Does the heart rule the head? Economic and emotional incentives for university attendance[1]

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Abstract

Young people from low income families and in rural areas have been shown to be less likely to attend university than their wealthier counterparts, even with the same grades. This paper examines the impact of providing information on the costs and benefits of attending university on the interest and likelihood of young people attending university, which has been shown to be effective in other contexts. Here, three approaches are trialled in schools in rural England: (1) students were given information cards clarifying the costs and benefits of going to university; (2) students' parents received the cards; (3) students were given an aspirational talk on what it's like to go to university. We find that students who received the information cards were significantly less likely to state their intention to go to university. In contrast, we find that students that attended the talk were significantly more likely to state they intended on going to university. In addition, in a sub-sample of students with university application data we also find that self-reported intentions significantly predicts actual applications. These findings indicate that information delivery pathways matter in improving students' aspirations and that emphasising the social and personal growth has a greater impact on aspiration than financial gains.

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1. Introduction

University matriculation and completion are associated with higher lifetime earnings, higher levels of subjective well-being, and lower rates of morbidity and mortality (Kane, 1994; Psacharopoulos, 1994; Vila, 2000; Lochner, 2011). Despite these benefits, a substantial proportion of young people do not attend university, particularly people from low income families, and those whose parents and peers have not themselves attended University. Crawford & Greaves (2015) find that young people from white families are significantly less likely to attend university than any ethnic minority, and that this is particularly the case for poor white students. As the authors note, this cannot be explained by differences in educational attainment alone, as some minorities, including Pakistani and Bangladeshi students, have lower attainment than their white counterparts, and are still more likely to apply to university. Although their data are not sufficient to reach conclusions about why this might be, the Crawford and Greaves paper suggests that it "seems plausible that aspirations and expectations might play a role" (p. 8).

In addition, low income students who do apply to University, systematically apply to less prestigious institutions than those from wealthier backgrounds (Anders, 2012). This gap has remained over recent history and appears to not depend purely on economic factors. As Hoxby & Avery (2013) note, scholarships, grants and subsidies often make prestigious colleges cheaper for low income students than less prestigious ones. In the U.S.A., most Ivy League universities provide free tuition for low income students and in the UK nearly all universities - including all elite universities - have the same tuition costs and are free at the point of use (fees start being paid once the graduates are working). Thus to maximise utility, students ought to attend the best University to which they are able to get accepted, regardless of their financial circumstances. However high achieving students from low income families are less likely to apply to prestigious selective universities than high achieving students from higher income families (Hoxby & Avery, 2013) and recent work evaluating the impact of financial aid to students, suggests that the policy of offering financial support to low income students has no impact on university attendance (Bulman and Hoxby, 2015).

The compelling economic reasons for students to attend university and continued lower attendance of university by young people of low SES backgrounds and whose parents did not attend university, compared with young people from more affluent, more educated families, indicate that alternative approaches are needed. One possibility is that students do not fully understand the costs and benefits of higher education. This information asymmetry hypothesis (whereby some, particularly poor students, lack full information about the benefits of education) is supported by Hoxby and Avery (2013) in the United States and by Minty (2014) in the UK. These researchers found that students in general, and particularly low income students have a poor understanding of costs and benefits of higher education and the types of funding available. This can then result in sub-optimal decision making with, for example, secondary school students in Chile who overestimate the costs of university being less likely to apply and more likely to drop-out (Hastings et al, 2015). This kind of information asymmetry has also been shown to hinder optimal school choice (Hastings & Weinstein, 2007) and limit the effectiveness of other policies such as the Earned Income Tax Credit (Chetty et al, 2013). This information asymmetry suggests a clear policy prescription - finding an effective way of delivering information to students.

Several studies have investigated how reducing this asymmetry can be reduced by providing accurate information about the returns of education. Attanasio & Kaufman (2009) find that perceived returns of education are correlated with college enrolment in Mexico, but the cross-sectional nature of this study does not allow to establish the causal link between perceived returns of education and college enrolment [5]. However, in a randomly controlled study in the Dominican Republic high school students who were given information about the financial returns of education completed on average 0.20-0.35 more years of education than students who had not (Jensen, 2010).

In relation to university applications, Hoxby and Turner (2013) analysed the impact of providing information to high school students in the U.S.A. on the application process and university net costs, alongside personalised applications and application fee waivers. They found this to increase high achieving, low-income students' applications and acceptances to universities. They also found that these students tended to apply to more prestigious universities.

It is also possible that the barriers to attending university are not limited to the real or perceived financial benefits of a university degree. The adoption of new behaviours is highly influenced by peer effects and social learning (Boyd and Richerson, 2005). Low income students living in a social environment where their family and peers have not attended university may be less likely themselves to feel like they should go. In these situations, role models with shared backgrounds can be particularly effective in transmitting information (Ray, 2006).

How people update their beliefs is affected not only by the availability of the information, but how this information is delivered. There is growing evidence that providing facts and statistics may crowd out emotional and inspirational messages, and vice versa. This is demonstrated in a study in Madagascar comparing the use of delivering statistical information about the financial benefits of education with the use of a role model to describe these benefits. Both interventions resulted in increases of school test scores and attendance, although the combination of role model and statistics reduced the impact, compared with each intervention in isolation (Nguyen, 2008).

Our study builds upon this empirical work and expands it in some ways. First, previous studies investigating how information can increase further education are based on settings where access to school or university requires financial resources that may not be accessible to all. In the UK, there are no upfront fees and government loans are provided to all with low interest fees and extended repayment periods of up to 30 years. As a result, the information gap in the UK is likely to play a more important role in mediating the decision of attending university, than in countries where this decision is restricted by financial access.

The information gap in the UK may also have been exacerbated with the increased complexity of the new tuition fees system introduced in 2010. Students and parents may not be fully informed about the costs and benefits of university, such as the progressive student loans' repayment system, the type of financial aid available and the average increased lifetime earnings of about £200,000 (Walker and Zhu, 2013). The information gap is also likely to be

[5] Attanasio & Kaufman (2009) are only able to detect the impact of perceived returns on decisions already made, so it's possible that people have higher perceived returns because they are already in college due reverse causality.

particularly relevant in a rural low density environment, like Somerset, where the likelihood of interacting with people that have gone to university is reduced.

Second, our study builds on Nguyen (2008) by testing the impact different ways of delivering information - information cards delivered to students and parents, and aspirational speeches delivered by a role model - has on the student's self-reported likelihood of applying to university in a Western context.

The opacity of the costs and benefits of higher education and the lack of role models is likely to result in sub-optimal decision making. Here, three approaches were trialled with the goal of increasing the transparency of the costs and benefits of attending university: (1) students were given information cards clarifying the costs and benefits of going to university; (2) students' parents received the cards; (3) students were given an aspirational talk from a local and relatable role model on what it's like to go to university. The information provided on the cards focused on the future earnings of attending university, the level of financial support available to low income students, and the student loan repayments system (Figure 2). The talk described these points and in addition included a personal account from the speaker on their university experience and their career path since.

The structure of this paper is as follows. Section 2, below, describes the interventions and a small scale pilot study in which they were evaluated prior to the main study. Section 3 describes the experimental design of the main study, while section 4 provides our results. This is followed by our conclusions.

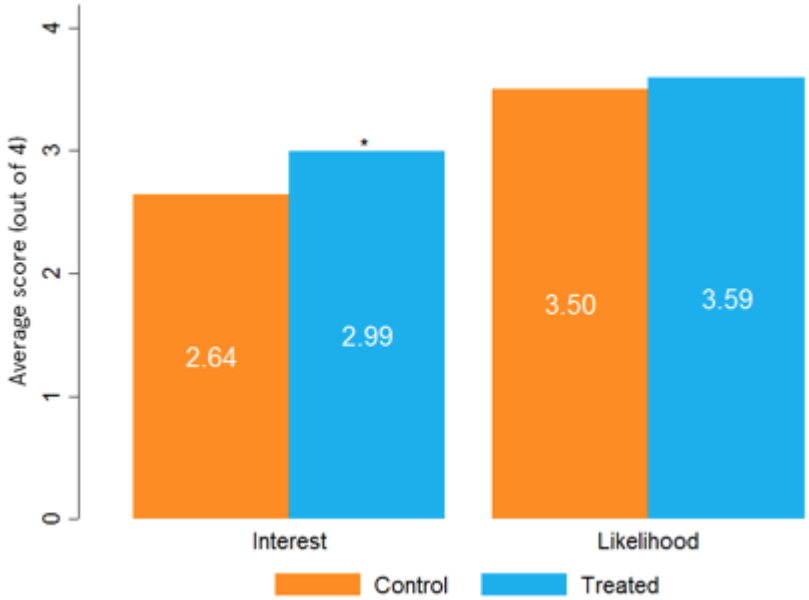
2. Pilot Study

The 'cards' intervention was tested for its efficacy in a pilot study to help inform the design of the main experiment. It took place in a single school in a different region from the main experiment, with our sample consisting of two classes of year 13 students (aged 17-18 and in their final year of high school). 60 students in these classes were randomly assigned to either receive, or not, the set of informational cards at the beginning of September 2014 (32 received the card and 28 did not). Participants were then surveyed two weeks later (see survey in the SI) and were asked whether they were interested in attending University and whether they thought they were likely to do so, on a four point scale. Table 1, below, shows the results of a simple regression analysis of these questions. Figure 1, illustrates these findings graphically.

Table 1: Pilot Study Results - Effect of information on interest in and likelihood of attending University		
	(1)	(2)
	(Interest)	(Likelihood)
Treat	0.353*	0.240
	(0.169)	(0.247)
Constant	2.647***	3.529***
	(0.111)	(0.162)
Observations	30	30

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1. Pilot Study Results - Scores on a 4 point scale



As can be seen from our analysis, even in this small sample, there was a statistically significant increase in the rate at which students report being interested in attending University, although there is no corresponding impact on their perceived likelihood of attending.

We noted that the four point scale used in the pilot appeared to suffer from substantial ceiling effects, and that the shortness of the survey itself, while conducive to completion, did not allow for more detailed analysis. Qualitative feedback on the pilot further suggested that students remembered the cards if they received them, but that students found it strange that some students had been given the cards while others had not. These points are reflected in the design of the main experiment.

3. Main Experiment

We now proceed to describe our main experiment, beginning with our three interventions.

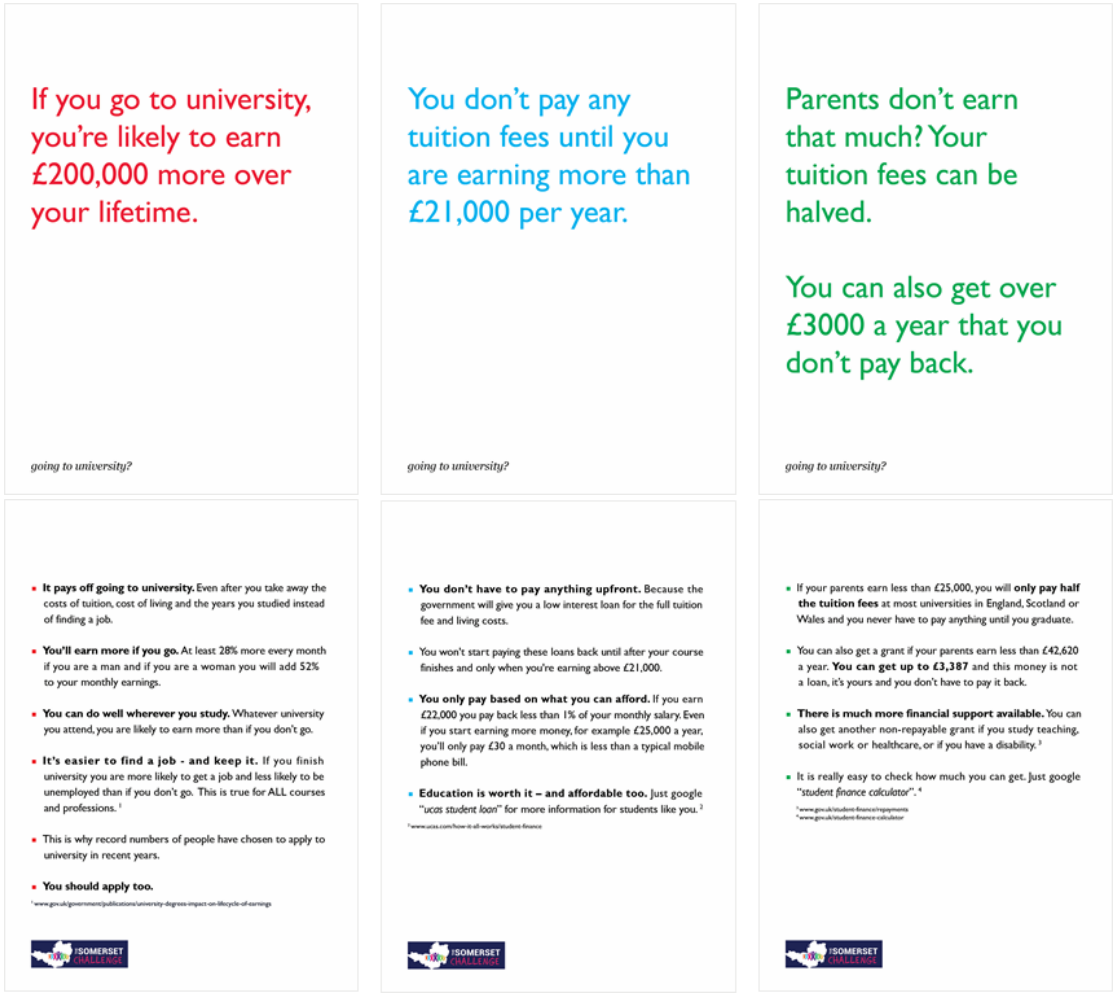
Control Condition

Our control condition represents treatment as usual in Somerset schools. Individuals, classes, and schools assigned to this group received the same support that they would have in the absence of the experiment, and did not have any support withheld from them.

Students' Cards

Students were randomly assigned to receive the same cards as were used in the pilot experiment (Figure 2). In order to avoid contamination issues, this treatment was randomised at the level of students' class, so that each class within a school was randomly assigned either to receive the intervention, or not to. For this experiment, these cards were placed in glossy, transparent envelopes, hand addressed to the student using their first name.

Figure 2. The front and back of the three information cards distributed to the students



Parents' Cards

In addition to the cards used in the pilots, a set of similar cards were developed for parents (see the parents cards in the SI). These cards aimed to convey the same information as the students' treatment cards, but were written in language aimed at parents - referencing their children's opportunities, and how their family income could mean having lower fees and higher student grants. These cards were posted to students' homes by schools, and so were randomised at the individual level.

Role Model Aspirational Talk
Participants in this condition received a talk from a relatable figure, which aimed to both inform them of the costs and benefits of going to university, and to provide an example to students of a person from their background who attended university. The speaker, who is also one of the authors of this study (MS), was born in Somerset, and attended a comprehensive (state funded, non-selective) school in a neighbouring county before going to university. While at university he founded a small business with friends, and subsequently completed postgraduate degrees at a Russell Group University before working for the British government. The speaker was also the first member of his family to attend University at any level. Talks at different schools were delivered as similarly as possible, while avoiding "mechanical" delivery styles. All talks lasted for approximately 15 minutes, and students had time to ask questions after the talk.

3.1 Experimental Design

The experiment was conducted on 2645 students between years 10 and 13 (aged 15-18) in 10 schools in Somerset. In order to maximise statistical power while subjected to logistical constraints, participants were randomised into different treatments at varying levels.

As the likelihood of parents discussing cards between themselves or with other parents' students was deemed to be low, and the intervention was delivered outside of school (delivered to the home address of the students), this intervention was randomised at the individual level, such that each student's parents received the intervention with equal likelihood and independent of each-other. Across the sample there are 2645 students, of whom 1329 were assigned to this condition.

Delivering cards to students in schools independently of each other was thought not to be viable logistically, and the likelihood of spillovers through students talking to each other about the cards was thought to be comparatively high. As such, this intervention was randomised at the level of the form group, which is the class in which students register their attendance at the beginning of the day (equivalent to Home Room in many US schools). 1397 students were randomly assigned to this condition, including 690 who also received the parents' cards intervention.

Finally, the role model aspirational talk treatment, which was considered to have the highest risk of contamination, and to pose the greatest logistical challenges for schools, was randomised at the year-group level, so that an entire school-year in a given school was assigned either to receive the talk, or not to. Across the sample there are 27 year groups, of which 8 are treated with the aspiration talk. 798 students were randomly assigned to this condition, including 393 who received the student cards intervention, 402 who received the parents' cards intervention, and 196 who received all three interventions.

Interventions were delivered in October of 2014. In December 2014, schools administered surveys to students using an online survey produced by the researchers.

3.2 Data description

Our sample consists of 2645 students across the 10 schools in our sample, in years 10 (ages 14-15) through to 13 (ages 17-18), who completed our survey. Students completing the survey

are asked their first names, surnames and their registration group. These data are used to iteratively match participants to their treatment assignment, first automatically, and then manually for those who remain unmatched. Descriptive statistics of the sample's age and gender can be found in the table below. Balance checks find that our treatments are balanced with respect to whether or not students' families and friends have a history of attending university, and their ages. Participants receiving the aspiration talk treatment are statistically significantly more likely to be female than participants who did not receive this talk - this is most likely an artefact of the higher level at which randomisation occurs for this treatment. As a result, we consider this potential source of bias by including a gender variable in the analysis.

Table 2: Descriptive statistics on year group and gender

	N	%
Year 10	1002	37.8
Year 11	779	29.4
Year 12	202	7.6
Year 13	129	4.8
Year 10/11	533	20.1
Male	641	23.3
Female	674	25.4
No gender specified	1330	50.2
Total	2645	100

Data Limitations

Some students in two schools in the sample did not enter their school year when completing the survey. These participants are assigned a binary variable indicating that this data is missing for them, but are otherwise included in the sample. The two schools in question do not have sixth-forms, and therefore these students for whom these data are not available are either in year 10 or 11. In addition, per the table above, roughly half of participants do not report their gender.

3.3 Empirical strategy

Our analysis is conducted over a series of regression models. In the case of each of these models, we estimate a linear prediction model, with a binary outcome measure. The model estimated takes the form:

$$O_{icyh} = \alpha + \beta_1 P_i + \beta_2 S_{ch} + \beta_3 T_{yh} + \beta_4 G_i + \beta_5 Y_y + \beta_6 H_h + u_{ic}$$

Where O is the outcome measure under consideration, $\alpha$is a constant term, $P$is a binary treatment indicator showing whether a student's parents receive information cards or not, S is a binary treatment indicator showing whether a participant receives the student cards or not, T is

a binary treatment indicator showing whether the participant receives the aspiration talk, or not. G is a binary variable set to 1 if a participant is male and 0 else, **Y** is a vector of year group fixed effects, and **H** is a vector of school fixed effects. Finally, u is a standard error clustered at the level of the class. Given that treatment occurs at multiple levels, preventing fixed effects from being used, for example at the class level, we have opted to make use of the most conservative standard error structure available, based on pre-analysis of the control group responses.

The structure of our main analyses is as follows. In the next section, we consider manipulation checks investigating whether participants' information sets were influenced by our interventions. We then proceed to our primary analysis, which concerns students' reported interest in attending university, their reported likelihood of doing so, and for a sub-sample their realised university applications

3.4 Manipulation checks

Manipulation checks were undertaken in order for us to ascertain that our intervention was in fact effective at generating more accurate information about applying to university. This involved questions related to the information that was contained in the information cards and the perceptions of going to university. These questions allowed us to ascertain whether those that should have received the cards with the information on them did in fact absorb the information and change their perceptions.

We tested whether the treatment group was more knowledgeable than the control group in relation to the initial payment and repayment of the tuition fees, and the average increase of lifetime earnings for university graduates. The results of these manipulation checks can be found in the table below.

Table 3: Manipulation checks on facts about university related to (1) the cost of tuition fees, (2) the repayment of student loans, and (3) the likely increase in future earnings for graduate students.

	(1) Fees	(2) Loans	(3) Earnings
Students	-0.039*	0.073*	0.040
	(0.019)	(0.030)	(0.020)
Parents	0.006	0.012	0.027
	(0.015)	(0.019)	(0.015)
Talk	-0.159***	0.171***	0.122***
	(0.025)	(0.028)	(0.024)
Constant	0.868***	0.554***	0.137***
	(0.021)	(0.037)	(0.024)
Observations	2645	2645	2645

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As can be seen from the table above, the information students who received the information cards themselves, or who received the talk, was generally improved compared with the control group. We note that the decrease in accurate information about tuition fees was a result of students being over-optimistic about this after they received the information cards. A similar pattern of results is observed for students who received the 'talk' condition, but there is no evidence of effects from the cards being sent home to parents.

We also carried out another manipulation check to determine whether students' subjective and emotional beliefs about university were altered by our interventions (Table 4).

Table 4: Manipulation checks for feelings about university related to (1) whether it is a place only for wealthy people, (2) whether it is a place to meet interesting people, and (3) whether people that go to university live a happier life.

	(1) University for wealthy	(2) Meeting interesting people	(3) Live a happier life
Students	-0.003	-0.037	-0.010
	(0.012)	(0.022)	(0.016)
Parents	-0.007	-0.038*	-0.009
	(0.011)	(0.019)	(0.015)
Talk	-0.028*	0.051	0.055**
	(0.013)	(0.026)	(0.018)
Constant	0.130***	0.570***	0.127***
	(0.016)	(0.031)	(0.021)
Observations	2645	2645	2645

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As can be seen from this table, the factual cards about University life do not influence students' feelings about university life in general, whether they were sent to students or to their parents (although there is a statistically significant decline for students whose parents received cards in the rate of thinking that university students meet more interesting people among students). By contrast, the talk intervention both decreases the extent to which students believe that University is only for people from wealthy families, and increases their belief that people who attend university have happier lives. Their beliefs about whether university students know more interesting people is not significant at conventional levels (p=0.06) but shows signs of moving in the intended direction.

3.5 Analysis

We now proceed to the analysis of our primary outcome measures. Our regression analysis examines the impact of the intervention on the stated likelihood of the students going to university, as well as their stated interest in doing so.

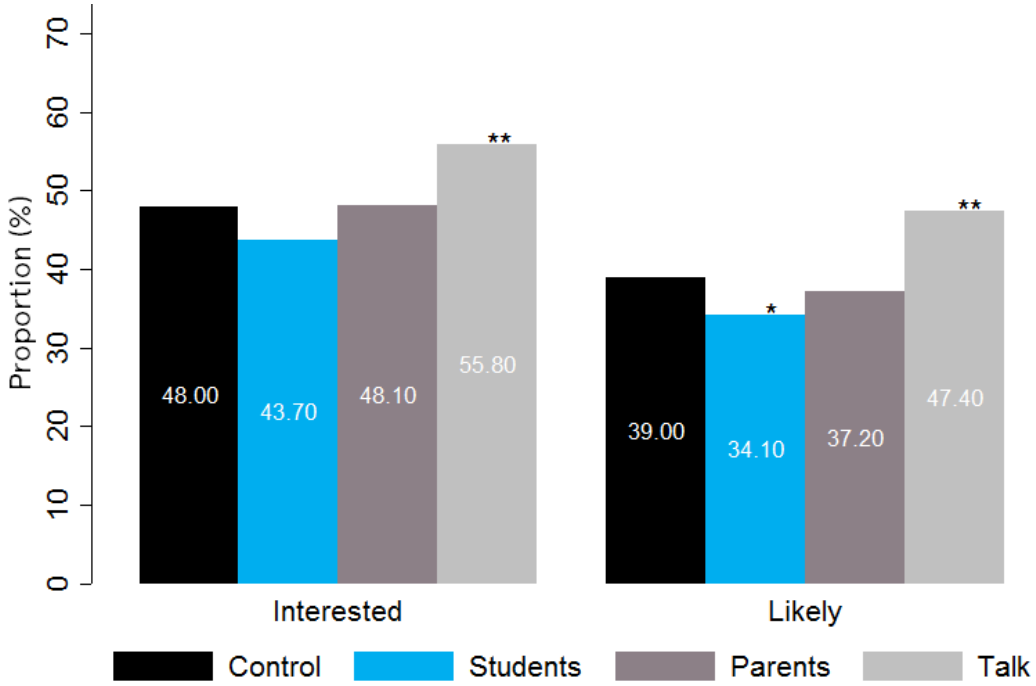
Table 5, below, reports the results of this primary analysis. Column 1 reports our standard model estimated for participants' stated likelihood of attending university, where students who identify themselves as "likely" or "very likely" to attend take values of 1 and other students take values of 0. Column 2 reports the same model where the outcome measure is students' stated interest in attending university. As we are also interested in the extent of students' ambition, as well as their absolute levels, column 3 uses as its outcome measure whether students' stated their interest in applying to Russell Group universities in particular. Figure 3 reflects these results graphically.

Table 5: OLS regression analysis on the effect of the interventions on (1) the stated likelihood of attending university, (2) the stated interest in attending university, and (3) the interest in attending a Russell Group university.

	(1) Likely to attend	(2) Interested in attending	(3) Russell Group university
Students	-0.049*	-0.040	0.009
	(0.023)	(0.023)	(0.028)
Parents	-0.018	0.004	0.000
	(0.019)	(0.018)	(0.009)
Talk	0.084**	0.081**	0.165***
	(0.028)	(0.027)	(0.041)
Constant	0.390***	0.477***	0.090***
	(0.031)	(0.033)	(0.027)
Observations	2513	2513	2513

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 3. Effect of interventions on students' interest in and likelihood of attending University.



* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Our results run somewhat contradictory to some of our expectations. We find that despite improving the quality of student information about the costs and benefits of attending University, giving students the cards had a negative and statistically significant effect on students' stated likelihood of attending university, although no significant negative effect on their interest in attending (although $p<0.10$ for this estimate). By contrast, the talk intervention significantly increases both stated interest in attending and stated likelihood of doing so, by roughly eight percentage points in both cases. As may have been expected from the manipulation checks, we do not find any effects of sending parents cards on our outcomes.

Looking at the Russell Group outcome measure in column 3, we find a significant and large positive effect on interest in applying to these universities in the Talk intervention, but no effect for the other two interventions. This suggests that the talk intervention is effective at convincing marginal students who already intend to apply to university to aim higher, and that the negative impact overall of the cards intervention acts primarily on those who did not intend to apply to Russell Group Universities.

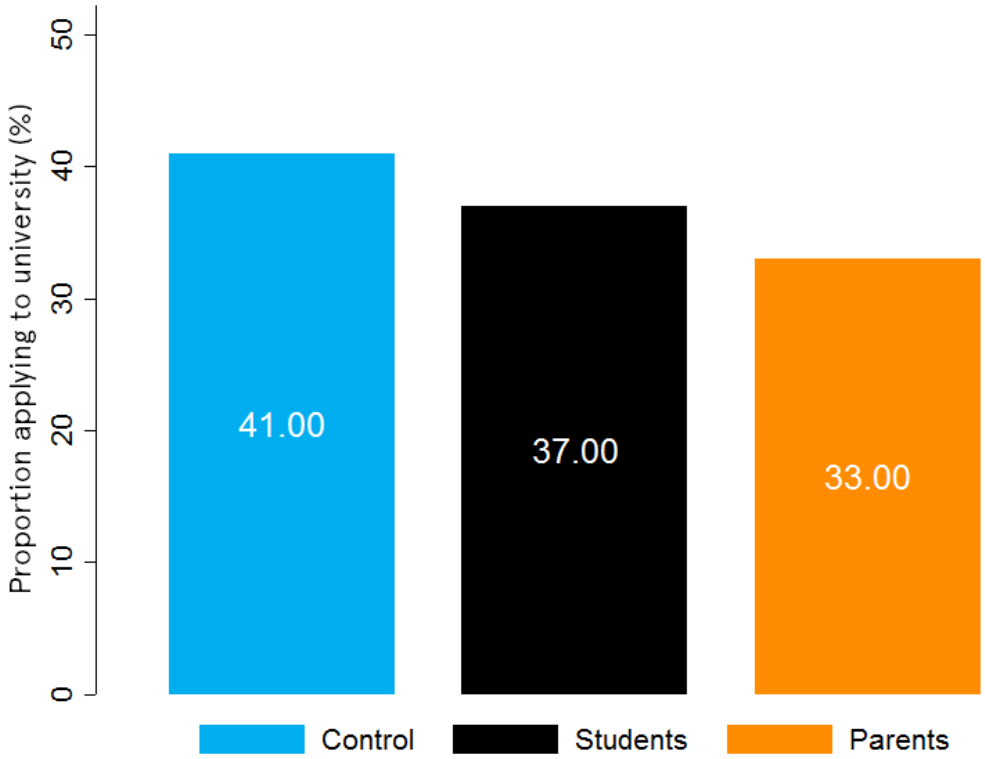
Further analysis finds no significant interaction effects between any of our interventions.

Validation

Our choice of outcome measure, self-reported surveys, may not be as reliable as actual attendance at university. In order to challenge this limitation, we requested university application data from schools. For one school in our data, we were able to gather data on realised university applications through the UCAS system, and match these with survey responses. This had two purposes. First, matching the two outcome measures allowed us to test the external validity of our self-reported survey measures (see Sanders & Emanuel, 2016 for details). Second, we are able to present investigate the treatment effects using this data, for the students

and parents treatments (the level of randomisation precludes this analysis for the talk outcome measure).

Figure 4. Effects of students' and parents' cards on UCAS Applications



* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The pattern of results is the same as that found in the survey responses, with the information cards resulting in a smaller proportion of students applying to university - however due to small sample sizes this is not statistically significant at conventional levels (p=0.07).

Further Analysis: Instrumental Variables

Following from our main analysis, we also consider the underlying drivers of students' decisions to attend University. In cross-sectional, non-randomised trials, we might expect a correlation between accurate information and/or favourable beliefs and students' intentions to attend university. This connection is likely to be endogenous, however, as students who are more interested may seek out more information, or may attend university open days, allowing them to see the variety of backgrounds from which current students are drawn.

In our experiment we have three exogenously applied treatments, which have different statistically significant impacts on students' emotive beliefs about university, and their knowledge about the costs and benefits of attending (Tables 3 & 4). The exogenous impact on these factors can be used to estimate the causal relationship between students' information sets, their beliefs, and the self-reported likelihood of attending university.

We investigate this using a simple two stage least squares estimation. In the first stage, we estimate an identical model to our manipulation checks, in which participants receive a score of

either 1 (if they are correct in their information or positive in their beliefs), or 0 (if they are incorrect in their information or negative in their beliefs). Predicted values from this stage are then recovered and used in a second stage regression to estimate the impact of information and beliefs on students' reported likelihood of attending university, following the model below:

$$L_{icyh} = \alpha + \beta_1 \hat{O}_i + u_{ic}$$

Where $\hat{O}$ is the recovered predicted value of the outcome measure from the first stage regression. Table 6, below, shows the results of this analysis for our 'fact' questions, while Table 7 shows the same results for the 'feeling' questions.

Table 6: Two-stage least squares estimation for fact measures on the stated likelihood of attending university,

	(1) Likely to Attend	(2) Likely to Attend	(3) Likely to Attend
Fees	-0.279*	-	-
	(0.137)	-	-
Loans	-	0.158	-
	-	(0.119)	-
Earnings	-	-	0.292
	-	-	(0.178)
Constant	0.695***	0.367***	0.407***
	(0.110)	(0.080)	(0.041)
Observations	2513	2513	2513

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: Two stage least squares estimation for 'feeling' measures on the stated likelihood of attending university,

	(1)	(2)	(3)
	Likely to Attend	Likely to Attend	Likely to Attend
School for Wealthy	-1.649	-	-
	(1.172)		
Meeting interesting people	-	0.873**	-
	-	(0.322)	-
Have a happier life	-	-	1.450*
	-	-	(0.610)
Constant	0.642***	-0.041	0.204
	(0.122)	(0.190)	(0.114)
Observations	2513	2513	2513

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Our instrumental variables analysis provides a local average treatment effect for participants whose beliefs or knowledge were influenced by our treatments. Although our study is not powered for this analysis, we find a positive effect of positive beliefs about university in general, and a smaller negative effect of having better information, driven by over-optimism about fees in the control group. This finding, combined with those presented thus far, suggests that information provision may not be harmful per se, but that positive feelings toward university is necessary in order to be influenced by information about the costs and benefits of attending university.

4. Conclusions

These findings cast an interesting light on our prior hypothesis that students' decisions not to attend university were based on a lack of accurate information on the associated financial costs and benefits. We consider that there are two possible explanations for this finding – one, that students' prior beliefs about the financial aspect of attending university were unduly optimistic (for which the evidence we present is mixed), and so our information treatment has made them more pessimistic about them; or two, that students' rational thinking about university crowd out on feeling the emotional pull of university (as suggested by our IV results).

Perhaps even more interestingly, our talk intervention created a statistically significant increase in students' interest in attending university, as well as their perceived likelihood of applying. This combination of interventions allows us to take an "instrumental variables" approach to our analysis, and to test the hypothesis that improving people's information about university is less effective than improving their feelings about university. These results are striking – we find a significant negative effect of having correct information about fees on stated likelihood of

attending University, but a strong effect of students having more positive feelings about University.

The negative impact of the student cards in the interest and likelihood of attending university is surprising. Information alone results in students being less keen to go to university, which in turn appears to be reflected in less actual university applications. It is possible that optimal decision for students in this context is, in fact, to not attend university, and previously students were making the decision of going to university based on erroneous facts. Alternatively, too much information can hinder behaviour change, which has been shown elsewhere. For example, providing daily information on the benefits of continuing education produced no effect on attendance or test scores in secondary school students in the U.S.A. (Fryer, 2013). In a health context, providing excessive information on healthy behaviours results in more negative outcomes than just providing moderate amount of information (Wilson et al, 2015).

From the results of our two pilots and our two trials we can offer some conclusions.
First, missing information does not seem to be as major a factor in university application decisions as was previously assumed. Crucially, providing information alone can actually backfire and produce negative outcomes. Given the scarcity of other information presented on the cards, it is quite unlikely that something other than the information is driving these results.

Second, and most importantly for our practical purposes, we find that the use of an inspirational role model focusing on the emotional and social aspects of attending university has considerable power at driving student aspirations. Although the specific intervention here may not be easily scaled, talks from former students or other aspirational figures can be brought to scale and should be considered as an intervention more widely as schools could look to recruit successful alumni for this purpose.

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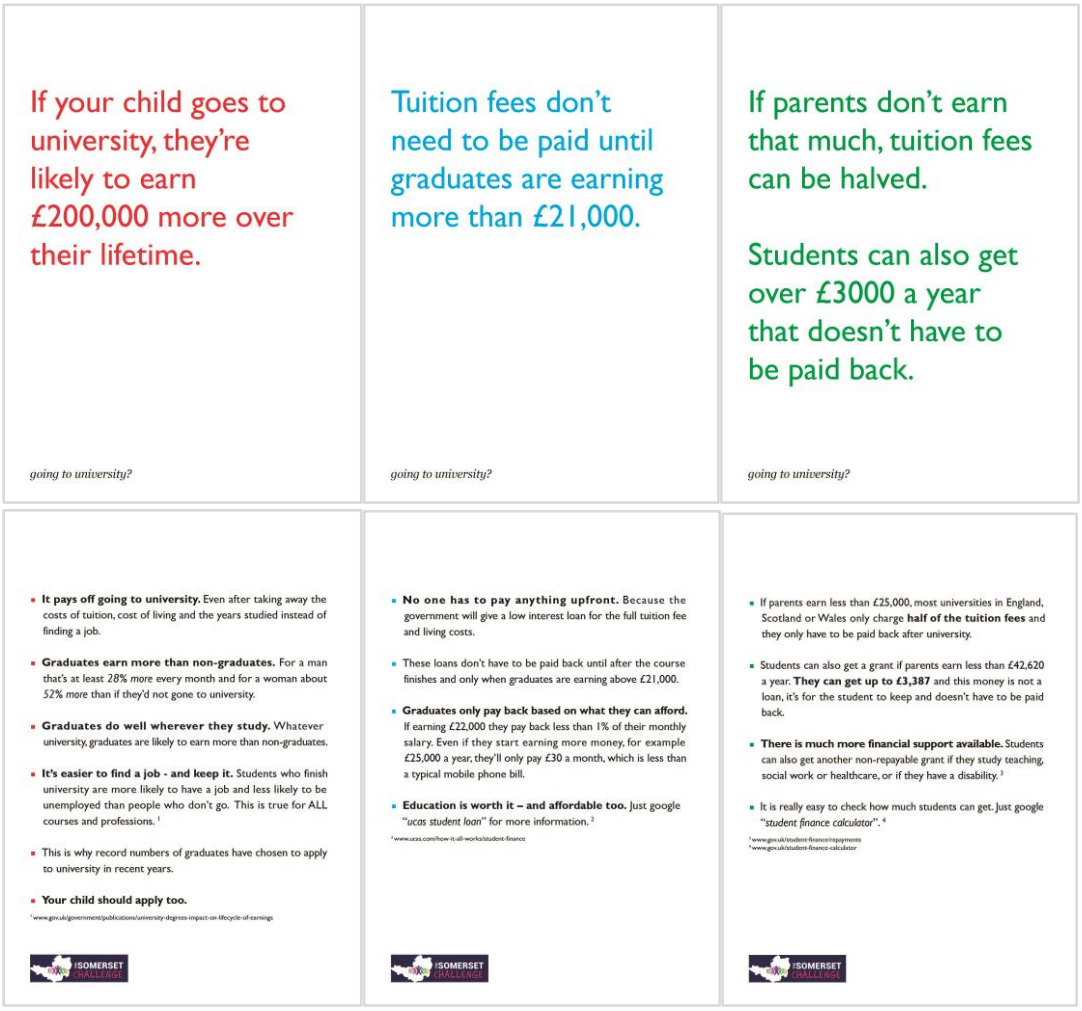
6. Supplementary Information

Parents' info cards

Figure S1. The front and back of the three information cards distributed to the students' parents.



Survey

1) First Name

2) Surname

3) Tutor Group

4) How interested are you in attending university?

    1) Not interested
    2)
    3) Not sure
    4)
    5) Very interested

5) How likely are you to attend university?

    1) Very unlikely
    2)
    3) Not sure
    4)
    5) Very likely

6) If you are planning on going to university, which of these universities are you thinking of applying?

a) University of Birmingham
b) University of Bristol
c) University of Cambridge
d) Cardiff University
e) Durham University
f) University of Edinburgh
g) University of Exeter
h) University of Glasgow
i) Imperial College London
j) King's College London
k) University of Leeds
l) University of Liverpool
m) London School of Economics & Political Science
n) University of Manchester
o) Newcastle University
p) University of Bath
q) University of Nottingham
r) University of Oxford
s) Queen Mary University of London
t) Queen's University Belfast
u) University of Sheffield
v) University of Southampton
w) University College London
x) University of Warwick
y) University of York

z) Other University
aa) Not thinking of applying

7) If you are planning on going to university, which of the following courses are you thinking of applying to study (tick all that apply)?

Engineering
Architecture
Computer Sciences
Mathematics or Physics
Biosciences or Chemistry
Economics, Business or Accountancy
Law
Medicine, Veterinary or Dentistry
Art, Media, Fashion, Dance or Design
Psychology, Sociology or Anthropology
English and Languages
History, Geography or Archaeology
Philosophy or Politics
Agriculture or Forestry
Sport
Not thinking of going to University

8) Has anyone from your close family (parents or siblings) attended or is attending University?

Yes / No

9) How many students from your school do you think go to University?

a) Most
b) About half
c) A few
d) Almost none

10) What are your predicted A-Levels grades? Fill in the number of each grade you are predicted to get.

A* / A / B / C / D / E

11) How much do you agree with the following sentences:

Completing a university degree is a good investment in the future.
Strongly Agree / Agree / Neither Agree nor Disagree / Disagree / Strongly Disagree

Universities are only for wealthy people.
Strongly Agree / Agree / Neither Agree nor Disagree / Disagree / Strongly Disagree

I don't know why I go to school; I really feel that I am wasting my time in school.
Strongly Agree / Agree / Neither Agree nor Disagree / Disagree / Strongly Disagree

I go to school because eventually it will enable me to enter the job market in a field that I like.

Strongly Agree / Agree / Neither Agree nor Disagree / Disagree / Strongly Disagree

My school provides me with the necessary information to make decisions about going to university.
Strongly Agree / Agree / Neither Agree nor Disagree / Disagree / Strongly Disagree

I can go to university if I work hard.
Strongly Agree / Agree / Neither Agree nor Disagree / Disagree / Strongly Disagree

When I make plans, I am almost certain that I can make them work.
Strongly Agree / Agree / Neither Agree nor Disagree / Disagree / Strongly Disagree

In my case, getting what I want has little or nothing to do with luck.
Strongly Agree / Agree / Neither Agree nor Disagree / Disagree / Strongly Disagree

Sometimes I feel that I don't have enough control over the direction my life is taking
Strongly Agree / Agree / Neither Agree nor Disagree / Disagree / Strongly Disagree.

12) Which of the following do you think apply to this sentence (tick all that apply): *People who go to University* _____

a) develop important skills
b) struggle with money
c) have more interesting jobs
d) spend less time with their friends
e) meet interesting people
f) have happier lives
g) are regularly stressed
h) earn more money

13) The payment of tuition fees is:

a) Upfront, when you start university and you can't get a loan to pay for the fees
b) Upfront, when you start university and you can get a loan to pay for the fees
c) Free

14) If you get a loan to study at university, when do you have to start to pay it back?

a) Immediately after finishing your degree
b) 10 years after finishing your degree
c) After earning more than £21,000 per year
d) After earning more than £12,000 per year

15) If you were to guess, how much do you think a university graduate earns, <u>on average over a lifetime</u>, compared to somebody without a university degree?

a) £250,000 - £500,000 <u>less</u> than a non-graduate
b) £100,000 - £250,000 <u>less</u> than a non-graduate
c) £50,000 - £100,000 <u>less</u> than a non-graduate
d) £1,000 – £50,000 <u>less</u> than a non-graduate
e) About the <u>same</u> as a non-graduate
f) £1,000 – £50,000 <u>more</u> than a non-graduate
g) £50,000 - £100,000 <u>more</u> than a non-graduate
h) £100,000 - £250,000 <u>more</u> than a non-graduate

Balance Checks

Table S1: Balance checks by age, gender and past university attendance by friends/family

	(1)	(2)	(3)
	Age	Male	Past University by friends/family
Talk	0.167	-0.070	-0.055
	(0.533)	(0.123)	(0.191)
Students	0.072	-0.017	0.091
	(0.071)	(0.015)	(0.046)
Parents	0.014	0.007	0.001
	(0.027)	(0.022)	(0.032)
Constant	14.599***	0.269*	2.413***
	(0.128)	(0.084)	(0.070)
Observations	2645	2645	2645