Cool to be Smart or Smart to be Cool?
Understanding Peer Pressure in Education*

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Abstract

Students may care deeply about their image or what others think of them, and these concerns may affect schooling behavior. We identify two potentially important peer cultures: one that stigmatizes effort (thus, where it is “smart to be cool”) and one that rewards ability (where it is “cool to be smart”). We build a model that shows that either may lead to lower educational effort when effort and performance are potentially observable by peers. We design a field experiment to both test whether students are influenced by these concerns in general, and to separately test which of these concerns they are responding more to. We implement the experiment in two different settings: a high school in a low income, high minority share area and two high schools in higher income, lower minority share areas. In both settings, fewer students sign up for a lottery to get complimentary access to an online SAT prep package when they believe their decision will be revealed to their classmates. We further show that this behavior is consistent with a greater concern for hiding effort in the lower income, higher minority share school, and a greater concern with hiding low ability in the higher income, lower minority share schools.

Keywords: peer pressure, education, field experiment, signaling.

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1 Introduction

Most people care, to at least some degree, about their social image or what others think about them. For example, we might care whether others think we are intelligent, fun, trustworthy or important. The idea that a desire to shape one’s social image or signal one’s type may affect how we behave in interactions with others is at the core of the concepts of signaling in economics (Spence 1973) and impression management or self-presentation in sociology and psychology (Goffman 1959).

Understanding whether, and why, behavior is influenced by concerns about social image is particularly important when considering adolescents. First, adolescence is the period in which there is the greatest focus on establishing an image or identity, and adolescents may therefore be more highly concerned with or susceptible to others’ opinions or influences. Second, many decisions made during adolescence may have large and long-lasting consequences, such as those relating to schooling investments, smoking, drinking, drug use or risky sexual activity.

Bursztyn and Jensen (2015) show that educational effort is dramatically reduced when it is observable to peers. They find that students cut back on the number of high school exit exam practice questions they answer after the introduction of a leaderboard showing which students in the class had the most correct answers. Separately, students are less likely to sign up for a complementary SAT prep course when their decision will be revealed to peers.\footnote{1The exception is honors classes, where students taking both honors and non-honors classes are more likely to sign up when their honors peers will observe the decision.}

Despite these apparently powerful negative peer influences, little is known about why students change their behavior when it is observable. In other words, what are students trying to signal to their peers through their behavior? Understanding this underlying motivation is likely to be critical both for understanding the root causes of educational underachievement and for designing corrective policy strategies. In this paper, we model two underlying mechanisms for negative peer pressure effects and provide a field test that allows us to disentangle them.

One of the most prominent theories describing the potentially negative effects of peer pressure is the “Acting White” hypothesis modeled in Austen-Smith and Fryer (2005). In their model, students have both a social type and an economic type. In choosing how much educational effort to exert, they face the problem of simultaneously signaling two audiences: peers and firms. Peers like students who are high social types, while firms want to hire high economic types. As in the classic signaling model of Spence (1973), the psychic cost of studying is assumed to be lower for high economic types. However, if studying is also costlier for high social types (e.g., the opportunity cost is greater), in the “Acting White” equilibrium students reduce their educational effort to avoid sending the signal to peers that they are a low social type. More broadly, the “Acting White” hypothesis suggests that minority students may face punishment from peers for exerting effort because it signals that they are weakly attached to the group (Fordham and Ogbu 1986, Austen-Smith and Fryer 2005, Fryer 2007, Fryer and Torelli 2010). Thus for example, when the returns in
the labor market are low relative to the returns to group membership, students over some range of underlying ability may decide that signaling group loyalty is more important when choosing educational effort, i.e., it is “smart to be cool.”

However, what if peers also like individuals who are intelligent, or high economic types? Put another way, most people would presumably prefer not to be thought of as unintelligent. This may be directly important for one’s happiness, or it may be that in some settings, signaling a high economic type to peers has present or future returns. Building on this observation, we propose a new form of peer social concern, namely a concern with revealing low ability when high ability is rewarded by peers (i.e., where it is “cool to be smart”). We argue that such concerns alone can also result in negative peer pressure, and in a way that may resemble the “Acting White” hypothesis. In particular, many actions that students can undertake may reveal their ability or economic type to their peers, such as participating in class by raising a hand to ask a question or to answer one posed by the teacher. In such settings, some students, particularly those with low ability (or those who believe they have low ability relative to their peers), may choose not to undertake such actions for fear of revealing that they are not high ability.

We present a model that incorporates both of these concerns, where students may value either attribute: social type (as in Austen-Smith and Fryer 2005) or economic type (our new proposed mechanism). The model generates predictions about how both mechanisms may influence educational investment behavior, as well as how the two can be differentiated empirically (or at least, how we can infer which of the two is dominant if both are present). In doing so, we build on a much simplified version of Austen-Smith and Fryer (2005), where students have a two-dimensional type (social and economic) and want to signal their type to their peers. We show that the motive to signal either of the two components (social or economic) is sufficient to result in negative peer pressure, and thus both stories are potentially consistent with the empirically observed phenomenon, namely that some students may not undertake important educational efforts or investments when they are observable to peers.

We further show that augmenting the model with a particularly designed lottery yields differing predictions based on whether concerns for signaling social type or concerns for signaling economic type prevail in a particular setting.

We test the model using a field experiment in Los Angeles public high schools. We offer students access to an SAT prep package that includes free access to an online app, a diagnostic test, plus free one-on-one tutoring. The core of our test builds on Bursztyn and Jensen (2015) in varying at the student level whether students believe the decision to sign up (and here, the diagnostic test

\[2\text{In Austen-Smith and Fryer (2005), peers are assumed not to care about the individual’s economic type (as firms are assumed not to care about their social type).}\]

\[3\text{These individuals may also seek out opportunities that allow them to signal high ability without the risk of actually revealing their true ability. For example, a student may raise their hand in class when the teacher asks a question but only when many other students are also raising their hand (so the chances of being called on are low).}\]

\[4\text{In Austen-Smith and Fryer (2005), students care about signaling only their social type to their peers, and thus, only one mechanism of peer pressure is present in their model.}\]
score) will potentially be revealed to classmates. If students behave differently when they believe their decision will be revealed to peers, it indicates the presence of peer social concerns.

To distinguish between the two proposed mechanisms, we add a lottery and vary the likelihood that students who sign up will win the free SAT package. Assume that with probability $p$, a student who signs up for the lottery will win the package and get the benefit associated with it. When the decision is public, others will also learn that the student signed up. And if they win, their diagnostic test will also be public, which will reveal their ability to others. If effort is stigmatized, signup rates should increase in $p$ when the decision is public. In effect, if students face a large social cost just for signing up, they will be more likely to sign up and incur this cost when they have a greater chance of winning the lottery and receiving the benefit of the package. By contrast, if fear of revealing ability is present, then signup rates should decrease in $p$ when the signup decision is public. The intuition is that students with low ability can sign up for the package, which allows them to pool with the high ability types, with very little risk of being revealed to be a low ability type (since the diagnostic test score is only revealed if the student wins the package). Thus when the decision to sign up is public, the differential response to $p$, whether signup increases or decreases in $p$, allows us to distinguish which of the two motives is present (or, which of the two dominates, since both may apply).

We implement this experiment in three Los Angeles high schools. Driven by the theory, and based on field work, we chose one school where we predict effort stigmatization is likely to be more important (a lower achieving, lower income school with a higher minority share) and two where signaling high ability is more likely to be important (higher achieving, higher income schools with lower minority shares), pre-registering these choices. Subsequent surveys in these schools reveal that indeed, students report greater concerns with whether people think they are smart in the latter schools, compared to the former.

Overall, we find that signup rates are lower in all schools when the decision (and potentially the

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5The model predicts that $p$ will have no effect on signup when decisions are private, since there are no costs associated with signing up or winning when everything is private.

6It is beyond the scope of the present paper to model or test the origin or evolution of peer culture and why it may differ across settings. However, we can offer some suggestive intuition. In the “Acting White” literature, when students have more limited mobility and fewer labor market opportunities with higher human capital requirements, it might be more important to signal social type, since one is likely to keep the same group of friends after high school and derive value from maintaining membership in a network with them. Moreover, group loyalty might be particularly important among groups formed by ethnic minorities (see, Berman 2000, Gans 1962, Lee and Warren 1991, and Ausubel 1977). By contrast, in settings where students are more likely to go to college or have higher mobility, concerns about maintaining membership in a network of high school friends may be less significant. Alternatively, signaling a higher economic type might in fact be more valuable when many of your peers may hope for or go on to higher paying jobs with high human capital requirements. Finally, the different school cultures may arise due to historical patterns of access and opportunity. In higher achieving schools with better funding and wealthier and more educated parents, a higher share of students have traditionally gone to college, so doing well in school and preparing for college is the behavior of the majority of students, rather than the exception. By contrast, in lower income and lower achieving schools, students may have historically faced many barriers to access to college, so students working hard to do well and planning to attend college are perhaps in a small minority, rather than the norm.
diagnostic test score) will be revealed to classmates, consistent with Bursztyn and Jensen (2015). On their own, these results could be been taken as evidence of the “Acting White” hypothesis, and we might then conclude that this phenomenon was more widespread than we might have believed, even occurring in a school that has a much lower share of minority students. Alternatively, we may have been tempted to conclude that the “Acting White” hypothesis was not in fact about “Acting White,” but something different altogether. However, our experimental design allows us to differentiate the two different underlying motivations driving this negative peer pressure. In the lower income school, when decisions are public, signup rates are indeed higher when \( p \) is greater, consistent with a greater concern over revealing effort (signup rates are unaffected by \( p \) when the decision is private). By contrast, signup rates are lower when \( p \) is greater in higher income schools when the decision is public, consistent with a greater concern over revealing ability (again, private signup rates are unaffected by \( p \)).

And strikingly, in higher income schools, when the decision is public the likelihood of signup declines primarily for students with lower grades when the chance of winning the package is high rather than low; this result is further evidence of the “cool to be smart” mechanism, since such students are most likely to have low scores revealed through the diagnostic test. Further consistent with these effects being driven by peer social concerns, in both types of schools we see the biggest effects among students who say it is important to be popular (these are the students who will have the highest concern about how others perceive them) and, in the higher income schools, when students report that in their school it is important to be smart in order to be popular. Thus, we find strong support for the model, and evidence of both types of concerns, exactly where they would be predicted.

Although our primary goal is to uncover and disentangle mechanisms behind peer pressure, we also find that students in the public treatment in both types of schools, having been less likely to sign up for the SAT prep package, are significantly less likely to have taken the SAT as of our last follow up survey. These results suggest that peer pressure concerns may be strong, since students were willing to give up a lot in order to not reveal effort or ability (the SAT package was valued at $100 dollars and the median expected score gain among all students offered the package was about 100-120 points). They also suggest the serious consequences of peer pressure effects.

Our paper aims to make several contributions. First, we contribute to the literature attempting

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7 Even cutting across schools, if we examine classrooms where students report a greater concern over whether others think they are smart, we see similar patterns.
8 Although grades are an outcome variable, not an innate attribute, they are likely to be correlated with ability. Further, grades will play an important role in college admissions, which will affect future earnings, and thus they are a reasonable proxy for a student’s economic type.
9 The same pattern does not hold when the signup decision is private, nor in the lower income school where we predicted that this mechanism is less likely to be present.
10 However, these are only self-reports. Further, our last follow up was near the end of the academic year, and many students will take the SAT in their senior year. Thus, we may only be capturing that students take it sooner, or perhaps more times, rather than whether they will ever take it. However, both of these outcomes may still be potentially valuable to the student.
to understand the barriers to educational achievement. Under both mechanisms we model, and empirically in both types of schools we examine, students are willing to pass up on potentially valuable opportunities just because of concerns about how their peers will perceive them. Further, we design a test that allows us to distinguish these two very different mechanisms, which is important because they suggest very different policy implications, as we discuss below.

As an additional contribution within this literature, we model and empirically confirm the importance of a new mechanism, where peers reward ability or economic type, which to the best of our knowledge has not been previously explored. We believe that this mechanism may be an important and widespread phenomenon that adversely affects learning and achievement, with the implication that negative peer pressure effects may be found outside of just those contexts where we expect the “Acting White” mechanism to be present. And the number of educational activities that may reveal ability, and thus which this mechanism may influence, is vast, including: asking or answering questions in class; joining in class discussions; participating in group or team assignments; making a presentation in front of the class; joining a study group; attending extra help or review sessions; or joining an academic club (e.g., physics club, debate club or Model U.N.). In settings where class participation is mandatory or “cold calling” is practiced, even the very act of attending class risks exposing one’s ability. And the range of potential responses to the concern about revealing ability, and the corresponding impact on student achievement, may be great. For example, choosing not to ask a question in class when one doesn’t understand the material (or not raising your hand when the teacher asks if everyone understood the material) can cause students to fall behind, particularly when lessons are cumulative and there are few outside opportunities to seek additional assistance. Given this wide range of activities that may reveal one’s ability, it is possible that students may regularly forgo or avoid some potentially beneficial learning action, or undertake certain actions that attempt to signal that they are a high social type, just to avoid revealing low ability (actual or self-perceived).

More broadly and outside of the educational context, our paper contributes to other literatures as well. Since the seminal work by Spence (1973), there has been a large theoretical literature on social signaling. Recently, a number of empirical studies have provided evidence of the importance of social signaling in a variety of settings, from voting, to prosocial behavior, to conspicuous consumption (e.g., DellaVigna et al. forthcoming, Ariely et al. 2009, DellaVigna et al. 2012, Charles et al. 2009). We contribute to this literature by experimentally disentangling different reasons for
This paper also relates to a number of recent studies using field experiments to separate the role of different potential mechanisms behind economic phenomena (e.g., Karlan and Zinman 2009, DellaVigna et al. 2012, and more closely related, Bursztyn et al. 2014). Unlike previous studies, however, our experiment explicitly departs from different settings where the dominant mechanism is expected to be different: it is precisely our goal to show that similar results can be explained by very different channels in different settings. As such, our approach highlights the importance of thinking of the heterogeneity of environments when designing mechanism experiments linked to theory – this could have important implications when considering generalizing a set of findings. For example, consider our basic finding of nearly identical effects of public signup (pooling the signup rates across levels of $p$) in the two types of schools. In the absence of a more precisely constructed test, one might have incorrectly inferred that the same mechanism applied in both settings.

We also hope to highlight what we consider to be several methodological advantages to our approach, which uses theory to guide experimental design in a way that allows different mechanisms to be tested with a single experiment (differentiating between effort stigmatization and ability rewarding based on the differential effect of $p$ in the public treatment). First, using the same experiment for both mechanisms, rather than variations in the experiment or altogether different experiments for each, reduces or eliminates the possibility that differences in the experimental design itself may be driving any observed differences across settings. Second, this approach is also more economical, in that it doesn’t require us to run different experiments in each setting to test for the two mechanisms. Finally, by simultaneously testing both mechanisms with a common treatment, we are able to tell which mechanism dominates in a particular setting (running different experiments for each mechanism may just indicate that both are present but not which dominates), which may be the most relevant factor for policy design. Related, for studies interested in understanding different cultural settings, whether school-based or otherwise, this choice-based approach offers a strategy for identifying or revealing underlying cultural factors without the need for subjective appraisals or direct elicitation from respondents.

The remainder of this paper proceeds as follows. In the next section, we present the theoretical framework that incorporates the two types of peer concerns and generates predictions on how they will influence educational investments and how the two mechanisms can be distinguished from each other. Section 3 discusses the experimental design and the connection to the theory. Section 4 presents the results and considers alternative explanations. Finally, Section 5 discusses the policy implications of these results and concludes.

\[\text{Suppose that we have two mechanisms } M_1 \text{ and } M_2 \text{ and two statistics } \sigma_1 \text{ and } \sigma_2 \text{, such that } \sigma_i > 0 \text{ if and only if mechanism } M_i \text{ is at work, for } i \in \{1, 2\}. \text{ To check if one of the mechanisms is present, one would have to compute both } \sigma_1 \text{ and } \sigma_2 \text{, which would be expensive if obtaining the two statistics requires different treatments. In addition, this would also be wasteful, because the two tests are one-directional and would ignore information if } \sigma_i < 0 \text{ for either } i. \text{ In these terms, our tests satisfy } \sigma_2 = -\sigma_1, \text{ which allows us to perform a two-directional test and make use of all information retrieved.}\]
2 Theoretical Framework

The model below is a simplified and modified version of Austen-Smith and Fryer (2005), adapted for the purposes of describing the two mechanisms (as opposed to a single ‘acting white’ mechanism) and for designing a test to differentiate the two. One notable difference is the payoffs from education. In Austen-Smith and Fryer (2005), ability is not observed, and firms pay wages based on both education and inferred ability, the latter of which is assumed to be greater for those choosing higher levels of education because educational effort is decreasing in ability (as in Spence, 1973). Thus, higher effort is a signal of higher ability, and if educational effort is not stigmatized (students are not treated differently depending on peers’ inference of their social type), all students would study more. By contrast, we treat economic ability as also being judged by peers just like social type, and educational effort is assumed to help reveal true ability\footnote{Thus, our model of education is not a pure ‘signaling’ model. For this reason, we will not need to address multiple equilibria and refinements, which are common in signaling models.} (to peers). We show that this alone can make students reduce educational effort in order to avoid revealing that they are low economic types.

In what follows, we first present a simple model of signaling social skills, then augment it to get a model of signaling economic skills. We then introduce a general model that includes a parameter $p$ that can be used to disentangle the two cases.

2.1 Simple model of “signaling social skills”

There is a continuum of students. They have an opportunity to participate in a certain educational activity that delivers benefit $b > 0$, but requires time. The opportunity cost of time is assumed to equal $c_i$, which is a student’s private information. We follow Austen-Smith and Fryer (2005) in assuming that this opportunity cost of time depends on the student’s ‘social type’. Specifically, there are two social types, low and high, so that $c_i = l$ for low social types and $c_i = h$ for high social types with $l < h$; in this way, we save on notation by having $c_i$ denote the social type, $c_i \in \{l, h\}$. We denote the share of low social types by $q$: $Pr(c_i = l) = q$. In what follows, we assume that $l < b < h$, so low social types have a positive net benefit $b - l > 0$ from the educational activity, and high social types have a negative net benefit $b - h < 0$ from this activity. To save on notation, we normalize $l = 0$, so the net benefit of low social types equals $b$.

Students care about their peers’ perception of their social type, and get utility $\lambda_s Pr_{-i}(c_i = h | Info)$, where the latter factor reflects the probability that the peers put on student $i$ being high social type conditional on $Info$, which denotes the history of the student’s actions that are common knowledge (public history). If we let $s_i \in \{0, 1\}$ be the student’s decision to sign up for the educational activity
(s_i = 1 if the student signs up and s_i = 0 otherwise), then a student i solves
\[
\max_{s_i \in \{0, 1\}} (b - c_i) s_i + \lambda_s \Pr_{-i}(c_i = h \mid Info).
\] (1)

In what follows, we distinguish between two settings: private and public. In the private setting, a student’s decision is not observed by the peers, so Info = {∅} (empty public history) regardless of the student’s choice. In the public setting, the decision is observed by the peers, and thus Info = s_i.

This model is easy to analyze. In the private setting, the second term in (1) is a constant unaffected by s_i, and student i maximizes (b − c_i) s_i. The student therefore chooses s_i = 1 if and only if b − c_i > 0, i.e., only if c_i = l. Consequently, the share of students who sign up is q, and all those that do sign up are low social types, whereas high social types do not sign up.

In the public setting, high social types (students with c_i = h) do not sign up either (the proof of the proposition below fills in the details). Suppose that share r of students with c_i = l sign up. If so, the payoff of an individual student from signing up is b − c_i (in this case, peers know that the student is a low social type); the payoff from not signing up equals, by Bayes’ formula, \[\lambda_s \frac{1-q}{1-q} + \lambda_s \frac{1-q}{1-q} = \lambda_s \frac{1-q}{1-q}.\] Solving for r, we obtain the following proposition.

**Proposition 1.** (Signaling social type) In the private setting, only students with positive net benefit (low opportunity cost c_i = l) sign up, so the share of students who sign up equals q. In the public setting, the share of students who sign up equals q if \(\lambda_s \leq b\); equals \(1 - \frac{\lambda_s}{b} (1 - q) \in (0, q)\) if \(\lambda_s \in \left(\frac{b}{1-q}, b\right)\), and equals zero if \(\lambda_s \geq \frac{b}{1-q}\).

In other words, signup in the public setting is weakly lower than signup in the private setting, and strictly lower if \(\lambda_s\) is high enough \((\lambda_s > b)\).

### 2.2 Simple model of “signaling economic skills”

Consider the same model, but assume now that each student also has ability a_i (‘economic type’). Suppose that ability is distributed on \([0, 1]\) for students with either value of c_i.\(^{16}\) Suppose that students do not get stigmatized or rewarded for being high or low social type, so \(\lambda_s = 0\); however, they get rewarded for their perceived ability, with coefficient \(\lambda_e\). In addition, assume that in the public setting, signing up reveals not only the fact of signing up s_i, but also the student’s ability

\(^{16}\)We follow Austen-Smith and Fryer (2005), who also adopt this assumption for simplicity. In general, there is no reason to believe that the distributions are the same or, more generally, that ability and social skills are uncorrelated. Furthermore, the correlation may have either sign. Students with a high opportunity cost (i.e., high social type) may also have low ability because they have never invested in this ability, which would imply negative correlation between ability and social type. Alternatively, high ability students are already very well prepared for the SAT, and their opportunity cost of studying further to obtain the same benefit is high; this would imply positive correlation between ability and social type. We prefer to remain agnostic about the true correlation and adopt the independence assumption for convenience. We note, however, that the results would remain unchanged for low or moderate levels of correlation, because the baseline results are not knife-edge.
a_i \) (again, peers learn about a student’s ability when they answer or ask a question in class, during participation in study group or similar activities). The student’s problem is therefore
\[
\max_{s_i \in \{0,1\}} \left( (b - c_i) s_i + \lambda_e \mathbb{E}_i (E_{-i} | \text{Info}) \left| a_i \right\} \right);
\]
here, \( \text{Info} = \{ \emptyset \} \) in the private setting and \( \text{Info} = (s_i, a_i) \) in the public setting. In what follows, we assume that \( h \gg 0 \), specifically, that \( h > b + \lambda_e \); this ensures that students with high opportunity costs do not sign up just to reveal their high ability, which would lead to positive peer effects, whereas our focus is on negative peer effects.

In this version of the model, the private setting is unchanged: a student signs up if and only if \( c_i = l \). In the public setting, among students with \( c_i = l \), smarter students sign up, as they are more interested in revealing their economic type. More precisely, students with \( a_i \) close to 1 always sign up. If \( \lambda_e \leq 2b \), then even a student with \( c_i = l \) and \( a_i = 0 \) prefers to sign up: indeed, in such an equilibrium, by signing up this student reveals his low economic type but gets the benefit \( b \); if he does not sign up, he pools with high social types, who on average have ability \( \frac{1}{2} \). For \( \lambda_e > 2b \), the equilibrium takes the form of a cutoff: students with \( a_i \geq t \) sign up and students with \( a_i < t \) do not. The cutoff \( t \) may be found from the following indifference condition:
\[
\frac{b + \lambda_e t}{1 - q + \frac{qt}{2}} = \frac{h}{1 - q + \frac{qt}{2}}.
\]
Solving for \( t \), we obtain the following proposition.

**Proposition 2. (Signaling economic type)** Suppose \( h \) is sufficiently high, specifically \( h > b + \lambda_e \). In the private setting, the share of students who sign up equals \( q \). In the public setting, the share of students who sign up equals \( q \) if \( \lambda_e \leq 2b \); and it equals
\[
1 + \frac{bq}{\lambda_e} - \sqrt{1 - q + \frac{b^2q^2}{\lambda_e^2}} < q
\]
for \( \lambda_e > 2b \).

In other words, the share of students who sign up in the private and public settings is identical for low \( \lambda_e \), while the share is lower in the public setting for \( \lambda_e \) above a certain threshold.

### 2.3 Introducing a lottery to separate the two mechanisms

We now consider a joint model of signaling social and economic skills (in other words, we consider the case where both \( \lambda_s \) and \( \lambda_e \) may be positive). Furthermore, we now assume that a student who chose \( s_i = 1 \) (signed up) gets to participate in the educational activity with probability \( p \in (0, 1) \) (formally, there is a random variable \( w_i \in \{0, 1\} \) that is drawn independently of \( (a_i, c_i) \) and such that
Pr \((w_i = 1) = p\). Technically, this means that with probability \(p\), the student gets the benefit \(b\) and pays the opportunity cost \(c_i\) (and reveals his ability \(a_i\) in the public setting); with complementary probability \(1 - p\), he neither gets the benefit nor pays the cost, and in the public setting only \(s_i\) is revealed, but not \(a_i\).

The student of type \((a_i, c_i)\) therefore solves

\[
\max_{s_i \in \{0, 1\}} p(b - c_i) s_i + \lambda_s \Pr_{-i}(c_i = h \mid Info) + \lambda_e \mathbf{E}_{-i}(a \mid Info \mid a_i). \tag{3}
\]

Here, \(Info = \{\emptyset\}\) in the private setting. In the public setting, \(Info\) is a vector \((s_i = 0, w_i = 0, \emptyset)\) if the student did not sign up, a vector \((s_i = 1, w_i = 0, \emptyset)\) if the student signed up but lost the lottery, or a vector \((s_i = 1, w_i = 1, a_i)\) if the student signed up and won the lottery, in which case his ability \(a_i\) is also revealed.

The result in the private setting is identical to the previous cases: the share of students who sign up is \(q\). In the public setting, high social types \((c_i = h)\) do not sign up, and the strategies of low social types satisfy a single-crossing condition: if a student with ability \(a_i\) (and \(c_i = l\)) signs up, then so does a student \(j\) with ability \(a_j > a_i\). Thus, there is a threshold \(t\) such that students with \(a_i > t\) sign up and those with \(a_i < t\) do not. For a student with type \((a_i, c_i = l)\), the expected utility if he signs up equals\[17\]

\[
U_{s_i=1}(a_i, c_i) = pb + \lambda_e \left(pa_i + (1 - p) \frac{1 + t}{2}\right),
\]

and the expected utility if he does not equals

\[
U_{s_i=0}(a_i, c_i) = \lambda_s \frac{1 - q}{1 - q + qt} + \lambda_e \left(t \frac{qt}{2} \frac{1 - q + qt}{1 - q + qt} + \frac{1}{2} \frac{1 - q}{1 - q + qt}\right);
\]

notice that the latter does not depend on the student’s type. An interior threshold \(t \in (0, 1)\) corresponds to an equilibrium if and only if \(U_{s_i=1}(a_i, c_i) = U_{s_i=1}(a_i, c_i)\) for \(a_i = t\).

We thus have the following proposition.

**Proposition 3.** (Characterization of equilibrium) Suppose \(h > b + \lambda_s + \lambda_e\). Then there is a unique\[18\] equilibrium that satisfies the D1 criterion.\[19\] In the private setting, the share of students who sign up equals \(q\). In the public setting, the share of students who sign up equals \(q\) if and only if...

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\[17\]In a putative equilibrium where nobody signs up, this is only true for properly chosen out-of-equilibrium beliefs.

\[18\]Proposition shows that this holds in any equilibrium that satisfies the D1 criterion (Cho and Kreps, 1987).

\[19\]Without this requirement, there may be additional equilibria, such as one where nobody signs up, and a student who signs up would be believed to have \(c_i = l\) and, unless proven otherwise, \(a_i = 0\). This equilibrium fails the D1 criterion because the student that gains the most from deviation has \(a_i = 1\), as there is a positive probability that this high \(a_i\) will be revealed. In this signaling game, the receiver is nonstrategic, but one can easily adapt Cho and Kreps (1987) to this case by assuming that it is strategic and has a unique best response that gives the sender (student) the assumed payoff.

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10
\( \lambda_s + \lambda_e p \leq \frac{pb}{2(1-q)} \). If \( \lambda_s \geq \frac{pb}{2(1-q)} + \frac{\lambda_e}{2(1-q)} \), then nobody signs up, and for \( \lambda_s \in \left( pb - \lambda_e p, \frac{pb}{1-q} + \frac{\lambda_e}{2(1-q)} \right) \), the share of students who sign up is given by

\[
\frac{1 + p}{2p} + \frac{qb}{\lambda_e} - \sqrt{\left( \frac{1 + p}{2p} + \frac{qb}{\lambda_e} \right)^2 - q \left( \frac{1}{p} + \frac{2b}{\lambda_e} + \frac{2\lambda_s (1-q)}{\lambda_e} \right) } \in (0, q).
\]

Thus, the share of students in the public setting is the same as in the private setting if both \( \lambda_s \) and \( \lambda_e \) are small, and is smaller than in the private setting if either \( \lambda_s \) or \( \lambda_e \) are large. We now turn to comparative statics.

**Proposition 4.** *(Comparative statics)* The share of students who sign up in the public setting is (weakly) decreasing in \( \lambda_s \). It is also (weakly) decreasing in \( \lambda_e \) if \( \lambda_s \) is low enough\(^{20}\) and is increasing in \( \lambda_e \) otherwise. Furthermore, as \( p \) increases, more students sign up if \( \lambda_s > \frac{\lambda_e - 2b}{2(1-q)} \) and fewer students sign up otherwise.

These comparative statics results are summarized in Figure 1. Most importantly for our purposes, they imply the following. If \( \lambda_e \) is high relative to \( \lambda_s \) (for example, if \( \lambda_s = 0 \)), then an increase in \( p \) would decrease the share of students who sign up in the public setting. If \( \lambda_e \) is small and \( \lambda_e \) is not, then an increase in \( p \) would increase this share. In other words, the effect of \( p \) depends on the relative importance of signaling of one’s social type and economic type to the peers.

### 3 Experimental Design and Connection with Theory

#### 3.1 Experimental Design

We conducted our experiment in three public high schools in two areas of Los Angeles, between December 2015 and February 2016. We focused on 11th grade classrooms, since this is when students typically begin preparing for the SAT. The first school is large, with over 3,000 students, and located in a lower income area of Los Angeles. In this school, 97% of students are Hispanic/Latino, 74% are eligible for free or reduced-price meals and the median income in the school’s ZIP code is about $44,000. Approximately 54% of seniors take the SAT, and the average score is around 1,200. Our sample contains 257 students from this school. The second and third schools both have over 2,000 students and are located in higher income areas of Los Angeles. Averaging across the two schools, 33% of students are Hispanic/Latino, 41% are white, 41% are eligible for free or reduced-price meals and the median income is about $66,000. Approximately 60% of seniors in these schools take the SAT, and the average score is around 1,500. We have 254 students from these two schools in our sample. Combined across the three schools we have 511 students, in 17 classrooms.

\(^{20}\)More precisely, if \( \lambda_s < \frac{b}{2(1-q)} \left( \sqrt{(1-p)^2 + 4p(1-q)} - (1-p) \right) \).
Based on our priors and field work, we chose, and pre-registered, these particular schools for testing our model because we expected effort stigmatization to dominate in the first school and ability rewarding to dominate in the other two. Though ultimately our experiment is specifically designed to test whether this is the case, we can provide some preliminary evidence that supports our priors. After our experiment was complete, we asked students to fill out a survey (see below) that included the following item: “To be popular in my school it is important that people think I am smart.” (1: strongly disagree ... 5: strongly agrees). In the lower income, higher minority share school, the mean response was a 2.39. By contrast, the mean was 2.90 in the higher income, lower minority share schools. The difference is statistically significant at the 1 percent level.

As in Jensen and Bursztyn (2015), the core of our experiment involved offering students the opportunity to sign up for complimentary access to an SAT preparation package. Students were handed a form at their desks that included the following:

“[Company Name] is offering a chance to win an SAT prep package intended to improve your chances of being accepted and receiving financial aid at a college you like. The package includes:

- Premium access to the popular [App Name] test prep app for one year;
- Diagnostic test and personalized assessment of your performance and areas of strength and weakness;
- One hour session with a professional SAT prep tutor, tailored to your diagnostic test.

This package is valued at over $100, but will be provided completely free.”

Thus, students were told the value of the SAT preparatory package was over $100 and they appear to have highly valued it. Beyond the very high signup rates, as shown below, students reported on the second survey form believing the package could have a big impact on their test scores. Though the form did not mention any specific expected impact on test scores, in school 1, the median expected point gain reported by students was 100 (with an average of 426). In schools 2 and 3, the median was 123 (with an average of 338). Thus, forgoing signup, just due to peer social image concerns, represents a real perceived cost to students.

Within this offer, we used a 2x2 design, cross-randomizing: (i) the probability of winning the package conditional on signing up during the experiment, and (ii) whether students were told that the other students in the room would observe their signup decision and diagnostic test score. Accordingly, the signup form continued as follows:

“If you choose to sign up, your name will be entered into a lottery where you have a 25% [75%] chance of winning the package.
Both your decision to sign up and your diagnostic test score will be kept completely private from everyone, including [except] the other students in the room.

Would you like to sign up for a chance to win the SAT prep package?

We refer to the forms containing the 25% chance of winning the lottery as the *Low probability* condition, and those with the 75% chance as the *High probability* condition. Forms with the word “including” are the *Private* condition, and those with the word “except” are the *Public* condition. The forms, shown in the Supplemental Appendix, were otherwise completely identical for the various treatment groups.

Forms with the differing treatments were pre-sorted in an alternating pattern and handed out to students consecutively in their seats. By varying treatment status among students within classrooms, our design ensures that students in the various groups otherwise experience the very same classroom, teacher and overall experimental environment.

Students were instructed to hold their questions and refrain from communicating with anyone until after all of the forms had been collected by our team. Thus, students could not coordinate on their signup decisions or observe what other students were choosing. Further, because students could not communicate with each other, and because the forms looked nearly identical at a glance, they would not have been aware that others were being given different privacy assurances or a different likelihood of winning the lottery.

After the first form was collected, we distributed a second form containing additional questions, discussed in more detail below, followed by assent and consent forms.

Though we have four different conditions, the forms were extremely similar, varying only in a single word, “except” or “including,” and/or a single digit, 2 or 7. As with varying treatment among students within classrooms, a big advantage to this approach is that the different treatment arms are therefore treated identically in every other way, with nothing else differing that might drive different responses, other than the single word relating to privacy or the single digit relating to the likelihood of receiving the package. One disadvantage is that if students don’t read carefully or pay close attention, they might overlook these critical details. However, to the extent that they do, this would weaken our test, suggesting the effects are even stronger than what we measure.

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21 The nature of our experiment, which required handing out forms with varying treatment assignments in the classroom, precluded us from assigning treatment to each student based on a pure random draw. However, what is most important for our analysis is that the assignment procedure used should result in treatment groups that are similar in expectation, which we verify below. The fact that students may be sitting near friends (in classrooms where students are free to choose where to sit), or those with the same last name and thus potentially related or of a similar ethnicity (when seats are assigned alphabetically) should not in itself affect our test, since students filled out the forms without communicating with each other.

22 As originally distributed, the second form in the first school did not include a small number of questions that were added before visits to the second and third schools. The research team therefore revisited the first school again in February 2016 and collected answers to these additional questions. We were able to survey over 86% of the students from the original sample in that school. Treatments are still balanced for the sample that was surveyed during the second visit (see Appendix Table A.1).
As noted in the introduction, another strength of our design is that the two mechanisms generate predictions of changes in take-up as a response to varying $p$ that go in *different directions*.

It is worth highlighting some distinctions between the experimental design applied here and the one used in Bursztyn and Jensen (2015). First, we include a lottery with varying probabilities of winning the package, rather than giving it to all students who sign up. Second, the SAT prep package in the current design includes a diagnostic test, the results of which will be revealed in the public condition for students who win the package. Finally, in the public condition, there is a difference in the likelihood that it is revealed that you signed up for the course (this happens with certainty) and whether others learn your diagnostic score (which only occurs if you win the lottery). These variations are critical for testing and differentiating *why* students change their educational choices when others observe those choices, rather than just *whether* they change their choices, as in the previous paper.

Table 1 presents tests of covariate balance. As expected, the four groups are very well balanced on the measured dimensions: sex, age, and ethnicity.

### 3.2 Linking the Experiment to the Theoretical Framework

The key model predictions that we can test with our experiment are:

(i) Under both mechanisms, the signup rate with the public condition is lower than with the private condition;

(ii) Under both mechanisms, $p$ should not affect signup rates in the private condition.

(iii) In a setting where effort is stigmatized, the signup rate in public with $p = 0.75$ is higher than with $p = 0.25$. The intuition is that conditional on publicly signing up (and thus paying the stigma cost), the marginal student would prefer to get the package.

(iv) In a setting where ability is rewarded, the signup rate in public with $p = 0.75$ is lower than with $p = 0.25$. The intuition is that conditional on publicly signing up (and thus signaling that one is high ability), the marginal student would prefer *not* to get the package.

Thus, it is precisely the differential response to $p$ in the public condition (along with, as we will show, a lack of any effect of $p$ in the private condition) that allows us to isolate and test two very different underlying mechanisms with our single experiment.

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23Outside of the behavior or motives that we are trying to model and test, one could construct theories for why even private signup rates could be affected by $p$. For example, students may dislike losing so much that they are less likely to sign up for a lottery when they have a small chance of winning, even when the cost of signing up is otherwise zero and the outcome is purely random. Finding no effect of $p$ in the private treatment, as we do, rules out such possibilities (or indicates that different effects cancel each other out perfectly)
As noted in the introduction, we consider it a strength of our design, and a potentially valuable methodological insight for other field experiments, that the same exact treatment can yield a test for both mechanisms. Other approaches, such as designing different experiments or treatments to test for the two mechanisms separately, raise the possibility that differences in outcomes are not just due to different mechanisms, but other differences between the two experiments. Further, this approach is more efficient and cost-effective, using all of the available information. In addition, using the same experiment in all settings enables a choice based revelation of which motive is dominant in a particular setting. And knowing which mechanism dominates in a particular setting is also likely to be important for policy design\footnote{Note, we also chose not to implement an alternate form of the treatment making the signup decision public but the diagnostic score private. In principle, holding \( p \) constant, this third treatment condition could have allowed for separate tests of effort stigmatization (by comparing the fully private condition to this mixed privacy condition) and the ability rewarding mechanism (by comparing the mixed privacy condition to where both are revealed). However, doing so would have forfeited some of the advantages of having a single test based on the sign of the parameter. For example, this would not have allowed us to test which mechanism dominates in any particular setting. We were also concerned that emphasizing differential privacy conditions in this way would have been awkward and potentially made the issue of privacy too salient. Further, testing based only on the differential response to varying \( p \) allows us to conduct a placebo test for any possible direct effects of \( p \) via the private condition. Finally, this approach could have biased against one mechanism and in favor of the other. For example, suppose students are very concerned with privacy and when presented a form promising privacy for one outcome but not the other, they assume the worst, namely that neither are guaranteed to be private. Thus the test for effort stigmatization (signup public, test score private vs. both private) will be interpreted like the fully public condition, meaning the observed difference will include both the effort stigma mechanism and the ability rewarding mechanism. By contrast, the test for the ability rewarding mechanism (the difference between signup public, test score private and both public) will be biased against finding any effect. The same would hold if students are inattentive, such as only reading the first half of the privacy guarantee in the mixed privacy treatment and assuming that because the signup decision is public, the diagnostic score will be as well.}

4 Results

4.1 Main Results

Figure 2 provides visual evidence of the main results on peer pressure. In both types of schools, making the signup decision public rather than private results in a striking decline in signup rates. Further, despite the large socioeconomic differences between the two types of schools, the results (both in baseline levels and treatment effects) are nearly identical, with private signup rates around 80 percent, and a decline to 53 percent when the decision is believed to be public. The results are large and statistically significant, and consistent with the results in Bursztyn and Jensen (2015)\footnote{The effects are somewhat larger than those found in Bursztyn and Jensen (2015), particularly in the lower income school, which is more comparable to the sample of schools examined in that paper. However, the effects we report here pool the impact of public signup for the two levels of \( p \) (0.75 and 0.25), whereas in Bursztyn and Jensen (2015) the effects are for \( p = 1 \). As we predict theoretically and find experimentally, a lower level of \( p \) increases the negative effect of public signup, so it is not surprising that we find larger effects in our current setting.}. However, as noted, despite their similarity, these effects could be driven by very different underlying mechanisms in the two types of schools.
Figure 3 focuses on the lower income school. In the panel on the left, signup rates are unaffected by the likelihood of winning the lottery when the signup decision is private. As noted, the model predicts that \( p \) will not affect signup when the decision is private. And although one might expect that students should be more likely to sign up when there is a greater chance of winning, since the costs of signing up are zero (just checking a box on the form), students who perceive any positive value to the prep package should sign up regardless of the likelihood of winning. When decisions are public, however, signup rates are dramatically lower when the likelihood of winning the lottery is 25% rather than 75%. The 18 percentage point difference is statistically significant at the 5 percent level. This result is consistent with a fear of revealing a low social type, or effort stigmatization.

Figure 4 examines the higher income schools. As before, there is no effect of \( p \) on signup rates when the signup decision is private. However, when the decision is public, the likelihood of winning the lottery has a dramatic effect on signup rates. As predicted when fear of signaling social type is the operative (or dominant) motive, students are more likely to sign up when the chances of winning are 25% rather than 75%, again consistent with students attempting to pool with the high economic types when there is less of a risk that their own economic skill will be revealed. The 26 percentage point decline is very large, and statistically significant at the 1 percent level.

Together, Figures 2 through 4 paint a compelling picture. Based on Figure 2, we find that making decisions public lowers signup. However, the complete opposite effects of \( p \) in the public condition (right-hand panels) of Figures 3 and 4 show that the underlying mechanisms in the two types of schools are very different.

We can confirm this visual evidence in these figures with regressions. To replicate Figure 2, we begin by regressing an indicator for whether individual \( i \) in school \( s \) chose to sign up for the prep package (\( \text{Signup} \)) on an indicator for whether he was offered the public or private treatment (\( \text{Public} \)), separately for the lower and higher income schools:

\[
\text{Signup}_{i,j} = \beta_0 + \beta_1 \text{Public}_{i,j} + \epsilon_{i,j}, j \in \{\text{lower income, higher income}\},
\]

where \( \beta_1 \) is the coefficients of interest, namely the estimated effect of making the signup decision public. In additional specifications, we add other covariates (age and dummies for sex and Hispanic) as well as surveyor and classroom fixed effects; the latter further isolate the within-classroom variation in the public vs. private condition across students. These results will capture the overall effects of making signup public rather than private in the two types of schools and are displayed in Table 2.

To replicate Figures 3 and 4, we add to the previous equation a dummy for whether the individual faced a 0.25 (i.e., low) probability of winning the lottery to get the SAT prep package (\( \text{Low probability} \)) and the interaction of the public treatment with the dummy on facing a low probability (\( \text{Public} \times \text{Low probability} \)), also separately for the two types of schools:
\[
\text{Signup}_{i,j} = \beta_0 + \beta_1 \text{Public}_{i,j} + \beta_2 \text{Low probability}_{i,j} + \beta_3 \text{Public} \times \text{Low probability}_{i,j} + \epsilon_{i,j},
\]
\[j \in \{\text{lower income, higher income}\}, \quad (5)\]

where \(\beta_2\) measures the effect of facing a low probability of winning the package in the private treatment, and \(\beta_3\) measures the differential effect of facing a low probability in the public condition. In additional specifications, we again add other covariates, as well as surveyor and classroom fixed effects. These results are presented in Table 3.

In addition to p-values from robust standard errors, in all tables we also present p-values from wild bootstrap clustered standard errors and from permutation tests.

The results of the regressions are very much consistent with what was revealed in the figures. Table 2 shows that making the decision public reduces signup in both types of schools, with point estimates of about 0.25 – 0.27. All of the results are all significant at the one percent level, and are robust to including individual covariates and classroom and surveyor fixed effects. Table 3 shows that when the decision to sign up is public, the lottery with the higher likelihood of winning the SAT package increases signup in the lower income school, but decreases it in the higher income schools. And again, the results are all significant and robust to the inclusion of individual covariates or the classroom and surveyor fixed effects (though in a handful of cases, the \(p\)-values approach or reach 0.10.)

4.2 Further Evidence of Cool to be Smart Mechanism: Heterogeneity by Grades

If indeed students are trying to act to signal that they are high ability in the higher income schools, then a higher probability of revealing the diagnostic test score should be more likely to dissuade low-performing students from signing up for the package in comparison to high-performing students. The intuition is simple: if students are know their own ability, then those with lower grades will be more afraid of disclosing information about their ability if they get the package and their diagnostic test scores are revealed. This fear is less likely to affect students with higher grades.

We can directly test this prediction in the higher income schools. In the form following the signup decision, we collected self-reported information about students’ grades. Students were asked: “In general, how are your grades?” and were given five options to choose one from: “a) Mostly A’s; b) Mostly A’s and B’s; c) Mostly B’s and C’s; d) Mostly C’s and D’s; e) Mostly D’s and F’s.” In the higher income schools, 49% of students picked options a) or b). We therefore split the sample between those who picked one of these two options and those who picked one of the remaining three options, thus getting the closest possible to a median split.

\footnote{The one exception is the coefficient for the lower income school when individual covariates are added and the Wild bootstrap clustered standard errors are used, where the \(p\)-value is 0.017.}
In Figure 5, we restrict the sample to the public condition in the higher income schools (precisely where we expect the “cool to be smart” mechanism to be important). The figure displays the effect of changing the probability of winning the lottery on the signup rates, splitting the sample between students below (left panel) and above (right panel) the median in terms of their grades. As expected by the theory, for students with grades below the median, there is a substantial drop in the signup rate when the probability of getting the package – and thus revealing the diagnostic test score – goes up. The signup rate under \( p = 0.25 \) is 67% and the signup rate under \( p = 0.75 \) is 22% (the \( p \)-value of the difference is 0.000). For students with grades above the median, we observe a considerably smaller decrease in signup rates when the probability is higher: from 66% to 51% (\( p=0.243 \)). In fact, the drop in signup for students below the median is significantly larger than for those above the median (\( p=0.074 \)).

Under the proposed mechanism, in private, \( p \) is not expected to have a differential effect on the signup rate by the level of ability of the student. Figure 6 confirms this prediction. It replicates Figure 5, but now restricting to the private condition in the higher income schools. We find no effect of \( p \) for both students below and above the median in terms of their grades: signup rates are all around 80% regardless of \( p \) or whether the students are above or below the median. Table 4 reproduces the results of Figures 5 and 6 in regression form and confirms the conclusions from these figures.

Since this mechanism is dominant only in the higher income schools, we should also not expect to see the patterns in Figure 5 in the lower income school. Appendix Figures A.1 and A.2 replicate Figures 5 and 6 for the lower income school and confirm this prediction.\(^{27}\) We do not observe a differential effect of \( p \) on the likelihood of lower vs higher ability students to sign up for the package in either the private or public conditions.

### 4.3 Additional Heterogeneity

Our motivating hypothesis is that students who care about what others think of them will behave in ways intended to signal either their economic or social skills. Implicit in this approach is that all students care about what others think of them. However, some may care more than others. Though we do not have a perfect measure of true underlying concern, in the survey we handed out after the signup forms had been returned, we asked students how important it was for them to be popular. They were given the choice of answering on a 1 to 5 scale (from “Not important” to “Very important”). Figures 7 and 8 split the sample into as close to the median as possible, between those who most think it is important (responses 3 to 5) and those who think it is less important (responses 1 and 2). The figures show that as predicted, those who think it is more important to be popular cut back their signup rates dramatically (34 percentage points in the lower income

\(^{27}\)In the lower income school, it is more difficult to have a median split (we come closest by following the same criterion used in the higher income schools, with 28% of students reporting either mostly A’s or mostly A’s and B’s).
school and 43 percentage points in the higher income schools, both significant at the 1 percent level) when the decision is public compared to those who think it is less important. The latter group still reduces signup when the decision is public, however the differences are much smaller (half or less the size of the effect for those who think it is important) and even for this group, some still rank the importance of being popular a 2 of 5. Table 5 shows these results in regression form, and the conclusions are unchanged.

As noted above, our survey also asked students about whether being considered smart is important for being popular in their school. Though we chose one school where we expected social type to dominate student concerns and two where we expected economic type to dominate, there may be variation within schools as well. Schools may not be monolithic blocks and may instead consist of various subgroups or cliques that are more relevant peer groups for individual students. Thus, for example, even in the lower income schools, it is possible that for some subset of students, being smart is important for being popular, but for other students it is not. Figures 9 and 10 therefore split students in social skills and economic skills schools based on whether they say being seen as smart is important to being popular (responses of 3, 4 or 5 vs. 1 or 2).

Figure 9 shows that in the lower income school, the difference between signup rates in the public and private treatments seems to be nearly independent of whether the student thinks it is important to be smart in order to be popular. By contrast, Figure 10 shows that in the higher income schools, the difference between signup rates in public and private is extremely large (41 percentage points, significant at the 1 percent level) for students who say that being smart is important for being popular. For students who say being smart is not important for being popular however, the difference between the public and private treatments still goes in the same direction, but is much smaller and not significant at conventional levels. The results are again affirmed when we estimate them in regression form (Table 6).

Finally, Figures 11 and 12 split students according to whether their classroom average response (rather than their individual response) to whether being viewed as smart is important for being popular is above or below the median for the 17 classrooms pooled across the three schools. This again allows us to both explore heterogeneity in the response as predicted by the model and helps validate whether the difference across the two different kinds of schools is in fact likely driven by the different peer concerns rather than other differences across schools. With that said, however, we should note that almost all of the classrooms above the median in their response to this question are from the two higher income schools and almost all those below are from the lower income school (in itself, this observations validates our choice of schools as reflecting the two different types of peer concerns, economic and social; it also suggests that when discussing different policy implications for the two types of schools, it may be easier to predict whether the students in any particular school are likely to be driven more by concern about revealing or signaling economic or social skills).

Using this approach to split our sample into those who care about revealing economic type vs.
not, both Figures 11 and 12 and the regression results in Table 6 confirm the main results above. Students in classrooms with a lower concern about economic type are more likely to sign up in the public treatment when the likelihood of winning the SAT package is high and vice-versa for students in classrooms with a greater concern for economic type.

4.4 Additional Survey Evidence of Mechanisms

*Smart to be Cool.* As described in the theoretical framework, and following the model in Austen-Smith and Fryer (2005), we hypothesize that a driver for the social cost associated with displaying effort is the fact that this display signals that the student has a low opportunity cost of studying, which in turn signals a low “social type.” Additionally, this might also indicate that the student is less likely to be around his/her community after graduation. Though we cannot directly measure which particular underlying factor drives the stigma associated with effort, we collected additional evidence during a follow-up visit to all three schools between May and June 2016.28 As displayed in the follow-up survey form in the Supplemental Appendix, we asked the following question: “Suppose a classmate becomes less popular because he/she is studying too hard. Why do you think this would happen?” Students were asked to pick one option among the following: “a) Because other students don’t like hard workers; b) Because other students now think he/she is not a fun person to spend time with; c) Because other students now think he/she is less likely to be around in the future; d) Other reason (open ended); e) Don’t know.” In the lower income school, 37% of students picked option b). Option a) was picked by 7% of students, and option c) was only mentioned by 2% of students. Though only suggestive, these results suggest that there is indeed an update in peers’ perception of a student’s social type stemming from a decision to study harder. The low number of students choosing option a) also suggests that there is no direct stigma coming from effort per se. It is worth noting that the most common reasons given under “Other reason” in the lower income school were related to the student now being too busy to spend time with their friends (9% of students). In the higher income schools, where our evidence indicates that effort stigma is not the main driver of negative peer pressure, the evidence from the follow-up survey suggests that students seem to understand the mechanisms that would underlay that type of channel if it were present in their school: the numbers are very similar to the ones from the lower income school (8% picking option a), 36% choosing b), and 4% mentioning c)).

*Cool to be Smart.* As an additional approach to provide suggestive evidence of the proposed mechanism, in the follow up survey we asked the following question: “Now suppose a classmate becomes more popular because he/she is studying too hard. Why do you think this would happen?” Students were asked to pick one option from among the following: “a) Because other students admire hard workers; b) Because other students now think he/she is a smart person and they admire smart people; c) Because other students now think they can get help in their studying from

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28 We were able to survey 77% of students from the original sample.
him/her; d) Other reason: (open ended); e) Don’t know.” In the higher income schools, 58% picked either option a) or b) (29% for each option), and 21% picked option c). In the lower income school, 17% picked option a), 20% chose b), and 30% chose option c. These numbers are again merely suggestive, but they are consistent with the hypothesis that in the higher income school, there seems to be a culture that supports hard work and being smart.

4.5 Further Evaluating the Stakes: Impact on the Likelihood of Taking the SAT

The main objective of our paper is to test for mechanisms underlying negative peer pressure, and the signup decision is the relevant outcome for this purpose. However, as an additional way to evaluate the stakes of that decision, we revisited the three schools between late May and early June 2016, right before the end of the academic year. Students were asked to report whether they had already taken the SAT (or the ACT, though the vast majority choose the SAT), their score (if they already had one), whether they were planning to take one of the exams, and if so, when. Our goal is to assess whether the SAT prep package we offered had an impact on actual or anticipated college entrance exam taking. It is important to note however that in analyzing these outcomes, the effective assignment to different treatments is likely to be weakened due to contamination of the treatment groups, since students in the different treatments are likely to have discussed the offer with each other after our team left the classroom. Additionally, once students can communicate, other types of peer effects could be triggered, such as social learning.

In Appendix Table A.2, we present the effects on longer-term outcomes. In panel A, we restrict our sample to students in the private condition, across all schools. As discussed earlier, we observe similar signup rates in the private condition across the two levels of $p$. In fact, we also observe a similar selection of students that sign up in the private condition across the two levels of $p$. Individual characteristics are balanced for students who sign up in private condition for $p = 0.75$ and $p = 0.25$ (results available upon request). We can therefore examine the reduced-form impact of $p$ (the probability of having won the SAT package) in the private condition on longer-term outcomes. In the first three columns of Panel A, we analyze the effect of a higher $p$ on the probability that a student reported to have already taken the SAT (or ACT) by the time of our follow-up visit. We find evidence of a marginally significant, positive effect of over 10 percentage points. This amounts to a 40-50% increase in the probability if signup in the low probability group. A sizable share of students take the SAT on the first June test date, which was a few days after our visit. We therefore create another dummy variable for whether the student has already taken the SAT or plan to take it on that date, which is the last SAT exam date during the academic year. Here we also find significant increases on that likelihood for students assigned to the higher probability of

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29 This contamination would bias estimates towards zero, suggesting if anything that our results are an underestimate of the true effect.
In Appendix Table A.2, Panel B, we examine the same outcomes focusing instead of the effect of the private condition, compared to the public: by how much are these outcomes changed when the effects of peer pressure are turned off during the signup stage? This comparison would be relevant for evaluating the reduced-form effects of a policy that made signup private. For the outcomes in columns 1-3, we observe an increase of about 8 percentage points (or a 30% increase) in the probability of reporting to have already taken a college admissions test by the time of the visit. For the second outcome (columns 4-6), we also observe a large and significant increase.

These results suggest that our intervention might have had longer-term effects. However, in addition to the caveats mentioned above regarding loss of experimental control, we interpret our findings with extra caution. Students can still take the SAT at a later data, so the measured effect might just have been an increased likelihood of taking the test earlier. Further, the outcome is self-reported and there may be more desirability bias or demand effects for students who chose to take the prep package or for those who won the lottery and gained access to it. Finally, it could be that the effects are not coming just from the package, but that the package also got them to use other types of exam preparation services (though this could still be considered a mechanism through which the intervention affected additional outcomes).

4.6 Empirical Challenges and Alternative Explanations

The evidence presented above suggests that in all three schools, students face peer pressure to not engage in educational effort, at least in the form of preparing for the SAT. Further, we argue that the differential effects of $p$ in the lower income and higher income schools allows us to identify the effort stigmatization mechanism in the former, and the ability rewarding mechanism in the latter. We also show that other results support the conclusion of our two mechanisms. In this section, we consider several empirical challenges and alternative mechanisms and explanations for our results, and argue that they are either inconsistent with our evidence or rely on additional assumptions that are unlikely to hold.

Direct effects of lotteries. Because our tests rely on comparing signup rates under different probabilities of winning the lottery, any general effect of lotteries (e.g., students don’t like them or are confused by them, or participating in a lottery is rewarded or stigmatized by peers) will be factored out. Further, since there is virtually no difference in signup rates under low and high probabilities in the private setting, we can infer that the probabilities associated with the

30Unfortunately, we were unable to use test scores as an outcome. First, several students who had already taken a college admissions test did not report their scores, either because they had not received yet or because they chose not to report them. As a result, we end up with too few observations. Moreover, regressions using test scores would either be conditional on the student having already taken the test (thus implying differential selection across treatments) or would bundle the intensive and extensive margins, making it difficult to isolate the intensive margin effect.

31In addition, Bursztyn and Jensen (2015) find very similar negative peer pressure effects without lotteries, which suggests that stigmatizing lottery participation cannot be completely responsible for the observed results.
two lotteries per se do not have any direct effect on behavior. However, this does not rule out the possibility that participation in lotteries with different probabilities may be approved or stigmatized by peers. To explain the pattern of our results, such effects would also need to differ across schools. For example, students in low income schools would have to reward signing up for high probability lotteries and/or stigmatize signing up for low probability lotteries. The stigma could also just come from losing a lottery, regardless of the probabilities, in which case the expected stigma cost would be greater under the \( p = 0.25 \) lottery. Alternatively, students may not want to sign up for a low probability lottery because they will feel guilt (or worry that they would face jealousy) if they were to be one of the few students to win it, when so many others lost. The opposite effect would then have to hold in the higher-income schools; for example, students may worry that they will be teased or made fun of if they are one of the few to lose a high probability lottery, thus depressing signup rates in the \( p = 0.75 \) case.

We do not believe such effects are likely. First, we are not aware of any evidence from previous literature, or even anecdotal evidence from the field, for such effects (much less, in the differential pattern described across schools and of the magnitude that we observe in our results). Additionally, these alternative explanations would not necessarily also predict the heterogeneity results that we observe, at least not without further assumptions. Thus, for example, our model generates clear predictions, which are confirmed in the data, about how in higher income schools it is the students who most believe that it is important to appear to be smart who will be influenced by the public vs. private setting, and that it is those who are low ability that will reduce signup in public when the probability of winning is high compared to when it is low. These alternative mechanisms based on stigma or rewards for participating in, or winning vs. losing high vs. low probability lotteries, would not necessarily yield the same results without further modifications or assumptions.

Preferences for privacy. If students just have a general preference for privacy in all things in their life, a similar general pattern would emerge in that students would be less likely to sign up when the decision is public. This could also potentially explain the differential effects of \( p \) in low income schools, since students would only be willing to overcome their concern over privacy if they had a high chance of winning the course (though that would also come with a greater probability of having your ability revealed through the diagnostic test). However, it could not explain the opposite pattern in the higher income schools. In addition, this general concern for privacy would not yield the same predictions for how the effects vary by the importance of being seen as smart. Finally, we also note, the findings of Bursztyn and Jensen (2015) for students who vary their signup decision based on whether they are with their honors or non-honors peers.\(^{33}\)

\(^{32}\) Although technically, winning students could avoid having their peers know they won the lottery by not taking the diagnostic test. However, some students may have believed that lottery winners would be revealed in the public treatment, either directly or through the diagnostic test being mandatory. Alternatively, winning students may face an internal cost of lying, as in DellaVigna et. al (forthcoming).

\(^{33}\) Though it is conceivable that students care more about privacy with respect to one set of peers than another.
Effort may be stigmatized, but for a different reason. In the lower income school, we showed that the direction of the effect of the lottery probability in the public setting is consistent with effort being stigmatized. In the model, we assumed that effort is stigmatized because it signals that the student's opportunity cost of studying is low, and in particular they do not value the company of their peers. However, it is possible that effort itself is stigmatized (we show that the predictions of our model are robust to this possibility in the Supplemental Appendix). Alternatively, the results could also be consistent with any other factor that is correlated with a propensity to exert high effort and that also may be stigmatized, such as: a desire to leave the community; holding parents and/or teachers in high regard; having a full family where parents have time to parent the children; intention to choose a specific profession, perhaps a lawyer or a police officer; belief that effort rather than luck determines success. These individual alternatives are difficult to disentangle; for this reason, we view our test as having identified a class of mechanisms that can explain negative peer pressure effects in each of the schools. However, again, we do note that many of these alternatives would not necessarily generate predictions consistent with the heterogeneity observed in our results, such as with respect to the importance of being perceived as intelligent.

A propensity to exert high effort may also be correlated with high ability or low ability. Given the special role that signaling ability plays in the paper, we consider these possibilities separately.

Effort is associated with having low ability, unless proven otherwise. There are a number of reasons why students undertaking the most effort may be seen as having lower ability. For example, high ability students may not need to study because they understand the material much more easily and without need for further study, review or assistance. Alternatively, it may be that studying makes it harder for others to estimate the student's true ability, effectively pooling high and low ability students together; in this case, low ability students would have a higher propensity to study, thus giving rise to the negative correlation between ability and effort.

In the present case, taking the SAT prep package may be seen as a sign of low ability, since higher ability students may not need it in order to do well in the SAT. If that were the case however, we might expect that students should be more likely to sign up for the course when there is a high probability of winning it, because winning the course would allow them to offset the perception of low ability created by signing up because it gives them a greater chance of having their diagnostic score revealed to peers. This alternative is consistent with the results in the lower income schools but not the high income schools. However, within the lower income school, this alternative hypothesis would not necessarily be consistent with the heterogeneous effects by the assessment of the importance of being smart. Furthermore, in our follow-up survey, very few students agreed with the statement that students could become less popular because high effort implies low ability.

Effort is associated with having high ability. If effort is largely a signal of high ability, which is in turn considered a virtue, then in the public setting there should be a higher signup than in the private setting, which is the opposite of what we observe in either school. Of course, the diagnostic
test is also informative about a student’s ability, and thus it is possible that students try to pool with smarter peers by exerting high effort, unless the diagnostic test is likely to prove otherwise. But this is exactly the mechanism we describe for the higher-income school: signing up signals high ability, especially in the 25% setting where the student is unlikely to have their diagnostic test score revealed. Thus, assuming that effort is associated with high ability and this can lead to negative peer pressure is not an alternative explanation, but another way to state one of our mechanisms.

*High ability is stigmatized.* An alternative possibility is that students may dislike smart peers. For example, students may believe that smart peers will some day leave the community, regardless of whether they study or visibly exert effort. Alternatively, in a more localized setting such as a classroom containing only lower ability students, being high ability would make a student stand out or potentially arouse feelings of jealousy (or, for example, if high ability students often ridicule or look down on low ability students, then low ability students may dislike or also ridicule high ability students).

In this case, there are a few alternative mechanisms. If signing up for the SAT is in itself a signal of high ability (only smart students would take the SAT because they are the only ones who can get into college), and there will be a stigma cost incurred strictly by virtue signing up, this is similar to our other hypothesis in the social skills schools–students should be less likely to sign up when it is public, but within the public condition they should be more likely to sign up when there is a high chance of winning.

Alternatively, where high ability is stigmatized, students may seek opportunities to visibly fail. Thus, we might observe what looks like positive peer pressure; students are more likely to sign up when the decision is public than when it is private, as high ability students sign up so they can intentionally do poorly on the test to hide their high ability.

However, we show that there is no difference in the distribution of grades between takers and non-takers in the public setting (neither 25% nor 75% in the lower income school), which implies that just signing up, without additional information, should not be a signal of high ability.

*Ability to announce the facts of signup, winning the lottery and the diagnostic test in the private setting.* We cannot rule out that in the private setting, students could plan to make their decisions public and believe that they could do so credibly. This, however, should not invalidate the comparison between private and public settings in either of the schools. In the private setting, all students who have a net positive benefit from the prep package (i.e., those who are supposed to sign up in private setting) would still sign up; some of them might disclose their grades and some would not, but in either case signing up and not disclosing anything is better than not signing up and not disclosing. Thus, on the margin, the decision to sign up would not be affected – even though the peers’ beliefs about the students who eventually disclose and who do not may be different.

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34 Deliberately failing the test likely renders the prep package less useful, because tutoring is supposed to be tailored to the performance on this test; however, if the alternative is not signing up at all, making the test useless would not be a concern to a student motivated by this mechanism.
Signing up signals low income. One alternative explanation that could explain lower signup when the decision is public is that signup may signal coming from a poor household, which may be stigmatized. For example, in the higher income schools, it may be that students have private tutors or take other (more intensive and expensive) prep courses, and thus don’t need to sign up for a free course such as we offer. However, we note that in the higher income schools, the median income is still only about $66,000, which is not very high. More importantly, under this alternative hypothesis, we would expect that signup should be greater when the probability of winning the lottery is higher (since students incur the stigma cost for just signing up, so they will be more likely to do so when the expected benefit of signing up is greater, exactly as we predict when effort is stigmatized as in the lower income school), the opposite of what we observe. The pattern is potentially consistent with what we observe in the lower income school. However, we note that in the lower income schools, the median income is only $44,000, which is quite low. Further, nearly three-quarters of students are eligible for free or reduced-price meals. This means that students already likely know who is poor, since receiving this benefit is highly visible to others when you get your lunch in the lunchroom. In addition, in a setting where the vast majority of students are poor, it seems unlikely that a norm of stigmatizing those who are poor would take hold.

Students may already have some signal of each other’s ability and social type. Our tests of these two mechanisms is predicated on the assumption that students continue to take actions, even into the 11th grade, that attempt to hide or signal something about their ability or social type. While one might argue that if that were not the case, we should not expect the results we observe, an alternative interpretation is that some other factor, such as any of the ones mentioned above, may be responsible for our results.

However, we find it quite reasonable that students still have only a very noisy signal of each others abilities or social types. First, there is considerable student turnover in schools. Thus, many students regularly start over with a blank slate and must newly establish their social and economic type to their new peers. Even those students who do not move may face a considerable influx of new classroom peers every year, for whom they have to newly establish their reputation. And beyond mobility across schools, there may be turnover in classmates within the school. In many high schools, students take their various classes with different groups of students (both because the same course is offered during different periods of the day to accommodate different

\[^{35}\text{This alternative explanation also would not predict that the results would vary with the student’s assessment of the importance of being seen as smart, as we observe.}\]

\[^{36}\text{Most states do not track turnover, but the available evidence suggests that the rates are high. A GAO report found that over 90% of students switched schools (for reasons other than grade promotion) at least once between kindergarten and 8th grade, with nearly 2/3 having switched two or more times (GAO 2010). For Rhode Island, which does collect data on turnover, in several school districts (including Providence, the largest), over 25% of high school students changed schools during the 2014-15 academic year alone (Providence Journal 2016). Annual turnover rates like these repeated over many years could lead to considerable changes in one’s classmates. For example, a report for Washington D.C. finds that of 123 students graduating from one high school, only 27 (22%) were in that school at any point during their freshman year (Washington Post 2015).}\]
schedules, and because from year-to-year, and sometimes even within years, students move back
and forth between remedial, regular and honors sections for different subjects). Thus, students
may regularly find themselves in a classroom with students they have not been with before and
therefore feel a need to regularly re-establish their reputation.

Second, even with a fixed set of peers, there may be secular, group-level changes that necessitate
renewed or ongoing signaling. For example, as students get older, the range and scale of social
opportunities generally increases. Accordingly, norms about social type may change or become
more salient, as may the average level of student concern about social type. Alternatively, as
students get closer to graduation and/or college, norms regarding economic type may change or at
least become more salient.

Beyond that, individual students may change considerably over time. Student performance,
used by peers to infer ability, may fluctuate over time for reasons such as material becoming more
difficult with school progression (e.g., algebra in 9th grade vs. calculus in 11th), mean reversion,
or difficulties in a student’s home or personal life. Similarly, adolescence is a period in which
personality, priorities, interests and behavior can change quite dramatically. A student’s true
social type, or the social type they just want to be perceived as, may vary over time, requiring
additional signaling.

Finally, regarding ability specifically, the grouping of students into remedial, regular and honors
classes provides some rough information on ability, but more fine grained detail is unlikely to be
known within these classes (and it may be relative ability within a class type that is rewarded).
For example, a student in a regular class could be a borderline remedial student or a borderline
honors student. Plus, when grades are kept private, as there are in U.S. high schools, and where
students are able to avoid situations in which ability may be revealed and can in fact potentially
deceive others (e.g., saying that they found a difficult exam to be easy), students may only have a
noisy signal of each other’s ability.

Thus overall, between changes in peer group composition, group level changes, changes in
individual students, and the possibility that people forget over time, there may always be a need
for constant signaling to reinforce or re-establish one’s reputation. In fact, we believe that the very
importance and broader relevance of the mechanisms we consider is the possibility that, given how
many behaviors may reveal ability or social type, students may daily or regularly alter the behavior
with respect to decisions that may yield educational or learning benefits.

Privacy with respect to parents, teachers and other school personnel. The interpretation of our
results is that students’ signup decisions are responding to potential social costs from peers, such
as effort or low ability being stigmatized. However, one might wonder whether students thought
that their decisions would also be made known to (or kept private from) parents, teachers, guidance

37Related, people may just forget over time; a signal of high ability revealed in 9th grade may not be sufficient to
sustain a reputation of high ability without additional reinforcement.
counselors or others in the school, and that these individuals provide a separate form of motivation to sign up (such as not wanting to disappoint a teacher). However, we note that the signup form specifically referenced privacy with respect to classmates, and did not mention any of these other individuals. Of course, it is possible that students assumed that the decisions would be public to these other individuals regardless of whether classmates would know (e.g., teachers always know students’ grades), or that the decision would not be known by teachers and others regardless (since this was a private company offering the course, rather than a school course), in which case the effects would be differenced out when comparing the public vs. private regimes. However, it is possible that students misinterpreted the form and believed that the same privacy regime stated on the form would also apply to others, not just classmates. We believe this is unlikely as a general phenomenon, since in both types of schools, signup was lower when the decision was public, and it seems unlikely that parents, teachers or other school officials would sanction students for signing up for a free SAT prep package. Further, Bursztyn and Jensen (2015) use a similar design, without the lottery, and for example find that students taking both honors and non-honors classes respond very differently to the decision being public when they are with their honors peers compared to when they are with their non-honors peers, and it is unlikely that they would make different inferences about whether their teachers or others would know about their signup just based on the peers they were sitting with at the time they were asked.

It is also not clear that any perceived pressure from parents or teachers would vary with the likelihood of winning the lottery. Similarly, it is unclear why the effects would vary with the reported importance of being popular.

5 Discussion and Conclusion

In this paper, we find strong evidence consistent with peer pressure. High school students are willing to forgo educational investment or effort opportunities due to concerns about how they will be perceived by their classmates. The results have important implications for school policy with respect to whether effort or investment should be kept private, due to such peer pressure concerns. We also show that such behavior can arise from two very separate motives, including a new motive, ability rewarding, that has previously been unexplored in the economics literature. Further, which

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38 If anything, any such effects would likely work against our main results, suggesting social pressure has an even bigger effect than we observe. Though it is possible that the opposite effects could hold, like students whose grades are so poor that they worry teachers or parents will make fun of them for even considering that they might be able to get into college, or cases where parents don’t want students to attend college (perhaps hoping instead they will join the family business, the military, religious clergy or other career that does not require college, or not wanting their children to get their hopes up because they will not be able to afford college), we believe such cases are not likely to be very widespread.

39 Though students in low income schools may feel that teachers or parents will be much more disappointed in them for not signing up for something they had a strong likelihood of winning, compared to when the likelihood is low.

40 Though students who feel a need to be liked by peers may also feel a need to please parents and teachers.
particular motive is behind peer concerns is predictable, and simple questions can help reveal it. And although both motives lead to underinvestment or lower effort, understanding which motive is operative can have implications for the design of corrective policy.

First, understanding which peer concern prevails in a particular school can help in the design of information or marketing campaigns intended to improve school performance, by tailoring the campaign to the specific peer concern that may be holding students back. This is important not just for the efficacy of these programs but also because targeting the wrong message could actually be counterproductive. For example, trying to change attitudes so that doing well in school is rewarded rather than stigmatized (to counter the smart to be cool story) by emphasizing all of the positive things associated with doing well may increase the stigma for not doing well (working against the cool to be smart story).

Further, some programs may be labeled or marketed differently in the presence of the two peer cultures. For example, teachers often make themselves available after classes for additional interaction with students. When such programs are labeled as extra help, attending will be perceived as a sign of low ability. Calling such programs advanced material or enrichment might reverse some of that stigma. But in schools where effort is stigmatized, calling them advanced might make them more stigmatized (there may be less stigma associated with efforts to make sure a student isn’t failing vs. optional efforts to go above and beyond what is required for class).

In addition, in schools where the biggest concern is about revealing a low economic type, privacy of grades is likely to be important. Otherwise, low ability students may reduce effort in order to signal that they are cool. However, in schools where the main worry is to signal a high social type, keeping grades private could in fact be detrimental to performance. In general, not all effort or investments students can make in their education can be kept private. Students must raise their hand in class to ask questions if they want to understand material better, and attending extra sessions or academic clubs will be revealed. In these cases, if students are going to face stigma costs for engaging in effort or investments, it would in fact be preferable for these students to have their grades revealed, so they can at least get the benefit of revealing a higher economic type. This also suggests that the increased emphasis on the privacy of grades, common in the U.S. but less common elsewhere, which may have been a policy designed to enhance performance at good schools, may in fact have a detrimental effect on performance in worse schools.

Though when thinking about what is kept private for students, we may in fact arrive at the opposite conclusion when considering what is revealed about inputs rather than outcomes. For example, though in schools where students care about signaling their ability we may want to keep grades private (so low ability students do not cut back and attempt to signal higher social skills), by contrast we might want to make inputs (effort or investments) as visible as possible. Doing so would enable low ability students to pool with the high ability students. And in schools where effort is stigmatized, though we may want to make grades more visible so that students who try
hard at least get the benefits of revealing a high economic type, we may want to make effort or investments as private as possible, so students can try hard without facing social stigma.

The same would hold for other honors programs or resources. Making participation public would lead to more stigma in lower income schools, but might encourage participation in high income schools, since low ability students will want to pool with the high ability types.

A number of other policy implications follow as well. For example, where effort is stigmatized, mandates may be effective. Students will not be singled out for stigma if they raise their hand in class, attend a review session or take an SAT prep course if all students are required to do so. On the other hand, where ability is stigmatized, mandatory participation in some activities may have adverse effects for low ability students. Policies such as cold calling, group work or class presentations may lead to worse outcomes for low ability students, who may be stigmatized or engage in behaviors to avoid revealing low ability or going out of their way to signal a high social type.

Beyond that, the finding that students avoid potentially valuable educational investments in order to avoid revealing low ability merits further exploration for links to a wide range of other behaviors. For example, taken to an extreme, one might imagine that students will act out, engage in self-handicapping behavior (for example, visibly undertake social activities so as to have an excuse for not doing well), skip classes (so as not to be called on, or when one has to make a presentation in front of class) or even potentially drop out, due to such motives. While this is not to suggest that all trouble students are low ability, nor that this motive can explain all such behavior, the role of such effects documented here suggests that additional study of these other behaviors is warranted.

Finally, the finding that low ability students seek to avoid behaviors that may signal their ability contributes to the debate on tracking in schools, potentially providing one argument in favor of increased sorting. Though it is thought that one negative aspect of sorting for low ability students is that they lose out on the positive effects of having high ability peers, our results suggest that high ability peers also have a negative effect on low ability peers because the latter will want to avoid revealing their low ability. Greater sorting by ability may reduce the stigma of being the lowest ability person within a class; the more homogeneous the ability and achievement levels are for students within a class, presumably the less stigma associated with poor performance there will be.
References


Figures and Tables

Figure 1: *Comparative Statics of the Model*

(Description of the diagram follows the visual representation.)
Figure 2: **Effect of Public Treatment on Signup Decision**

Notes: This figure presents the means and 95% confidence intervals of the signup rates for students in the private and public conditions, across all schools. There are 511 observations in total, 257 in the lower income school and 254 in the higher income schools.
Figure 3: Effect of Public Treatment and Probability of Winning the SAT Prep Package on Signup Decision – Lower Income School

Notes: This figure presents the means and 95% confidence intervals of the signup rates for students across four conditions: private/high probability (N=65), private/low probability (N=66), public/high probability (N=63), and public/low probability (N=63), for the lower income school. There are 257 observations in total.
Figure 4: Effect of Public Treatment and Probability of Winning the SAT Prep Package on Signup Decision – Higher Income Schools

Notes: This figure presents the means and 95% confidence intervals of the signup rates for students across four conditions: private/high probability (N=64), private/low probability (N=62), public/high probability (N=63), and public/low probability (N=65), for the higher income schools. There are 254 observations in total.
Figure 5: **Signup Rates for Public Decisions: Split by Grades – Higher Income Schools**

![Bar chart showing signup rates for public decisions, split by grades and grades above the median.](image)

**Notes:** This figure presents the means and 95% confidence intervals of the signup rates for students in the public condition in the higher income schools, separately for students with typical grades below or above the median. The dummy on whether grades are below the median is constructed by collapsing the answers to the question, “In general, how are your grades?” to two categories. Answers “Mostly A’s” and “Mostly A’s and B’s” were coded as grades above the median. Answers “Mostly B’s and C’s”, “Mostly C’s and D’s” and “Mostly D’s and F’s” were coded as grades below the median. There are 60 observations in the left panel and 67 in the right panel.
Figure 6: **Signup Rates for Private Decisions: Split by Grades – Higher Income Schools**

Notes: This figure presents the means and 95% confidence intervals of the signup rates for students in the public condition in the higher income schools, separately for students with typical grades below or above the median. The dummy on whether grades are below the median is constructed by collapsing the answers to the question, “In general, how are your grades?” to two categories. Answers “Mostly A’s” and “Mostly A’s and B’s” were coded as grades above the median. Answers “Mostly B’s and C’s”, “Mostly C’s and D’s” and “Mostly D’s and F’s” were coded as grades below the median. There are 68 observations in the left panel and 58 in the right panel.
Figure 7: **Signup Rates for Private vs. Public Decisions: Importance of Being Popular – Lower Income School**

Notes: This figure presents the means and 95% confidence intervals of the signup rates for students in the private and public conditions in the lower income school, separately for students who consider important to be popular in their school and those who do not. The dummy for whether the student considers it important to be popular is constructed by collapsing the answers to the question, “How important is it to be popular in your school?” from a 1-5 scale to a dummy variable (answers 3-5 were coded as considering it important, 1-2 as not important). There are 116 observations in the “important to be popular” panel and classes and 139 in the “not important” panel.
Figure 8: Signup Rates for Private vs. Public Decisions: Importance of Being Popular – Higher Income Schools

Notes: This figure presents the means and 95% confidence intervals of the signup rates for students in the private and public conditions in the higher income schools, separately for students who consider important to be popular in their school and those who do not. The dummy for whether the student considers it important to be popular is constructed by collapsing the answers to the question, “How important is it to be popular in your school?” from a 1-5 scale to a dummy variable (answers 3-5 were coded as considering it important, 1-2 as not important). There are 116 observations in the “important to be popular” panel and classes and 138 in the “not important” panel.
Figure 9: **Signup Rates for Private vs. Public Decisions: Importance of Being Considered Smart to be Popular – Lower Income School**

![Graph showing signup rates for private vs. public decisions.](image)

**Notes:** This figure presents the means and 95% confidence intervals of the signup rates for students in the private and public conditions in the lower income school, separately for students who think it is important to be considered smart in order to be popular in their school and those who do not. The dummy for whether the student thinks it is important to be considered smart to be popular is constructed by collapsing the answers to the statement, “To be popular in my school it is important that people think I am smart” from a 1-5 scale to a dummy variable (answers 3-5 were coded as considering it important, 1-2 as not important). There are 118 observations in the “important to be popular” panel and classes and 104 in the “not important” panel.
Figure 10: **Signup Rates for Private vs. Public Decisions: Importance of Being Considered Smart to be Popular – Higher Income Schools**

Notes: This figure presents the means and 95% confidence intervals of the signup rates for students in the private and public conditions in the higher income schools, separately for students who think it is important to be considered smart in order to be popular in their school and those who do not. The dummy for whether the student thinks it is important to be considered smart to be popular is constructed by collapsing the answers to the statement, “To be popular in my school it is important that people think I am smart” from a 1-5 scale to a dummy variable (answers 3-5 were coded as considering it important, 1-2 as not important). There are 130 observations in the “important to be popular” panel and classes and 124 in the “not important” panel.
Figure 11: Effect of Public Treatment and Probability of Winning the SAT Prep Package on Signup Decision – Classrooms Below Median in Opinion on Importance of Being Considered Smart to be Popular

Notes: We split classrooms across all schools by their average 1-5 answer to the statement “To be popular in my school it is important that people think I am smart.” This figure restricts the sample to classrooms below the median, and presents the means and 95% confidence intervals of the signup rates for students across four conditions: private/high probability (N=69), private/low probability (N=70), public/high probability (N=62), and public/low probability (N=65). There are 266 observations in total.
Figure 12: Effect of Public Treatment and Probability of Winning the SAT Prep Package on Signup Decision – Classrooms Above Median in Opinion on Importance of Being Considered Smart to be Popular

Notes: We split classrooms across all schools by their average 1-5 answer to the statement “To be popular in my school it is important that people think I am smart.” This figure restricts the sample to classrooms above the median, and presents the means and 95% confidence intervals of the signup rates for students across four conditions: private/high probability (N=60), private/low probability (N=58), public/high probability (N=64), and public/low probability (N=63). There are 245 observations in total.
<table>
<thead>
<tr>
<th></th>
<th>Male dummy</th>
<th>Age</th>
<th>Hispanic dummy</th>
<th>Number of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[1]</td>
<td>[2]</td>
<td>[3]</td>
<td>[4]</td>
</tr>
<tr>
<td>Male dummy</td>
<td>0.543</td>
<td>0.531</td>
<td>0.516</td>
<td>0.5</td>
</tr>
<tr>
<td>[0.5]</td>
<td>[0.501]</td>
<td>[0.502]</td>
<td>[0.502]</td>
<td>[0.502]</td>
</tr>
<tr>
<td>Age</td>
<td>16.310</td>
<td>16.226</td>
<td>16.31</td>
<td>16.266</td>
</tr>
<tr>
<td>[0.464]</td>
<td>[0.461]</td>
<td>[0.464]</td>
<td>[0.568]</td>
<td>[0.462]</td>
</tr>
<tr>
<td>Hispanic dummy</td>
<td>0.713</td>
<td>0.75</td>
<td>0.683</td>
<td>0.695</td>
</tr>
<tr>
<td>[0.454]</td>
<td>[0.435]</td>
<td>[0.467]</td>
<td>[0.462]</td>
<td>[0.462]</td>
</tr>
</tbody>
</table>

Notes: Columns 1-4 report the mean level of each variable, with standard deviations in brackets, for the four different experimental conditions. Column 5 reports the $p$-value for the test that the means are equal in the four conditions.
TABLE II: EFFECT OF PUBLIC TREATMENT ON SIGNUP DECISION

<table>
<thead>
<tr>
<th>Dependent variable: Dummy: The student signed up for the SAT prep package</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public treatment</td>
<td>-0.2621*** [0.057]</td>
<td>-0.2595*** [0.057]</td>
<td>-0.2561*** [0.057]</td>
<td>-0.2703*** [0.057]</td>
<td>-0.2517*** [0.056]</td>
<td>-0.2484*** [0.057]</td>
</tr>
<tr>
<td>Inference Robustness</td>
<td>p-value Robust S.E.</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>p-value Wild Bootstrap</td>
<td>0.005</td>
<td>0.017</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>p-value Permutation test</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Mean of private take-up</td>
<td>0.794</td>
<td>0.802</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Includes individual covariates</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Includes classroom and surveyor FE</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>257</td>
<td>257</td>
<td>257</td>
<td>254</td>
<td>254</td>
<td>254</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.077</td>
<td>0.078</td>
<td>0.116</td>
<td>0.082</td>
<td>0.135</td>
<td>0.153</td>
</tr>
<tr>
<td>Sample:</td>
<td>Lower income school</td>
<td>Higher income schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Columns 1 to 3 restrict the sample to the lower income school, and columns 4 to 6 restrict to the higher income schools. Columns 1 and 4 present OLS regressions of a dummy variable for whether the student signed up for the SAT prep course on a public sign up dummy. Columns 2 and 5 replicate add individual covariates (age and dummies for male and Hispanic). Columns 3 and 6 further add surveyor and classroom fixed effects. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.
**TABLE III: EFFECT OF PUBLIC TREATMENT AND LOW PROBABILITY ON SIGNUP DECISION**

<table>
<thead>
<tr>
<th>Dependent variable: Dummy: The student signed up for the SAT prep package</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low probability dummy</td>
<td>0.0184</td>
<td>0.0199</td>
<td>0.0101</td>
<td>0.0096</td>
<td>0.0076</td>
<td>0.0077</td>
</tr>
<tr>
<td>[0.071]</td>
<td></td>
<td>[0.072]</td>
<td>[0.074]</td>
<td>[0.072]</td>
<td>[0.070]</td>
<td>[0.070]</td>
</tr>
<tr>
<td>Public sign-up dummy (A)</td>
<td>-0.1656**</td>
<td>-0.1633**</td>
<td>-0.1645**</td>
<td>-0.4000**</td>
<td>-0.3752***</td>
<td>-0.3794***</td>
</tr>
<tr>
<td>[0.080]</td>
<td>[0.081]</td>
<td>[0.081]</td>
<td></td>
<td>[0.080]</td>
<td>[0.081]</td>
<td>[0.082]</td>
</tr>
<tr>
<td>Low probability*Public (B)</td>
<td>-0.1930*</td>
<td>-0.1938*</td>
<td>-0.1839</td>
<td>0.2551**</td>
<td>0.2414**</td>
<td>0.2571**</td>
</tr>
<tr>
<td>[0.113]</td>
<td>[0.114]</td>
<td>[0.114]</td>
<td></td>
<td>[0.112]</td>
<td>[0.109]</td>
<td>[0.110]</td>
</tr>
</tbody>
</table>

Inference Robustness (A)

| p-value Robust S.E.                                           | 0.040   | 0.045   | 0.043   | 0.000   | 0.000   | 0.000   |
| p-value Wild Bootstrap                                        | 0.087   | 0.101   | 0.087   | 0.011   | 0.015   | 0.013   |
| p-value Permutation test                                      | 0.047   | 0.052   | 0.048   | 0.000   | 0.000   | 0.000   |

Inference Robustness (B)

| p-value Robust S.E.                                           | 0.090   | 0.092   | 0.108   | 0.023   | 0.028   | 0.020   |
| p-value Wild Bootstrap                                        | 0.073   | 0.065   | 0.039   | 0.085   | 0.127   | 0.077   |
| p-value Permutation test                                      | 0.024   | 0.033   | 0.039   | 0.002   | 0.004   | 0.002   |

Mean of private take-up in high prob. group                    | 0.785   |         |         |         | 0.797   |

Includes individual covariates                                 | No      | Yes     | Yes     | No      | Yes     | Yes     |
Includes classroom and surveyor FE                             | No      | No      | Yes     | No      | No      | Yes     |
Observations                                                    | 257     | 257     | 257     | 254     | 254     | 254     |
R-squared                                                       | 0.094   | 0.095   | 0.133   | 0.122   | 0.170   | 0.192   |

Sample: Lower income school                                      |         |         |         |         |         |         |
Higher income schools                                           |         |         |         |         |         |         |

Notes: Columns 1 to 3 restrict the sample to the lower income school, and columns 4 to 6 restrict to the higher income schools. Column 1 and 4 present OLS regressions of a dummy variable on whether the student faced a 0.25 (low) probability of getting the SAT prep package conditional on signing up, whether the student signed up for the package in public, and the interaction of low probability with public decision. Column 2 and 5 replicate columns 1 and 4 adding individual covariates (male dummy, age, and Hispanic dummy). Column 3 and 6 replicate columns 2 and 5 adding surveyor and classroom fixed effects. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1
TABLE IV: EFFECT OF HIGH PROBABILITY ON SIGNUP: SPLIT BY GRADES (HIGHER INCOME SCHOOLS)

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Dummy: The student signed up for the SAT prep package</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>High probability (p) dummy (A)</td>
<td>-0.1420</td>
</tr>
<tr>
<td></td>
<td>[0.121]</td>
</tr>
<tr>
<td>Grades below median * high probability (B)</td>
<td>-0.2921**</td>
</tr>
<tr>
<td></td>
<td>[0.118]</td>
</tr>
<tr>
<td>Grades below median * low probability</td>
<td>0.0104</td>
</tr>
<tr>
<td></td>
<td>[0.119]</td>
</tr>
</tbody>
</table>

Inference Robustness (A)

<table>
<thead>
<tr>
<th>p-value</th>
<th>Robust S.E.</th>
<th>Wild Bootstrap</th>
<th>Permutation test</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-value</td>
<td>0.243</td>
<td>0.237</td>
<td>0.126</td>
</tr>
<tr>
<td>Wild Bootstrap</td>
<td>0.290</td>
<td>0.384</td>
<td>0.292</td>
</tr>
<tr>
<td>Permutation test</td>
<td>0.203</td>
<td>0.272</td>
<td>0.171</td>
</tr>
</tbody>
</table>

Inference Robustness (B)

<table>
<thead>
<tr>
<th>p-value</th>
<th>Robust S.E.</th>
<th>Wild Bootstrap</th>
<th>Permutation test</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-value</td>
<td>0.015</td>
<td>0.007</td>
<td>0.022</td>
</tr>
<tr>
<td>Wild Bootstrap</td>
<td>0.176</td>
<td>0.158</td>
<td>0.220</td>
</tr>
<tr>
<td>Permutation test</td>
<td>0.019</td>
<td>0.010</td>
<td>0.029</td>
</tr>
</tbody>
</table>

Mean of signup for students with grades above median under low probability

<table>
<thead>
<tr>
<th>Includes individual covariates</th>
<th>Yes</th>
<th>No</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Includes classroom and surveyor FE</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

| Observations | 127 | 127 | 127 | 126 | 126 | 126 |
| R-squared    | 0.117 | 0.187 | 0.252 | 0.001 | 0.103 | 0.208 |
| Sample       | Public Condition | Private Condition |

Notes: This table restricts the sample to the higher income schools. Columns 1 to 3 restrict the sample to the public condition, and columns 4 to 6 restrict it to the private condition. The dummy on whether grades are below the median is constructed by collapsing the answers to the question, "In general, how are your grades?" to two categories. Answers "Mostly A's" and "Mostly A's and B's" were coded as grades above the median. Answers "Mostly B's and C's, "Mostly C's and D's" and "Mostly D's and F's" were coded as grades below the median. Columns 1 and 4 present OLS regressions of a dummy variable for whether the student signed up for the SAT prep package on a high probability dummy, a dummy on whether the student has grades below the median interacted with the high probability dummy, and a dummy on whether the student has grades below the median interacted with the low probability dummy. Columns 2 and 5 add individual covariates (age and dummies for male and Hispanic). Columns 3 and 6 further add surveyor and classroom fixed effects. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.
### TABLE V: EFFECT OF PUBLIC TREATMENT ON SIGNUP DECISION: BY IMPORTANCE OF POPULARITY

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Dummy: The student signed up for the SAT prep package</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public*Important to be popular (A)</td>
<td>-0.3378***</td>
<td>-0.3374***</td>
<td>-0.3268***</td>
<td>-0.4286***</td>
<td>-0.3820***</td>
<td>-0.3878***</td>
<td>[0.085]</td>
</tr>
<tr>
<td>Public*Not important to be popular (B)</td>
<td>-0.1879**</td>
<td>-0.1857**</td>
<td>-0.1932**</td>
<td>-0.1412*</td>
<td>-0.1479*</td>
<td>-0.1355*</td>
<td>[0.078]</td>
</tr>
<tr>
<td>Important to be popular dummy</td>
<td>0.0301</td>
<td>0.0315</td>
<td>-0.0050</td>
<td>0.2286***</td>
<td>0.2196***</td>
<td>0.2255***</td>
<td>[0.071]</td>
</tr>
<tr>
<td>Inference Robustness (A)</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>p-value Robust S.E.</td>
<td>0.016</td>
<td>0.018</td>
<td>0.013</td>
<td>0.087</td>
<td>0.066</td>
<td>0.095</td>
<td>0.037</td>
</tr>
<tr>
<td>p-value Wild Bootstrap</td>
<td>0.014</td>
<td>0.015</td>
<td>0.014</td>
<td>0.081</td>
<td>0.064</td>
<td>0.104</td>
<td>0.016</td>
</tr>
<tr>
<td>p-value Permutation test</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.005</td>
</tr>
<tr>
<td>Mean of private signup for students who do not find it important to be popular</td>
<td>0.779</td>
<td>0.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** Columns 1 to 3 restrict the sample to the lower income school, and columns 4 to 6 restrict to the higher income schools. The dummy for whether the student considers it important to be popular is constructed by collapsing the answers to the question, “How important is it to be popular in your school?” from a 1-5 scale to a dummy variable (answers 3-5 were coded as considering it important, 1-2 as not important). Columns 1 and 4 present OLS regressions of a dummy variable for whether the student signed up for the SAT prep package on a public signup dummy, a dummy on whether the student considers it important to be popular in his/her school and the interaction of the two. Columns 2 and 5 add individual covariates (age and dummies for male and Hispanic). Columns 3 and 6 further add surveyor and classroom fixed effects. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.
TABLE VI: EFFECT OF PUBLIC TREATMENT ON SIGNUP DECISION: BY IMPORTANCE OF BEING CONSIDERED SMART TO BE POPULAR

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public*Important to be considered smart (A)</td>
<td>-0.2874***</td>
<td>-0.2871***</td>
<td>-0.2790***</td>
<td>-0.4084***</td>
<td>-0.3950***</td>
<td>-0.4068***</td>
</tr>
<tr>
<td>Public*Not important to be considered smart (B)</td>
<td>-0.2750***</td>
<td>-0.2671***</td>
<td>-0.2776***</td>
<td>-0.1226</td>
<td>-0.0983</td>
<td>-0.0797</td>
</tr>
<tr>
<td>Important to considered smart to be popular dummy</td>
<td>-0.0269</td>
<td>-0.0267</td>
<td>-0.0080</td>
<td>0.0794</td>
<td>0.0891</td>
<td>0.1030</td>
</tr>
</tbody>
</table>

Inference Robustness (A)

| p-value Robust S.E. | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 |
| p-value Wild Bootstrap | 0.017 | 0.023 | 0.045 | 0.005 | 0.005 | 0.005 |
| p-value Permutation test | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Inference Robustness (B)

| p-value Robust S.E. | 0.002 | 0.003 | 0.002 | 0.137 | 0.217 | 0.332 |
| p-value Wild Bootstrap | 0.011 | 0.033 | 0.033 | 0.351 | 0.489 | 0.591 |
| p-value Permutation test | 0.003 | 0.004 | 0.004 | 0.139 | 0.213 | 0.317 |

Mean of private signup for students who do not find it important to be considered smart to be popular

| 0.831 | 0.762 |

Includes individual covariates

| No | Yes | Yes | No | Yes | Yes |
| No | No | Yes | No | No | Yes |

Includes classroom and surveyor FE

Observations

| 222 | 222 | 222 | 254 | 254 | 254 |
R-squared

| 0.094 | 0.100 | 0.135 | 0.110 | 0.164 | 0.186 |

Sample: Lower income school Higher income schools

Notes: Columns 1 to 3 restrict the sample to the lower income school, and columns 4 to 6 restrict to the higher income schools. The dummy for whether the student thinks it is important to be considered smart to be popular is constructed by collapsing the answers to the statement, “To be popular in my school it is important that people think I am smart” from a 1-5 scale to a dummy variable (answers 3-5 were coded as considering it important, 1-2 as not important). Columns 1 and 4 present OLS regressions of a dummy variable for whether the student signed up for the SAT prep package on a public signup dummy, a dummy on whether the student thinks it is important to be considered smart to popular, and the interaction of the two. Columns 2 and 5 add individual covariates (age and dummies for male and Hispanic). Columns 3 and 6 further add surveyor and classroom fixed effects. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.
TABLE VII: EFFECT OF PUBLIC TREATMENT AND LOW PROBABILITY ON SIGNUP DECISION: MEDIAN SPLIT OF CLASSROOMS
BY AVERAGE OPINION ON IMPORTANCE OF BEING CONSIDERED SMART TO BE POPULAR

<table>
<thead>
<tr>
<th>Dependent variable: Dummy: The student signed up for the SAT prep package</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low probability dummy</td>
<td>0.0027</td>
<td>0.0015</td>
<td>-0.0088</td>
<td>0.0264</td>
<td>0.0261</td>
<td>0.0251</td>
</tr>
<tr>
<td>[0.067] [0.068] [0.069] [0.077] [0.075] [0.076]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public sign-up dummy (A)</td>
<td>-0.1987**</td>
<td>-0.1988**</td>
<td>-0.2060**</td>
<td>-0.3604***</td>
<td>-0.3466***</td>
<td>-0.3436***</td>
</tr>
<tr>
<td>[0.078] [0.079] [0.079] [0.083] [0.083] [0.083]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low probability*Public (B)</td>
<td>-0.1694</td>
<td>-0.1672</td>
<td>-0.1531</td>
<td>0.2340**</td>
<td>0.2296**</td>
<td>0.2419**</td>
</tr>
<tr>
<td>[0.110] [0.111] [0.111] [0.115] [0.114] [0.114]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inference Robustness (A)</td>
<td>p-value Robust S.E.</td>
<td>0.012</td>
<td>0.012</td>
<td>0.010</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>p-value Wild Bootstrap</td>
<td>0.079</td>
<td>0.093</td>
<td>0.079</td>
<td>0.014</td>
<td>0.018</td>
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<td>0.000</td>
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<tr>
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<td>p-value Robust S.E.</td>
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<td>0.133</td>
<td>0.169</td>
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<td>p-value Wild Bootstrap</td>
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<td>0.005</td>
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<td>Mean of private take-up in high probability group</td>
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<td></td>
<td></td>
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<td>No</td>
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<td>Yes</td>
</tr>
<tr>
<td>Includes classroom and surveyor FE</td>
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<td>No</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Observations</td>
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<td>R-squared</td>
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<td>0.105</td>
<td>0.143</td>
<td>0.172</td>
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</table>

Sample: Below median Above median

Notes: In this table, we split the classrooms by their average 1-5 answer to the statement “To be popular in my school it is important that people think I am smart.” Columns 1 to 3 restrict the sample to the classrooms below the median, and columns 4 to 6 restrict to those above the median. Column 1 and 4 present OLS regressions of a dummy variable on whether the student faced a 0.25 (low) probability of getting the SAT prep package conditional on signing up, whether the student signed up for the package in public, and the interaction of low probability with public decision. Column 2 and 5 replicate columns 1 and 4 adding individual covariates (male dummy, age, and Hispanic dummy). Column 3 and 6 replicate columns 2 and 5 adding surveyor and classroom fixed effects. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1
Supplemental Appendix – Not For Publication

Theory Proofs

Proof of Proposition 1. In the private setting, student $i$ maximizes $\max_{s_i \in \{0, 1\}} (b - c_i) s_i$, so $s_i = 1$ if and only if $b > c_i$, i.e., if $c_i = l$. Thus, the share of students signing up is $Pr(s_i = 1) = Pr(c_i = l) = q$.

In the public setting, let $r = Pr(s_i = 1 | c_i = l)$ and $\rho = Pr(s_i = 1 | c_i = h)$ be the shares of high and low social types signing up, respectively. Then Bayesian updating implies

$$Pr_{-i}(c_i = h | s_i = 1) = \frac{\rho (1 - q)}{\rho (1 - q) + rq}$$

$$Pr_{-i}(c_i = h | s_i = 0) = \frac{(1 - \rho) (1 - q)}{(1 - \rho) (1 - q) + (1 - r) q},$$

which are well-defined unless $r = \rho \in \{0, 1\}$, and when they are not, they can be taken to be any values in $[0, 1]$. Suppose first that $\rho > 0$. Then a student with $c_i = h$ is weakly better off participating than not, so

$$b - h + \lambda_s Pr_{-i}(c_i = h | s_i = 1) \geq \lambda_s Pr_{-i}(c_i = h | s_i = 0).$$

This implies

$$b - l + \lambda_s Pr_{-i}(c_i = h | s_i = 1) > \lambda_s Pr_{-i}(c_i = h | s_i = 0),$$

which means that all students with $c_i = l$ should choose $s_i = 1$, so $r = 1$. If so, we must have $Pr_{-i}(c_i = h | s_i = 0) = 1 \geq \lambda_s Pr_{-i}(c_i = h | s_i = 1)$, but then $[6]$ must be violated. This proves that $\rho > 0$ is impossible in equilibrium.

Now suppose that $\rho = 0$. Consider three cases. If $r = 1$, then $Pr_{-i}(c_i = h | s_i = 1) = 0$ and $Pr_{-i}(c_i = h | s_i = 0) = 1$, so this corresponds to an equilibrium if and only if $b - h \leq \lambda_s$ and $b - l \geq \lambda_s$, and since $0 = l < b < h$, the first one is trivially satisfied, whereas the second gives the condition $\lambda_s \leq b$. If $r \in (0, 1)$, then $Pr_{-i}(c_i = h | s_i = 1) = 0$ and $Pr_{-i}(c_i = h | s_i = 0) = \frac{1 - q}{1 - r q}$, so student with type $c_i = l$ is indifferent if and only if $b = \lambda_s \frac{1 - q}{1 - r q}$, i.e., $r = b \lambda_s (1 - q)$, which satisfies $r \in (0, 1)$ if and only if $\lambda_s \in \left(0, \frac{b}{1 - q}\right)$; furthermore, in this case students with type $c_i = h$ strictly prefer to choose $s_i = 0$. Thus, if $\lambda_s \in \left(0, \frac{b}{1 - q}\right)$, there is an equilibrium where share $qr = 1 - \frac{\lambda_s (1 - q)}{b}$ sign up. Finally, consider the case $\rho = r = 0$. In this case, $Pr_{-i}(c_i = h | s_i = 1) = \mu$ and $Pr_{-i}(c_i = h | s_i = 0) = 1 - \mu$ so this case corresponds to an equilibrium if and only if students with $c_i = l$ prefer $s_i = 0$ (then those with $c_i = h$ prefer this as well), i.e., if $b \leq \lambda_s (1 - q - \mu)$. Notice that it is possible to assign such belief $\mu$ only if $\lambda_s \geq \frac{b}{1 - q}$; at the same time, if this condition is satisfied, then such belief is indeed possible to assign (e.g., $\mu = 0$, or more generally
any \( \mu \in \left[0, 1 - q - \frac{b}{\lambda_e}\right] \). Therefore, if \( \lambda_s \geq \frac{b}{1 - q} \), then there is a PBE, and in any PBE no student signs up. We have thus proved that for any value \( \lambda_s \) there is a unique equilibrium behavior (which in case \( \lambda_s \geq \frac{b}{1 - q} \) may be supported by different beliefs regarding off-path action \( s_i = 1 \)). This completes the proof.

**Proof of Proposition 2** In the private setting, the problem is the same as in Proposition 1 as the public history is empty, and so only students with \( c_i = l \) sign up, and their share is \( q \). In the public setting, let \( r = \Pr(s_i = 1 \mid c_i = l) \) and \( \rho = \Pr(s_i = 1 \mid c_i = h) \) as in the proof of Proposition 1. Here, the assumption \( h > b + \lambda_e \) implies that for a student with \( c_i = h \), the cost \( h \) of signing up is higher than the benefit plus any possible gain in the peers’ perception about his \( a_i \) (this gain equals \( a_i - \mathbb{E}_{-i}(a \mid s_i = 0) \)). This implies \( \rho = 0 \).

Consider types with \( c_i = l \). Notice that the payoff of type \((c_i = l, a_i)\) from signing up is \( b + \lambda_e a_i \), and his payoff from not signing up is \( \lambda_s \mathbb{E}_{-i}(a \mid s_i = 0) \). Since the former is increasing in \( a_i \) and the latter is constant, then if some type \((c_i = l, a_i)\) weakly prefers to sign up, then for all \( a'_i > a_i \), type \((c_i = l, a'_i)\) strictly prefers to sign up. This also implies that if \( \lambda_e > 0 \), then types that satisfy \( c_i = l, a_i > 1 - \frac{b}{\lambda_e} \) must sign up in equilibrium: indeed, for such types the difference

\[
b + \lambda_e a_i - \lambda_s \mathbb{E}_{-i}(a \mid s_i = 0) \\
\geq b + \lambda_e (a_i - 1) > b + \lambda_e \left(1 - \frac{b}{\lambda_e} - 1\right) = 0
\]

and is thus positive, so they are strictly better off choosing \( s_i = 1 \). At the same time, if \( \lambda_e = 0 \), then such difference is positive for all \( a_i \). This implies that a positive share of types choose \( s_i = 1 \) in equilibrium, so \( r > 0 \).

Let \( t = \inf \{ a_i \mid s_i(c_i = l, a_i) = 1 \} \); then \( r > 0 \) means \( t \) is well-defined and satisfies \( t < 1 \). We have \( \mathbb{E}_{-i}(a \mid s_i = 0) = \frac{a_i^+ + (1-q)\frac{1}{2}}{qt + 1 - q} \). We thus have the inequality

\[
b + \lambda_e t \geq \frac{1}{2} \lambda_e \frac{qt^2 + 1 - q}{qt + 1 - q}, \tag{8}
\]

which must hold as equality if \( t > 0 \). An equilibrium with \( t \in (0, 1) \) exists, therefore, if and only if

\[
q \lambda_e t^2 + 2 (\lambda_e (1 - q) - bq) t + (1 - q) (2b - \lambda_e) = 0.
\]

This equation has no solutions on \((0, 1)\) if \( \lambda_e \leq 2b \), whereas if \( \lambda_e > 2b \) it has a unique solution (at \( t = 0 \) the left hand side equals \( (1 - q)(2b - \lambda_e) < 0 \) and \( t = 1 \) it equals \( 2b + \lambda_e > 0 \)). This solution equals

\[
t = 1 - \frac{\lambda_e + bq}{q \lambda_e} + \frac{1}{q \lambda_e} \sqrt{\lambda_e^2 (1 - q) + b^2 q^2};
\]

53
thus, if $\lambda_e > 2b$ there is an equilibrium where the share of students with $s_i = 1$ equals

$$q (1 - t) = 1 + \frac{bq}{\lambda_e} - \sqrt{1 - q + \frac{b^2 q^2}{\lambda_e^2}}.$$

Lastly, an equilibrium with $t = 0$ exists if and only if (8) holds as equality for $t = 0$, i.e., if $\lambda_e \leq 2b$. In this case, the share of students who sign up is $q$. This completes the proof. ■

Proof of Proposition 3. The private setting is completely analogous to Propositions 1 and 2. In public setting, the assumption $h > b + \lambda_s + \lambda_e$ implies that students with $c_i = h$ choose $s_i = 0$ in any equilibrium, for otherwise they would have a profitable deviation. This means that if we denote $r = \Pr (s_i = 1 \mid c_i = l)$ and $\rho = \Pr (s_i = 1 \mid c_i = h)$ as before, we have $\rho = 0$.

Consider the type $(c_i = l, a_i)$, and suppose that in equilibrium, he weakly prefers to sign up. This implies

$$pb + \lambda_e \left( pa_i + (1 - p) \frac{1}{2} \right) \geq \lambda_s \Pr (c_i = h \mid s_i = 0) + \lambda_e \Pr (c_i = h \mid s_i = 0),$$

Since the left-hand side is increasing in $a_i$ (as $p > 0$) and the right-hand side is constant, it must be that types $(c_i = l, a'_i)$ with $a'_i > a_i$ are strictly better off signing up, and thus must so in equilibrium. Thus, if $(c_i = l, a_i)$ signs up in equilibrium, so do $(c_i = l, a'_i)$ for $a'_i > a_i$.

We now consider the following possibilities. First, suppose that $r = 1$, so that (almost) all types with $c_i = l$ sign up. This equilibrium exists if and only if types $(c_i = l, a_i)$ are strictly better off signing up for $a_i$ arbitrarily close to 0. The corresponding condition is

$$pb + \lambda_e \left( pa_i + (1 - p) \frac{1}{2} \right) > \lambda_s + \lambda_e \frac{1}{2};$$

this holds for arbitrarily small $a_i$ if and only if $pb \geq \lambda_s + \frac{p}{2} \lambda_e$. Thus, for such parameter values, there is an equilibrium where the share of students who sign up equals $q$.

Now suppose that $r \in (0, 1)$; in this case, there is a threshold type $t = \inf \{a_i \mid s_i (c_i = l, a_i) = 1\}$ that satisfies $t \in (0, 1)$. Such equilibrium exists if and only if we have

$$pb + \lambda_e \left( pa + (1 - p) \frac{t + 1}{2} \right)$$

$$\geq \lambda_s \frac{1 - q}{qt + 1 - q} + \lambda_e \frac{qt \frac{t}{2} + (1 - q) \frac{1}{2}}{qt + 1 - q} \quad \text{for } a > t,$$

$$pb + \lambda_e \left( p \Pr (c_i = h \mid s_i = 1, a_i = a) \right) + \lambda_e \left( pa + (1 - p) \frac{t + 1}{2} \right) \leq \lambda_s \frac{1 - q}{qt + 1 - q} + \lambda_e \frac{qt \frac{t}{2} + (1 - q) \frac{1}{2}}{qt + 1 - q} \quad \text{for } a < t,$$
where the term $\lambda_s (p \Pr_{-i} (c_i = h \mid s_i = 1, a))$ reflects that types with $a_i = a$ and either $c_i$ choose $s_i = 0$ in equilibrium. For these inequalities to hold, we must have $\Pr_{-i} (c_i = h \mid s_i = 1, a_i = a) = 0$ for $a < t$ (notice that this is consistent with D1 criterion, because types with $c_i = h$ are never better off deviating to $s_i = 1$) and

$$pb + \lambda_e \left( pt + (1 - p) \frac{t + 1}{2} \right) = \lambda_s \frac{(1 - q)}{(1 - q) \frac{(1 - q)}{2} + \lambda_e \frac{qt t}{2} + (1 - q) \frac{(1 - q)}{2}}.$$ 

The last equation is equivalent to

$$pq \lambda_e t^2 + 2 \left( \lambda_e \left( \frac{1 + p}{2} - pq \right) + bpq \right) t + (1 - q) (2bp - 2\lambda_s - p\lambda_e) = 0. \quad (9)$$

Notice that $\frac{1 + p}{2} - pq > 0$; this means that the left-hand side is increasing in $p$, and therefore there is a solution on $t \in (0, 1)$ if and only if it is negative for $t = 0$ and positive for $t = 1$, i.e., if $2bp - 2\lambda_s - p\lambda_e < 0$ and $\lambda_e - 2\lambda_s + 2q\lambda_s + 2bp > 0$. Thus, for $\lambda_s \in \left( pb - \frac{b}{2} \lambda_e, \frac{pb}{1 - q} + \frac{\lambda_e}{2(1 - q)} \right)$, there is an equilibrium with

$$t = 1 - \frac{1 + p}{2pq} - \frac{b}{\lambda_e} + \frac{1}{q} \sqrt{\left( \frac{1 + p}{2p} + \frac{qb}{q} \right)^2 - q \left( \frac{1}{p} + \frac{2b}{\lambda_e} + \frac{2\lambda_s (1 - q)}{\lambda_e} \right)},$$

and thus with the share of students who sign up equal to

$$q(1 - t) = \frac{1 + p}{2p} + \frac{qb}{\lambda_e} - \frac{1}{q} \sqrt{\left( \frac{1 + p}{2p} + \frac{qb}{q} \right)^2 - q \left( \frac{1}{p} + \frac{2b}{\lambda_e} + \frac{2\lambda_s (1 - q)}{\lambda_e} \right)}.$$

Lastly, consider the case $r = 0$. The payoff of a student who does not sign up equals $(1 - q) \lambda_s + \frac{1}{2} \lambda_e$. The payoff of a student with type $(c_i = l, a_i = a)$ who signs up equals

$$pb + \lambda_s (p \Pr_{-i} (c_i = h \mid s_i = 1, a_i = a) + (1 - p) \Pr_{-i} (c_i = h \mid s_i = 1)) + \lambda_e (pa + (1 - p) E_{-i} (a \mid s_i = 1)).$$

Thus, such equilibrium will exist for $(1 - q) \lambda_s \geq pb + \left( p - \frac{1}{2} \right) \lambda_e$, if we choose out-of-equilibrium beliefs so that $\Pr_{-i} (c_i = h \mid s_i = 1, a_i = a) = \Pr_{-i} (c_i = h \mid s_i = 1) = E_{-i} (a \mid s_i = 1) = 0$. However, $E_{-i} (a \mid s_i = 1) = 0$ is inconsistent with D1 criterion because, as we proved above, the type $(c_i = l, a_i = 1)$ has most to gain by deviating, and thus beliefs that are not ruled out by D1 criterion must satisfy $\Pr_{-i} (c_i = h \mid s_i = 1, a_i = 1) = \Pr_{-i} (c_i = h \mid s_i = 1) = 0$, $E_{-i} (a \mid s_i = 1) = 1$. With these beliefs, an equilibrium with $r = 0$ exists if and only if $(1 - q) \lambda_s \geq pb + \frac{1}{2} \lambda_e$.

We have thus proved that for all parameters there is a unique equilibrium that satisfies D1 criterion, and it has the properties stated in the proposition. This completes the proof. ■
Proof of Proposition 4. For $\lambda_s \leq pb - \frac{q}{2} \lambda_e$, the share of students is constant and equals $q$. For $\lambda_s \in \left( pb - \frac{q}{2} \lambda_e, \frac{pb}{1-q} + \frac{\lambda_e}{2(1-q)} \right)$, this share is increasing, because the solution $t$ to (9) is decreasing, as the left-hand side is decreasing in $\lambda_s$. For $\lambda_s \geq \frac{pb}{1-q} + \frac{\lambda_e}{2(1-q)}$, the share is again constant and equals 0, thus proving the statement for $\lambda_s$.

With respect to $\lambda_e$, we again only need to study comparative statics if $\lambda_e \in \left( pb - \frac{q}{2} \lambda_e, \frac{pb}{1-q} + \frac{\lambda_e}{2(1-q)} \right)$ so that the share depends on the threshold found as solution to (9). Thus, the share of students who sign up is increasing in $\lambda_e$ if and only if the left-hand side of (9) is increasing in $\lambda_e$, at $t$ that solves the equation. This is the case if and only if $pt^2 + (p - 2pq + 1) t - p (1 - q) > 0$, and since (9) is satisfied, this is equivalent to $-bpqt - (1 - q) (bp - \lambda_s) > 0$. This is equivalent to $t < \frac{1 - q (\lambda_s - bp)}{bpq}$, which is true if and only if for $t = \frac{1 - q (\lambda_s - bp)}{bpq}$ the left-hand side of (9) would be positive. Plugging in and simplifying, the condition becomes $\lambda_s (1 - q) \frac{(1 - q) \lambda_s^2 + b (1 - p) \lambda_s - b^2 p}{b^2 pq} > 0$. Since $(1 - q) \lambda_s^2 + b (1 - p) \lambda_s - b^2 p$ is increasing in $\lambda_s$, the share of students who sign up is increasing in $\lambda_e$ if and only if $\frac{b}{2(1-q)} \left( \sqrt{(1-p)^2 + 4p (1 - q) - (1 - p)} \right)$, and decreasing in $\lambda_e$ otherwise. Notice also that $t < \frac{1 - q (\lambda_s - bp)}{bpq}$ is equivalent to $q (1 - t) > 1 - \frac{1 - q}{bp} \lambda_s$.

Finally, we analyze comparative statics with respect to $p$. The left-hand side of (9) is increasing in $p$ if and only if $q \lambda_s t^2 + 2 (\lambda_e (\frac{1}{2} - q) + bp) t + (1 - q) (2b - \lambda_e) > 0$; since (9) holds as equality, this is true if and only if $-\lambda_e t + 2\lambda_s (1 - q) > 0$. The latter is equivalent to $t < \frac{2\lambda_s (1 - q)}{\lambda_e}$, which is true if and only if the left-hand side of (9) becomes positive after plugging in $t = \frac{2\lambda_s (1 - q)}{\lambda_e}$. After simplifying, this becomes $p (1 - q) (\lambda_e + 2q \lambda_s) \frac{2b - \lambda_e + 2\lambda_s (1 - q)}{\lambda_e} > 0$, which is positive if and only if $2b - \lambda_e + 2\lambda_s (1 - q) > 0$. Thus, the share of students who sign up is increasing in $p$ if $\lambda_e < 2b + 2\lambda_s (1 - q)$ or, equivalently, if $\lambda_s > \frac{\lambda_e - 2b}{2(1-q)}$, and is decreasing in $p$ otherwise. This completes the proof. ■
Appendix Figures and Tables

Appendix Figure A.1
Signup Rates for Public Decisions: Split by Grades – Lower Income School

Notes: This figure presents the means and 95\% confidence intervals of the signup rates for students in the public condition in the lower income school, separately for students with typical grades below or above the median. The dummy on whether grades are below the median is constructed by collapsing the answers to the question, “In general, how are your grades?” to two categories. Answers “Mostly A’s” and “Mostly A’s and B’s” were coded as grades above the median. Answers “Mostly B’s and C’s”, “Mostly C’s and D’s” and “Mostly D’s and F’s” were coded as grades below the median. There are 86 observations in the left panel and 39 in the right panel.
Appendix Figure A.2
Signup Rates for Private Decisions: Split by Grades – Lower Income School

Notes: This figure presents the means and 95% confidence intervals of the signup rates for students in the public condition in the lower income school, separately for students with typical grades below or above the median. The dummy on whether grades are below the median is constructed by collapsing the answers to the question, “In general, how are your grades?” to two categories. Answers “Mostly A’s” and “Mostly A’s and B’s” were coded as grades above the median. Answers “Mostly B’s and C’s”, “Mostly C’s and D’s” and “Mostly D’s and F’s” were coded as grades below the median. There are 98 observations in the left panel and 33 in the right panel.
## APPENDIX TABLE A.I: BALANCE OF COVARIATES FOR SAMPLE REACHED IN THE SECOND VISIT TO THE LOWER INCOME SCHOOL

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<th>Private Low probability</th>
<th>Public High probability</th>
<th>Public Low probability</th>
<th>p-value</th>
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<td>[0.498]</td>
<td>[0.503]</td>
<td>[0.503]</td>
<td></td>
</tr>
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<td>[0.500]</td>
<td>[0.457]</td>
<td>[0.543]</td>
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</tr>
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<td>[0.194]</td>
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<td>55</td>
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Notes: Columns 1-4 report the mean level of each variable, with standard errors in brackets, for the four different experimental conditions. Column 5 reports the p-value for the test that the means are equal in the four conditions.
APPENDIX TABLE A.II: LONGER-OUTCOMES

<table>
<thead>
<tr>
<th>Panel A - restricting to private condition</th>
<th>Dependent variable: dummy that the student reported to have taken SAT by the time of early June 2016 visit</th>
<th>that he/she would taken the SAT by the end of 11th grade academic year</th>
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<td>(2)</td>
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<tr>
<td></td>
<td>[0.068]</td>
<td>[0.068]</td>
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<td>Inference Robustness</td>
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<tr>
<td>p-value Robust S.E.</td>
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<td>p-value Wild Bootstrap</td>
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<td>p-value Permutation test</td>
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<td>Mean of take-up under low probability</td>
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</tr>
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<td>Includes individual covariates</td>
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<td>Includes classroom and surveyor FE</td>
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<td>Observations</td>
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<td>R-squared</td>
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</table>

Sample: Private condition

<table>
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<th>Panel B - full sample</th>
<th>Dependent variable: dummy that the student reported to have taken SAT by the time of early June 2016 visit</th>
<th>that he/she would taken the SAT by the end of 11th grade academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Private treatment</td>
<td>0.0824*</td>
<td>0.0787*</td>
</tr>
<tr>
<td></td>
<td>[0.045]</td>
<td>[0.045]</td>
</tr>
<tr>
<td>Inference Robustness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p-value Robust S.E.</td>
<td>0.071</td>
<td>0.083</td>
</tr>
<tr>
<td>p-value Wild Bootstrap</td>
<td>0.092</td>
<td>0.102</td>
</tr>
<tr>
<td>p-value Permutation test</td>
<td>0.077</td>
<td>0.087</td>
</tr>
<tr>
<td>Mean of public take-up</td>
<td>0.244</td>
<td></td>
</tr>
<tr>
<td>Includes individual covariates</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Includes classroom and surveyor FE</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Observations</td>
<td>395</td>
<td>395</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.008</td>
<td>0.026</td>
</tr>
</tbody>
</table>

Sample: Full sample

Notes: Panel A restricts the sample to students in the private condition in all three schools. Panel B considers the full sample. In Panel A, Column 1 presents OLS regressions of a dummy variable for whether the student reported to have taken SAT by the time of early June 2016 visit on the high probability treatment dummy. Column 2 adds individual covariates (age and dummies for male and Hispanic). Column 3 further adds surveyor and classroom fixed effects. Column 4-6 replicate columns 1-3 considering a different outcome: a dummy that the student reported that he/she would taken the SAT by the end of the 11th grade academic year. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. In Panel B, we regress the same outcomes on the private treatment dummy.
Experimental Forms

First Form – Four Treatment Groups
Student Questionnaire

First name: ________________________________

Last name: ________________________________

Gender (please circle one):  Female  /  Male

What is your favorite subject in school? (Please circle one)
   a. Math  b. English Language Arts  c. History/Social Studies  d. PE/Elective

[Company Name] is offering a chance to win an SAT prep package intended to improve your chances of being accepted and receiving financial aid at a college you like. The package includes:

   · Premium access to the popular [App Name] test prep app for one year;
   · Diagnostic test and personalized assessment of your performance and areas of strength and weakness;
   · One hour session with a professional SAT prep tutor, tailored to your diagnostic test.

This package is valued at over $100, but will be provided completely free.

If you choose to sign up, your name will be entered into a lottery where you have a 25% chance of winning the package.

Both your decision to sign up and your diagnostic test score will be kept completely private from everyone, including the other students in the room.

Would you like to sign up for a chance to win the SAT prep package? (Please pick one option)

   Yes / No

If yes, please provide the following contact information:

Email address: ________________________________

Phone number: (_____)______________________

TURN OVER FORM AND WAIT PATIENTLY

Form A337
Student Questionnaire

First name: ________________________________

Last name: ________________________________

Gender (please circle one):  Female  /  Male

What is your favorite subject in school? (Please circle one)
a. Math  b. English Language Arts  c. History/Social Studies  d. PE/Elective

[Company Name] is offering a chance to win an SAT prep package intended to improve your chances of being accepted and receiving financial aid at a college you like. The package includes:

· Premium access to the popular [App Name] test prep app for one year;
· Diagnostic test and personalized assessment of your performance and areas of strength and weakness;
· One hour session with a professional SAT prep tutor, tailored to your diagnostic test.

This package is valued at over $100, but will be provided completely free.

If you choose to sign up, your name will be entered into a lottery where you have a 75% chance of winning the package.

Both your decision to sign up and your diagnostic test score will be kept completely private from everyone, including the other students in the room.

Would you like to sign up for a chance to win the SAT prep package? (Please pick one option)

Yes  /  No

If yes, please provide the following contact information:

Email address: _________________________________________

Phone number: (______)______________________

TURN OVER FORM AND WAIT PATIENTLY
**Student Questionnaire**

First name: _______________________________

Last name: ________________________________

Gender (please circle one):  Female        /        Male

What is your favorite subject in school? (Please circle one)
   a. Math        b. English Language Arts       c. History/Social Studies       d. PE/Elective

[Company Name] is offering a chance to win an SAT prep package intended to improve your chances of being accepted and receiving financial aid at a college you like. The package includes:

- Premium access to the popular [App Name] test prep app for one year;
- Diagnostic test and personalized assessment of your performance and areas of strength and weakness;
- One hour session with a professional SAT prep tutor, tailored to your diagnostic test.

This package is valued at over $100, but will be provided completely free.

If you choose to sign up, your name will be entered into a lottery where you have a 25% chance of winning the package.

**Both your decision to sign up and your diagnostic test score will be kept completely private from everyone, except the other students in the room.**

Would you like to sign up for a chance to win the SAT prep package? (Please pick one option)

   Yes  /  No

If yes, please provide the following contact information:

Email address: ________________________________

Phone number: (______)______________________

TURN OVER FORM AND WAIT PATIENTLY

Form A347
**Student Questionnaire**

First name: ______________________________

Last name: ______________________________

Gender (please circle one): Female / Male

What is your favorite subject in school? (Please circle one)
   a. Math        b. English Language Arts    c. History/Social Studies    d. PE/Elective

---

[Company Name] is offering a chance to win an SAT prep package intended to improve your chances of being accepted and receiving financial aid at a college you like. The package includes:

- Premium access to the popular [App Name] test prep app for one year;
- Diagnostic test and personalized assessment of your performance and areas of strength and weakness;
- One hour session with a professional SAT prep tutor, tailored to your diagnostic test.

This package is valued at over $100, but will be provided completely free.

If you choose to sign up, your name will be entered into a lottery where you have a 75% chance of winning the package.

**Both your decision to sign up and your diagnostic test score will be kept completely private from everyone, except the other students in the room.**

Would you like to sign up for a chance to win the SAT prep package? (Please pick one option)

   Yes / No

If yes, please provide the following contact information:

Email address: ______________________________

Phone number: (______)______________________
Second Form
Student Questionnaire (2)

First name: _____________________________

Last name: _____________________________

Gender (please circle one): Female / Male

Age: _____________________________

Ethnicity (please circle one):
   a. White  b. Black  c. Hispanic  d. Asian  e. Other

Do you plan to attend college after high school? (Please choose one option)
   a. Yes, four-year college
   b. Yes, two-year college/community college
   c. No
   d. Don’t know

In general, how are your grades? (Please choose one option)
   a. Mostly A’s
   b. Mostly A’s and B’s
   c. Mostly B’s and C’s
   d. Mostly C’s and D’s
   e. Mostly D’s and F’s

On a scale 1-5, how important do you think it is to be popular in your school?
(1: not important … 5: very important)
1  2  3  4  5

On a scale 1-5, how much do you agree with the following statement?
“To be popular in my school it is important that people think I am smart.”
(1: strongly disagree … 5: strongly agrees)
1  2  3  4  5

On a scale 1-5, how hard have you been studying for the SAT so far?
(1: not at all … 5: as hard as I possibly could)
1  2  3  4  5

On a scale 1-5, do you agree with the following statement?
“If I decided to study harder for the SAT, my classmates would support my decision.”
(1: strongly disagree … 5: strongly agrees)
1  2  3  4  5

How many points do you think this SAT prep package could improve your SAT test scores by?
________

Have you used any of the following to prepare for the SAT? (Circle all that apply)
A. SAT prep books;  B. SAT prep app;  C. SAT prep class;  D. Tutor;
E. Other (please specify_______________________)

What % of your classmates do you think signed up for the SAT package offer today? ______%

What % of your classmates do you think have already taken or plan to take an SAT prep course
other than the one we offered today? ______%
Final Follow Up Form
Student Questionnaire

First name: ____________________________________

Last name: ____________________________________

Have you taken the SAT or ACT? (Please choose one option)
   a. Yes, SAT
   b. Yes, ACT
   c. Yes, both
   d. No

If you have taken one of these exams, what was your score? (Please put the number)
   Score: __________________

If you haven't taken these exams yet, are you planning to take them? (Please choose one option)
   a. Yes
   b. No
   c. Don't know

If yes, when are you planning to take the exam?
   Month/Year: _______________________

Do you plan to attend college after high school? (Please choose one option)
   a. Yes, four-year college
   b. Yes, two-year college/community college
   c. No
   d. Don’t know

Please choose one option: “In my school, studying hard would make me…”
   1. much less popular
   2. less popular
   3. neither less nor more popular
   4. more popular
   5. much more popular

Suppose a classmate becomes less popular because he/she is studying too hard. Why do you think this would happen? (Please choose the option that describes best)
   a. Because other students don’t like hard workers
   b. Because other students now think he/she is not a fun person to spend time with
   c. Because other students now think he/she is less likely to be around in the future
   d. Other reason: __________________________________
   e. Don’t know

Now suppose a classmate becomes more popular because he/she is studying too hard. Why do you think this would happen? (Please choose the option that describes best)
   a. Because other students admire hard workers
   b. Because other students now think he/she is a smart person and they admire smart people
   c. Because other students now think they can get help in their studying from him/her
   d. Other reason: __________________________________
   e. Don’t know

Did the SAT Up prep package offered by UCLA researchers earlier this academic year give you extra motivation to take the SAT? (Please choose one option)
   a. Yes
   b. No
   c. Don’t know

TURN OVER FORM AND WAIT PATIENTLY