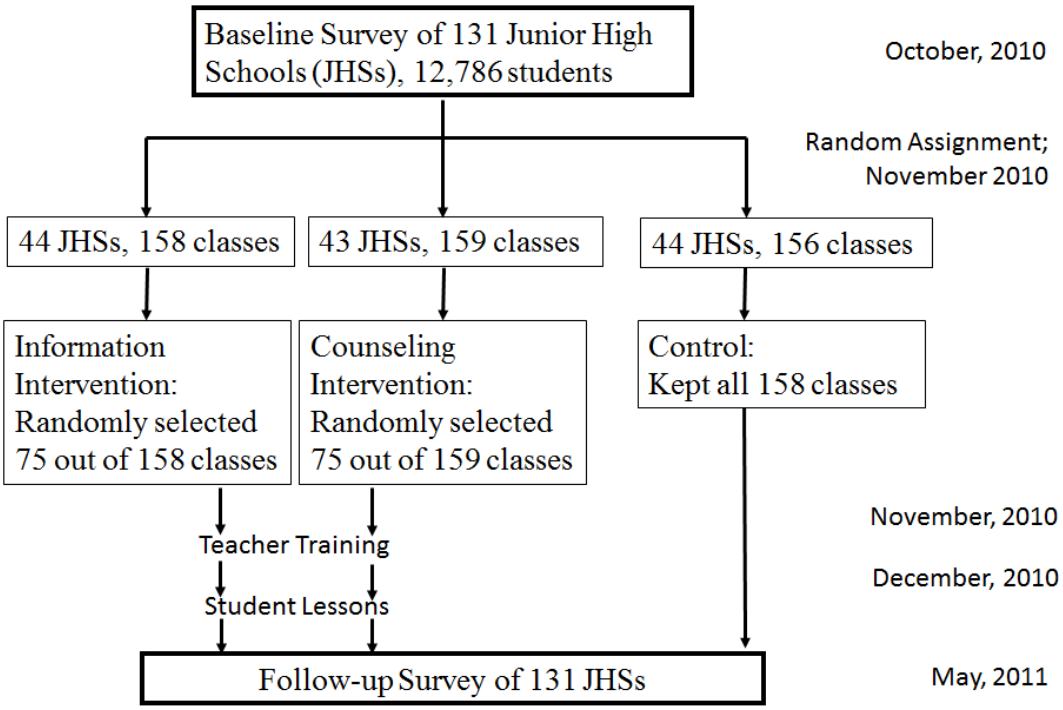
Baseline Survey of 131 Junior High Schools (JHSs), 12,786 students
October, 2010
Random Assignment; November 2010
44 JHSs, 158 classes
43 JHSs, 159 classes
44 JHSs, 156 classes
Information Intervention: Randomly selected 75 out of 158 classes
Counseling Intervention: Randomly selected 75 out of 159 classes
Control: Kept all 158 classes
November, 2010
Teacher Training
December, 2010
Student Lessons
Follow-up Survey of 131 JHSs
May, 2011

Figure 2: Student perceptions of how much it costs to attend vocational high school

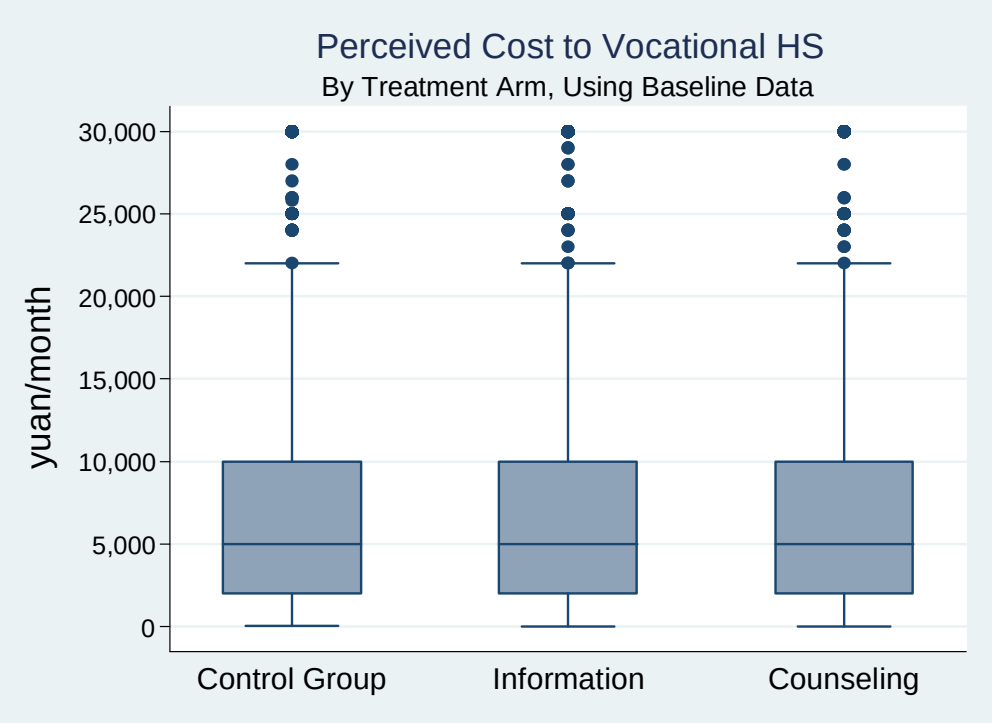

Figure 3A: Academic (Math) Achievement Scores in the Baseline and Evaluation Periods

(For both Information/Counseling Treatment and Control Groups)

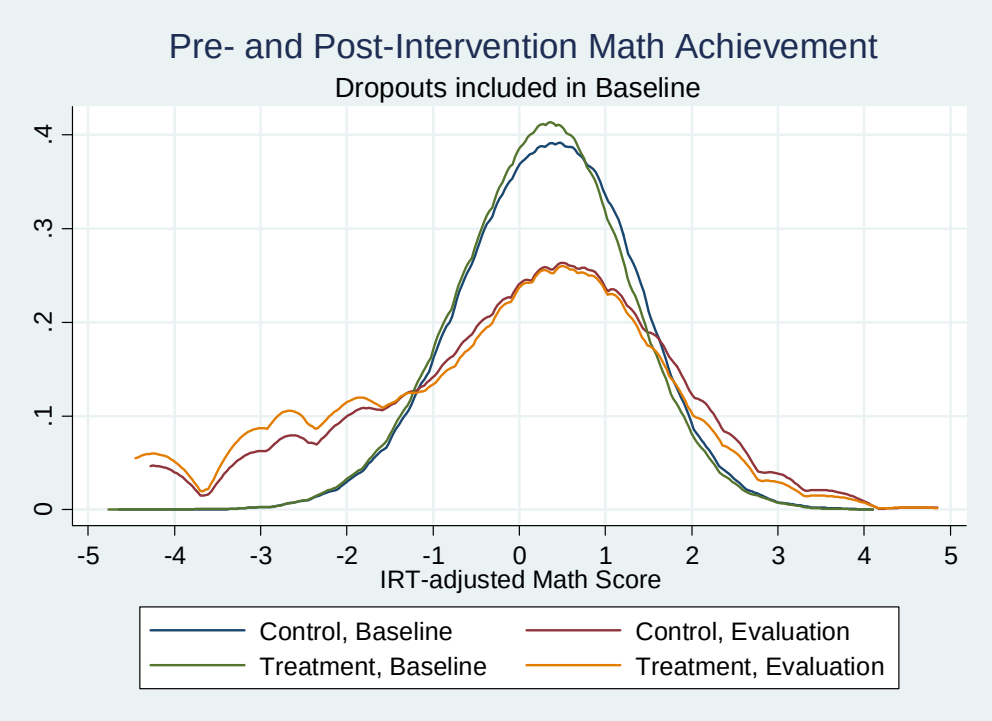

Figure 3B: Academic (Math) Achievement Gains in Grade 7 for Students with Different Expected Plans in the Baseline Survey

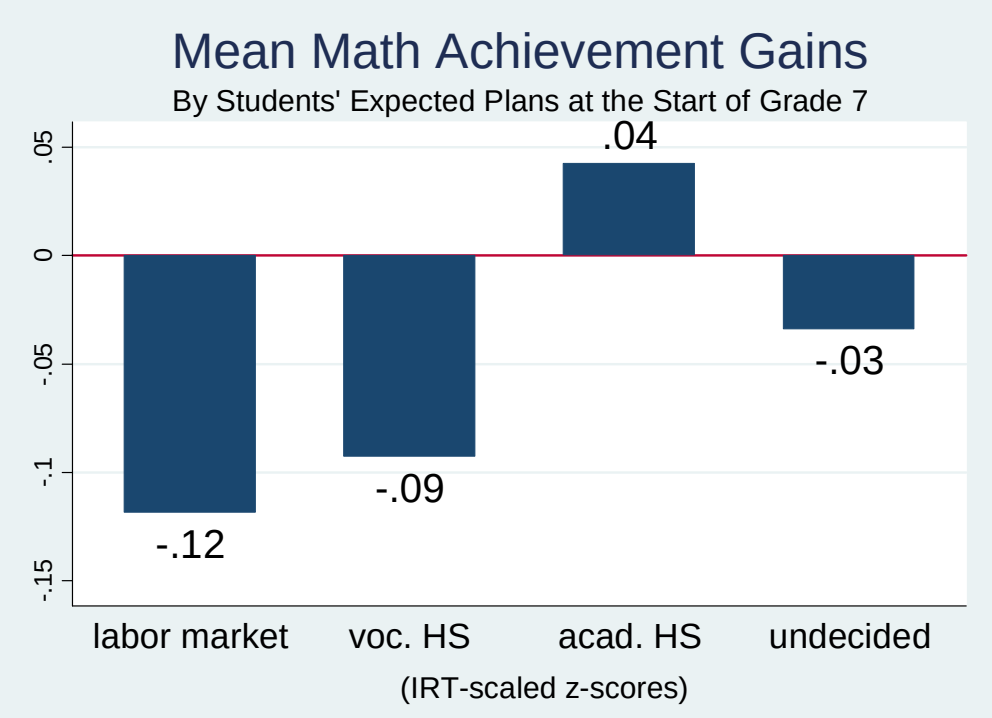

Table 1: Covariate Pre-Balance Test between Experimental Arms

	(1) Female	(2) age	(4) math score	(5) go acad HS	(6) go VET	(8) mom's edu	(9) dad's edu	(10) #sibs	(11) mom migrated	(12) dad migrated	(13) mom's health	(14) dad's health
Counseling	-0.01	0.04	-0.10	-0.03	0.02	-0.01	-0.06	0.01	0.06	0.02	0.02	0.01
	(0.01)	(0.07)	(0.08)	(0.03)	(0.01)	(0.02)	(0.21)	(0.07)	(0.05)	(0.02)	(0.02)	(0.03)
Information	-0.04***	-0.04	-0.02	0.01	-0.02	-0.01	0.04	0.24**	0.07*	0.01	0.02	0.03
	(0.01)	(0.07)	(0.07)	(0.03)	(0.01)	(0.02)	(0.18)	(0.10)	(0.04)	(0.02)	(0.02)	(0.03)
Constant	0.53***	13.30***	-0.14	0.57***	0.08***	0.64***	4.96***	-0.06	1.11***	0.69***	0.91***	0.36***
	(0.05)	(0.19)	(0.19)	(0.06)	(0.02)	(0.06)	(0.42)	(0.05)	(0.07)	(0.05)	(0.02)	(0.02)
Observations	12,704	12,714	12,790	12,769	12,769	12,796	12,382	12,532	12,794	12,493	12,637	12,512
R-squared	0.003	0.026	0.036	0.022	0.015	0.017	0.059	0.808	0.023	0.133	0.063	0.027

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2: Changes in the % of students planning to go to high school or not

		Plans (or dropped out) at the end of grade 7					
		work	voc. HS	acad. HS	undecided	dropped out	% of total (start of grade 7)
Plans at the start of grade 7	work	27%	15%	10%	21%	26%	5%
	voc. HS	6%	41%	20%	20%	13%	14%
	acad HS	3%	8%	73%	13%	3%	52%
	undecided	7%	15%	25%	41%	11%	29%
	% of total (end of grade 7)	6%	15%	49%	23%	8%	100%

Table 3: Monthly wages that entering grade 7 students perceive they would earn from graduating from different levels of schooling (at different percentiles of the reported wage distributions)

percentile	Junior HS	vocational HS	academic HS	university
10%	500	800	1000	1300
25%	800	1000	1200	2000
50%	1000	1500	2000	3000
75%	1500	2000	3000	5000
90%	2000	3000	5000	10000
95%	3000	4000	6000	13000

Table 4: Average Outcomes (from the Evaluation Survey) across Treatment Arms

	(1) all students	(2) counseling arm	(3) information arm	(4) control arm	(5) difference between counseling and control arms	(6) difference between information and control arms
Dropout	.08	.09	.08	.07	.02**	.01
					(.01)	(.01)
academic (math) achievement	.02	-.08	.03	.06	-.14*	-.02
					(.07)	(.07)
Plan to go to academic high school	.53	.54	.52	.53	.01	-.03
					(.02)	(.03)
Plan to go to vocational high school	.17	.17	.15	.17	.00	-.02
					(.02)	(.03)
Plan to go to any high school	.70	.71	.67	.70	.01	-.01
					(.01)	(.01)

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 5: Effects of Information and Counseling on Main Student Outcomes

(Dropout (y/n), Math Scores, Will Attend Academic, Vocational, or Any High School (y/n))

	dropout		math 2011		go to acad. HS		go to voc. HS		go to any HS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	unadj	adj	unadj	adj	Unadj	adj	unadj	adj	unadj	Adj
Information	0.01	0.01	-0.02	-0.01	-0.03	-0.03	-0.02	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.07)	(0.05)	(0.03)	(0.02)	(0.03)	(0.02)	(0.01)	(0.01)
Counseling	0.02**	0.01**	-0.14*	-0.07	0.01	0.02	0.00	0.02	0.01	0.00
	(0.01)	(0.01)	(0.07)	(0.04)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)
Female		-0.03***		-0.01		0.02**		0.08***		-0.05***
		(0.01)		(0.02)		(0.01)		(0.01)		(0.01)
Age		0.05***		-0.05***		-0.03***		-0.05***		0.02***
		(0.00)		(0.01)		(0.01)		(0.01)		(0.00)
math 2010		-0.02***		0.51***		0.05***		0.09***		-0.03***
		(0.00)		(0.01)		(0.01)		(0.01)		(0.00)
plan acad. HS		-0.05***		0.22***		0.33***		0.40***		-0.07***
		(0.01)		(0.02)		(0.01)		(0.01)		(0.01)
plan voc. HS		-0.01		-0.10***		0.25***		-0.02		0.28***
		(0.01)		(0.03)		(0.02)		(0.01)		(0.01)
asset value		0.00		0.00		-0.00		-0.00		0.00
		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)
mom's edu		0.00		0.00		0.00*		0.00*		0.00
		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)
dad's edu		-0.00		0.01**		0.00		0.00		-0.00
		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)
no. of siblings		0.00		-0.00		-0.00		0.01		-0.01
		(0.00)		(0.01)		(0.01)		(0.01)		(0.01)
mom migrated		0.01		-0.03		-0.01		-0.00		-0.01
		(0.01)		(0.02)		(0.01)		(0.01)		(0.01)
dad migrated		-0.00		-0.02		-0.00		-0.03**		0.02***
		(0.01)		(0.02)		(0.01)		(0.01)		(0.01)
mom's health		-0.01		-0.06***		-0.00		0.00		-0.00
		(0.01)		(0.02)		(0.01)		(0.01)		(0.01)
dad's health		0.01		-0.01		-0.01		-0.00		-0.01
		(0.01)		(0.02)		(0.01)		(0.01)		(0.01)
Constant	0.04***	-0.58***	-0.14	0.47**	0.71***	0.90***	0.59***	0.99***	0.12***	-0.09*
	(0.01)	(0.06)	(0.19)	(0.20)	(0.07)	(0.08)	(0.06)	(0.07)	(0.02)	(0.05)
Observations	12,786	12,082	11,426	10,848	11,414	10,837	11,414	10,837	11,414	10,837
R-squared	0.01	0.08	0.04	0.36	0.02	0.17	0.02	0.29	0.01	0.14

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 6: Local Average Treatment Effect Estimates of Attending Information or Counseling Lessons on Student Outcomes

	(1)	(2)	(3)	(4)	(5)
	dropout	math 2011	go any HS	go acad HS	go voc HS
Counseling	-0.01*	-0.09**	0.03	0.03*	-0.00
	(0.01)	(0.04)	(0.02)	(0.02)	(0.01)
Information	-0.01	-0.02	-0.02	-0.01	-0.01
	(0.01)	(0.05)	(0.02)	(0.02)	(0.01)
Observations	12,078	10,848	10,835	10,835	10,835
R-squared	0.08	0.36	0.17	0.29	0.14

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7A: Balance between Treatment and Control Arms for the Missing Cases

	(1) female	(2) Age	(3) math 2010	(4) go voc. HS	(5) go acad. HS	(6) mom's edu	(7) dad's edu	(8) # sibs	(9) mom migrated	(10) dad migrated	(11) mom's health	(12) dad's health
Counseling	-0.05	0.04	-0.03	0.04	-0.04	0.21	0.12	0.10	0.01	0.04	0.04	-0.01
	(0.04)	(0.09)	(0.09)	(0.03)	(0.04)	(0.21)	(0.13)	(0.07)	(0.03)	(0.03)	(0.04)	(0.04)
Information	-0.05	-0.02	-0.03	-0.03	0.04	-0.01	0.30*	0.08	0.07**	0.06**	0.12***	0.08*
	(0.05)	(0.10)	(0.10)	(0.04)	(0.04)	(0.25)	(0.17)	(0.07)	(0.03)	(0.03)	(0.05)	(0.04)
Observations	1,353	1,358	1,364	1,365	1,365	1,288	1,326	1,369	1,305	1,341	1,310	1,344
R-squared	0.023	0.089	0.044	0.031	0.040	0.094	0.769	0.027	0.162	0.074	0.059	0.032

Robust standard errors in parentheses

***p<0.01, ** p<0.05, * p<0.1

Table 7B: Balance between Treatment and Control Arms for the Non-Missing Cases

	(1) female	(2) Age	(3) math 2010	(4) go voc. HS	(5) go acad. HS	(6) mom's edu	(7) dad's edu	(8) # sibs	(9) mom migrated	(10) dad migrated	(11) mom's health	(12) dad's health
Counseling	0.00	0.02	-0.10	0.01	-0.02	-0.09	0.00	0.06	0.02	0.01	0.01	0.00
	(0.01)	(0.07)	(0.08)	(0.01)	(0.03)	(0.22)	(0.07)	(0.05)	(0.02)	(0.02)	(0.03)	(0.03)
Information	-0.04***	-0.04	-0.02	-0.02	0.01	0.05	0.23**	0.07*	0.01	0.02	0.02	0.03
	(0.01)	(0.07)	(0.07)	(0.01)	(0.03)	(0.19)	(0.10)	(0.04)	(0.02)	(0.02)	(0.03)	(0.03)
Observations	11,351	11,356	11,426	11,404	11,404	11,094	11,206	11,425	11,188	11,296	11,202	11,309
R-squared	0.004	0.024	0.036	0.016	0.019	0.057	0.813	0.024	0.132	0.063	0.025	0.016

Robust standard errors in parentheses

***p<0.01, ** p<0.05, * p<0.1

Table 8A: Heterogeneous Effects of Info and Counseling (By Baseline Math Scores)

(math33 = 33% of the lowest scoring students on the baseline math exam)

	(1) dropout	(2) math 2011	(3) go any HS	(4) go voc. HS	(5) go acad. HS
Counseling	0.01	-0.12*	0.01	0.01	0.00
	(0.01)	(0.06)	(0.02)	(0.02)	(0.01)
math33	0.02**	-0.85***	-0.10***	-0.15***	0.05***
	(0.01)	(0.04)	(0.01)	(0.02)	(0.02)
counseling*math33	0.02	0.06	0.02	0.02	0.00
	(0.01)	(0.08)	(0.02)	(0.03)	(0.02)
Information	0.00	-0.05	-0.03	-0.02	-0.02
	(0.01)	(0.06)	(0.02)	(0.02)	(0.01)
info*math33	0.03*	0.08	0.01	-0.00	0.01
	(0.02)	(0.07)	(0.03)	(0.03)	(0.02)
Observations	12,082	10,848	10,837	10,837	10,837
R-squared	0.08	0.26	0.16	0.28	0.14

Cluster robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Analyses adjusted for covariates (same covariates as Table 5)

Table 8B: Heterogeneous Effects of Information and Counseling (By Gender)

	(1) dropout	(2) math 2011	(3) go any HS	(4) go voc. HS	(5) go acad. HS
Counseling	0.03***	-0.07	-0.06	0.01	0.01
	(0.01)	(0.05)	(0.05)	(0.02)	(0.02)
Female	-0.02***	0.01	-0.00	0.02	0.07***
	(0.01)	(0.03)	(0.03)	(0.01)	(0.02)
counseling*female	-0.03**	-0.05	-0.03	0.03	0.02
	(0.01)	(0.05)	(0.05)	(0.02)	(0.03)
Information	0.02	-0.04	-0.01	-0.02	-0.02
	(0.01)	(0.05)	(0.05)	(0.02)	(0.02)
information*female	-0.01	0.00	0.01	-0.00	0.00
	(0.02)	(0.04)	(0.05)	(0.03)	(0.02)
Observations	12,078	10,860	10,848	10,835	10,835
R-squared	0.09	0.37	0.36	0.17	0.29

Cluster robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Analyses adjusted for covariates (same covariates as Table 5)

Table 8C: Heterogeneous Effects of Info and Counseling (by Poverty Level)

(According to our Household Assets Poverty Indicator, Poor33 = Poorest 33% Students in the Sample)

	(1) dropout	(2) math 2011	(3) go any HS	(4) go voc. HS	(5) go acad. HS
Counseling	0.02**	-0.10**	-0.07	0.02	0.03
	(0.01)	(0.05)	(0.05)	(0.02)	(0.02)
poor33	-0.01	0.04	0.06*	-0.01	0.02
	(0.01)	(0.03)	(0.03)	(0.02)	(0.02)
counseling*poor33	-0.02	0.00	-0.03	0.01	-0.02
	(0.01)	(0.05)	(0.05)	(0.02)	(0.03)
Information	0.01	-0.04	-0.00	-0.03	-0.01
	(0.01)	(0.05)	(0.04)	(0.02)	(0.02)
info*poor33	0.01	-0.01	-0.02	0.04	-0.00
	(0.02)	(0.06)	(0.05)	(0.03)	(0.03)
Observations	12,082	10,860	10,848	10,835	10,835
R-squared	0.09	0.37	0.36	0.17	0.29

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Analyses adjusted for covariates (same covariates as Table 5)

Table 9: Feedback from Students that Participated in the Information and Counseling Lessons (% yes)

Feedback Form Item	Information, Single Lesson	Counseling, Lesson 1	Counseling, Lesson 2	Counseling, Lesson 3	Counseling, Lesson 4
The lesson was very useful.	**80%**	82%	81%	**82%**	81%
I will study harder and stay in school as a result of the lesson	**88%**	87%	86%	**86%**	86%
I will share the content of the lesson with my parents.	**75%**	67%	65%	**66%**	67%
My parents will find the contents of the lesson useful.	**74%**	63%	62%	**66%**	66%
The lesson was presented clearly.	**80%**	75%	76%	**78%**	78%
The class discussion about the lesson was helpful.	**82%**	87%	82%	**83%**	83%
The duration of the lesson was appropriate.	**92%**	89%	90%	**92%**	90%

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Endnotes:

[i] We chose to rank and block schools by the number of students in grade 7 as school size has frequently been found to be associated with our outcomes of interest (student dropout, academic achievement, and plans to go to high school at the end of grade 7) (Slate and Jones, 2005). One of the 22 blocks had 5 (instead of 6) schools.

[ii] Average wages were estimated using the 2005 1% sample census. Surveys at the national and provincial levels which ask about individual wages generally do not distinguish between whether an individual has graduated from academic versus vocational high school. We thus provided students with information on the combined (average) wage levels of academic and vocational high school graduates.

[iii] Specifically, the lesson included costs for tuition and room and board for different types of high schools (provincial-level academic high school; city-level academic high school; regular high school; and vocational high school). The lessons also included information on the cost of tuition and room and board for various types of colleges (three year vocational colleges and four-year universities) and for different major categories ("popular", "regular" and "arts" majors) which tend to vary substantially in tuition.

[iv] Within treatment schools/classes, the student and family background characteristics (measured using our baseline survey data) of program attendees were not significantly different from those of non-attendees (table not shown for the sake of brevity).

[v] The tuition costs for vocational high schools in Hebei is 3,300 yuan/year (maximum). Dorm fees are at most 1,200 yuan/year. Furthermore, most vocational high school students receive 1,500 yuan/year in financial aid for the first two years. Students from poor, rural areas may receive even higher amounts.

[vi] The same pattern of changes in plans from the start to the end of grade 7 held in both treatment arms as well as the control arm. The pattern of results indicates that the information/counseling treatments may have had small or negligible effects. We look at the actual impact of information/counseling on plans to go to high school in Section 3.

[vii] We imputed the missing outcome values using Stata's *ice* command and ten imputations.

[viii] Our baseline data do not support these conclusions, however. The low-achieving dropouts from the control arm had perceived even higher wages to higher levels of schooling and even lower costs of vocational school compared to low-achieving dropouts from treatment arms (table omitted for brevity).

[ix] For the sake of completeness, we also examined whether the interventions impacted outcomes for students who (1) underestimate the wages to attending vocational high school versus directly entering the labor market and (2) overestimate tuition prices for vocational high school. In both cases, the heterogeneous effect estimates were both small in magnitude and not statistically significant at the 5% level (table omitted for the sake of brevity).

[x] We also looked at whether there were heterogeneous effects on students who reported that they made the plan themselves versus students who listened to their parents or others. However, we did not find any heterogeneous impacts of information or counseling on students who claimed to make the plans themselves (results not shown).