Online Appendix

Moving Attention but Not Enrollment: Nudging College Information Search at National Scale in Colombia

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A Behavioral Mechanisms and Ex-Ante Predictions

Section 2.2 of the main text maps each mechanism to the arm and contrast that identify it. This appendix records the underlying literature and the ex-ante hypotheses in the form they were stated in the team's October–November 2017 design correspondence.

The enrichment theories. Prospect theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991) holds that losses loom larger than equivalent gains, so messages emphasizing what students *lose* by not pursuing higher education should motivate more than gain-framed equivalents. Tailoring raises engagement when content is self-relevant (Kreuter, Farrell, Olevitch, & Brennan, 2000), motivating the nationwide-versus-departmental contrast. And richer information about the distribution of outcomes can shift beliefs and choices (Wiswall & Zafar, 2015), motivating the average-versus-range contrast, though it also adds complexity. Encouragement language and self-efficacy framing can lower psychological barriers to action (Bandura, 1977); the 2018 cohort varies encouragement at fixed message length.

The attention theories. The salience literature (Bordalo, Gennaioli, & Shleifer, 2012, 2013) emphasizes limited attention, and in digital environments simpler prompts may work better by reducing cognitive load (Shah, Mullainathan, & Shafir, 2012). Relatedly, the plain arm asserts qualitatively that higher education is rewarded and invites the student to search: by promising value behind the link while leaving the information gap open, it maximizes the marginal value of clicking (Loewenstein, 1994), whereas belief-targeting variants partially resolve the question inside the pop-up.

Summary of ex-ante predictions. The ex-ante hypotheses were: (1) loss-framed > gain-framed (prospect theory); (2) more salient, lower-cognitive-load messages generate higher engagement; (3) localized (state-specific) information generates higher engagement than generic information; and (4) the effect of granularity is ambiguous because it trades off informational content and complexity. Table A1 confronts each prediction with the realized 2017 engagement ranking.

Table A1: Ex-ante predictions vs. empirical performance (2017 cohort)

Mechanism	Ex-ante directional prediction	Click-through comparison	Verdict
Prospect theory (loss aversion)	Loss-framed > gain-framed	13.1% vs. 16.7%	Rejected ($p < 0.001$, reversed)
Personalization / tailoring	Statewide > nationwide	15.9% vs. 13.9%	Supported, small
Salience / cognitive load	Simple > information-rich	**20.9%** vs. 13.1–16.7%	Supported
Information granularity	Range vs. average: ambiguous	14.5% vs. 15.3%	No meaningful difference

Notes: Directional predictions are the implications of each mechanism as discussed above and in Section 2.2 of the main text; they were stated in the team's design correspondence of October–November 2017, before any results were observed. Click-through comparisons are grouped 2017 rates from Figure 3 of the main text (underlying regressions in Tables C4–C5 and C8 below). The table does not claim behavioral mechanisms are absent, but that their implications for optimal message choice are context-dependent.

B Experimental Design Details

Table B1 lists the nine 2017 treatment arms with their verified message content and the belief each was designed to target; Figure 1 of the main text shows the same design as it appeared on screen. Table B2 details the five 2018 treatment arms. In the implementation file the arm indicator is the `Tipo` field, which takes the values 0–9 and corresponds one-for-one to the arm numbers in Table B1 (`Tipo` 0, *"Sin mensaje"*, is the no-message control; `Tipo` 1, *"Genérico"*, is the plain invitation). The file's `ID_MENSAJE` field is a row identifier running 1–270, not an arm label: the 264 personalized records are one row per department × score band.

B.1 Message Texts as Displayed

Note: The texts below are reproduced verbatim from the implementation file ICFES used to display the messages (270 message records: one control, five generic variants, and 264 personalized variants covering 33 departments × 2 *Saber 11* score bands × gain/loss × average/range; archived in the replication materials as `message_catalog_2017.csv`), cross-validated against screenshots of the live platform captured on 14 November 2017. Every treated message begins with the same encouragement sentence and ends with the same link invitation; the randomized middle content is shown below for the four generic variants, with one personalized example. Peso values in personalized variants depend on the student's department and score band.

B.1.1 Encouragement text (treatment pop-ups)

Spanish:

> La educación superior es una gran oportunidad para profundizar tus conocimientos en el área de tu preferencia. Además podrías contribuir al progreso del país de una manera más especializada. Esta educación adicional es remunerada por el mercado laboral.

English:

> Higher education is a great opportunity to deepen your knowledge in the area of your preference. You could also contribute to the progress of the country in a more specialized way. This additional education is rewarded by the labor market.

Table B1: Treatment arms for the 2017 cohort

	Randomized message design				
No.	Statistics	Framing	Presentation	Message content (verified)	Theory / targeted belief
0	*Control (no pop-up)*			No message shown	Counterfactual for enrollment outcomes
1	*Plain invitation ("salient")*			Encouragement—higher education deepens knowledge in your preferred area, contributes to the country, and is rewarded by the labor market—plus the link	Search invitation: raises the perceived value of searching while leaving the information gap open; minimal cognitive load
Belief-targeting arms 2–9: the full $2 \times 2 \times 2$ *factorial (statistics* $\times$ *framing* $\times$ *presentation)*					
2	Nationwide	Gain	Levels	Adds to 1: earnings attainable at each degree level nationwide ("some university programs earn $1,780,000…")	Beliefs about returns to each education level; gain frame anchors attention on attainable gains
3	Nationwide	Loss	Levels	Adds to 1: average income foregone at each degree level if the student does not study	Same belief target, loss frame (prospect theory)
4	Nationwide	Gain	Range	Adds to 1: within-level earnings ranges nationwide ("some university graduates earn $1,280,000 while others earn $2,650,000…")	Beliefs about heterogeneity of returns within levels: choosing well matters, so search pays
5	Nationwide	Loss	Range	Adds to 1: ranges of income foregone at each level if the student does not study	Heterogeneity beliefs, loss frame
6	Personalized	Gain	Levels	As 2, with figures for the student's own department, benchmarked to graduates in the student's own *Saber 11* score band	Beliefs about the student's *own* returns (tailoring, self-relevance)
7	Personalized	Loss	Levels	As 3, personalized to department and score band	Own returns, loss frame
8	Personalized	Gain	Range	As 4, personalized to department and score band	Own-match heterogeneity, gain frame
9	Personalized	Loss	Range	As 5, personalized to department and score band	Own-match heterogeneity, loss frame

Notes: Arm numbers correspond one-for-one to the `Tipo` field of the ICFES implementation file (`Tipo` 0, *"Sin mensaje"*, is the control; `Tipo` 1, *"Genérico"*, is the plain invitation). "Personalized" statistics report figures for the student's own department, benchmarked to graduates in the student's own *Saber 11* score band; these arms are labeled "statewide" in the estimation exhibits (Tables C4 and C6). Every treated arm carried the same encouragement, link, and email option; only the statistics block varied. Message content is a verbatim translation from the implementation file; the Spanish as displayed is reproduced in "Message Texts as Displayed" below.

Table B2: Treatment arms for the 2018 cohort

		Randomized message design				
No.	Label	Length	Encouragement	Returns	Message content	Role in the design
0	Control		*(no link offered)*		Does not receive the link option	Counterfactual for enrollment outcomes
1	SnE	Short	No	–	Shows statistics about high school graduates and invites the student to visit the link, or to provide an email address to receive the information	Neutral short baseline
2	LnE	Long	No	–	Adds to 1: statistics about students taking *Saber 11* (neutral content, no returns)	Identifies message length at fixed neutral content (vs. 1); equal-length comparator for arms 4–5
3	SE	Short	Yes	–	Affirms that education is a great opportunity and invites the student to visit the link, or to provide an email address	Identifies encouragement at fixed length (vs. 1); closest to 2017's plain invitation
4	LEgain	Long	Yes	Gain	Adds to 3: average returns to university and to technical/technological degrees	Identifies framed-returns content at fixed length (vs. 2), gain frame
5	LEloss	Long	Yes	Loss	Adds to 3: average income foregone if the student does not pursue those degrees	Same contrast, loss frame

Notes: Labels match the estimation exhibits (Table D2) and Figure 3 of the main text. Character counts were calibrated to be identical within each length block (arms 1 and 3; arms 2, 4, and 5), so content contrasts are identified at fixed length and the length contrast at fixed content. The gain/loss arms mention average returns without the level-by-level detail of the 2017 messages.

B.1.2 Control condition

The implementation file is definitive: message ID 1 (tipo 0, *"Sin mensaje"*) carries an empty display text—students drawn into the control group, roughly one in ten, received no message. Control click-through is therefore zero by construction, and the informative engagement comparisons are across treatment arms. (The platform screenshots also record an encouragement-only pop-up with no statistics, link, or email option, the left panel of Figure B1; it does not correspond to any record in the implementation file, and its provenance—likely a non-experimental platform screen—remains unidentified.)

B.1.3 Treatment arms: generic, gain-framed, average presentation

Spanish (randomized middle content):

> Sabías qué en algunos programas universitarios ganan $1780000, mientras que algunos programas tecnológicos ganan $1080000, y algunos programas técnicos profesionales ganan $1040000.

English:

> Did you know that in some university programs graduates earn $1,780,000, while some technological programs earn $1,080,000, and some professional technical programs earn $1,040,000.

B.1.4 Treatment arms: generic, gain-framed, range presentation

Spanish (randomized middle content):

> Sabías qué algunos universitarios ganan $1280000, mientras otros ganan $2650000. Algunos técnicos profesionales ganan $800000, mientras otros ganan $1040000. Algunos tecnólogos ganan $850000, mientras otros ganan $1520000.

English:

> Did you know that some university graduates earn $1,280,000 while others earn $2,650,000. Some professional technicians earn $800,000 while others earn $1,040,000. Some technologists earn $850,000 while others earn $1,520,000.

B.1.5 Treatment arms: generic, loss-framed, range presentation

Spanish:

> Si NO adelantas estudios de educación universitaria tus ingresos podrían ser inferiores entre $540000 y $1920000 respecto a los que tendrías si asistieras a la universidad. Asimismo, si NO adelantas programas de educación tecnológica tus ingresos serían inferiores entre $110000 y $780000. Mientras que si NO estudias programas de técnica profesional perderías entre $60000 y $300000.

English:

> If you do NOT pursue university studies, your income could be between $540,000 and $1,920,000 lower than what you would have if you attended university. Likewise, if you do NOT pursue technological education programs, your income would be between $110,000 and $780,000 lower. And if you do NOT study professional technical programs, you would lose between $60,000 and $300,000.

B.1.6 Treatment arms: personalized, loss-framed, average presentation

Spanish:

> Si NO adelantas estudios universitarios en el departamento de BOGOTÁ D.C. tus ingresos podrían ser inferiores en promedio $1570000, comparado con el ingreso de universitarios que tuvieron un rendimiento similar al tuyo en las pruebas SABER 11. Mientras que respecto a Tecnólogos esta pérdida sería de $770000, y respecto a los Técnicos profesionales perderías $520000.

English:

> If you do NOT pursue university studies in the department of BOGOTÁ D.C., your income could be on average $1,570,000 lower, compared with the income of university graduates who had a performance similar to yours on the SABER 11 tests. With respect to technologists this loss would be $770,000, and with respect to professional technicians you would lose $520,000.

Note that the personalized variants conditioned on two student attributes at once: the student's own department, and the earnings of graduates with *similar Saber 11 performance*. Gain-framed variants presented the same magnitudes as gains from studying rather than losses from not studying.

B.1.7 Link and email offer (all treatment arms)

Spanish:

> Para mayor información sobre las oportunidades que tienes en educación superior da click en el siguiente link: `www.banrep.gov.co`
>
> Si lo deseas puedes recibir esta información en tu correo electrónico. *[Campo: Correo electrónico]* *Cancelar* *Aceptar*

English:

> For more information about the opportunities you have in higher education, click the following link: `www.banrep.gov.co`
>
> If you wish, you can receive this information in your email. *[Field: Email address]* *Cancel* *Accept*

Messages carried the attribution line *"Fuente: Ministerio de Educación Nacional — Cálculos: Banco de la República"* ("Source: Ministry of National Education — Calculations: Banco de la República").

B.2 Platform Screenshots

The screens below were captured on the live ICFES platform on 14 November 2017. Browser chrome and the surrounding desktop are cropped; English glosses are ours, and the one student email address visible in the captures is painted out before the image is written. Nothing else has been altered. The destination portal these screens linked to is shown in the main text (Figure 5).

Figure B1: Two treatment pop-ups as displayed, and an encouragement-only screen of unidentified provenance

Encouragement only, no link No arm record

Header: «Ten en cuenta que...» — no statistics, no link, no email field, a single «Cerrar» button.

Matches no record in the implementation file, which defines the control (Tipo 0) as no pop-up at all; its provenance is unidentified. The control saw no link, so its click-through is zero by construction.

Nationwide × loss × range Arm 5

«Si NO adelantas estudios de educación universitaria tus ingresos podrían ser inferiores entre $540000 y $1920000... Si NO adelantas programas de educación tecnológica... entre $110000 y $780000... técnica profesional... entre $60000 y $300000.»

Ranges rather than averages, framed as income foregone, and covering all three degree levels.

Personalized × loss × average Arm 7

«Si NO adelantas estudios universitarios en el departamento de BOGOTÁ D.C. tus ingresos podrían ser inferiores en promedio $1570000, comparado con el ingreso de universitarios que tuvieron un rendimiento similar al tuyo en las pruebas SABER 11...»

Personalization conditioned on two attributes at once: the student's own department and graduates in the student's own score band.

Notes: Every treated arm carried the same encouragement, link, and email field; arms 2–9 added the randomized statistical block. The left screen—encouragement text with a single *Cerrar* button and no link—matches no record in the implementation file, which defines the control (`Tipo` 0, *"Sin mensaje"*) as no pop-up at all; its provenance is unidentified (Section B.1). The control group therefore saw nothing, and its click-through is zero by construction. Texts are transcribed verbatim, with ellipses marking omitted clauses; the English translations are in Section B.1 above. The gain-framed counterparts presented the same magnitudes as gains from studying rather than losses from not studying. At the foot of every treatment pop-up: *Fuente: Ministerio de Educación Nacional — Cálculos: Banco de la República.*

B.3 Portal-Side Server Logs

Two Banco de la República server logs record behavior after the click, independently of the ICFES estimation sample: an arrivals log (136,992 events, 79,166 unique students, 11–24 November 2017) and a within-portal log recording 56,493 document openings by 31,499 students, with the URL in each case.

Of the 31,499 students who opened anything, 75.7% opened the departmental earnings annex, 26.8% the *Ser Pilo Paga* scholarship page, 15.8% career-orientation tools, 14.7% *ICETEX* student credit, and 11.1% Medellín municipal aid programs (shares exceed 100 because students opened several). Among them the mean was 1.79 openings, the median 1, and the maximum 28.

Merging arrivals to the ICFES delivery file matches 95.2% of within-portal clickers to an arm (Table B3). The arrival column reproduces the main-text ranking from a separate source—plain invitation first, gain above loss throughout, personalized above nationwide within frame—shifted up about three percentage points because the denominator is the narrower 24 November delivery. The depth column shows the plain invitation's advantage is not bought with shallower attention: its arrivals opened documents at 46.4%, at the top of the range, while every loss-framed arm falls at or below it. These are unadjusted shares from a window that does not coincide with the estimation sample, and the control is

absent because control students generated no display record; they corroborate the main results without substituting for them.

Table B3: Portal arrivals and within-portal search, by treatment arm (server logs, 11–24 November 2017)

Arm	Arrival rate (%)	Opened ≥1 doc. given arrival (%)
Plain invitation	24.0	46.4
Personalized · gain · average	22.2	46.4
Personalized · gain · range	20.3	47.6
Nationwide · gain · range	17.5	41.5
Nationwide · gain · average	16.9	42.2
Personalized · loss · average	16.6	41.5
Nationwide · loss · average	14.9	40.0
Personalized · loss · range	14.8	44.9
Nationwide · loss · range	14.1	36.6

Notes: Unadjusted shares from the Banco de la República server logs merged to the ICFES interim delivery file of 24 November 2017 (380,942 treated displays), not the estimation sample of 502,494. Arms carry 40,000–49,000 delivered students each. "Arrival" is a recorded visit to the portal landing page; the last column is the share of those arrivals opening any document linked from it. Arms are ordered by arrival rate; the control is absent by construction. Rates exceed the main-text click-through rates because the denominator is the delivered subset the log covers.

C Additional Results: 2017 Cohort

Composition, persistence, and switching. The search logic of the main text predicts that information which changes minds should appear first in program choice or persistence rather than in the extensive margin. We test this on the analysis subsample held outside ICFES (roughly 11% of the 2017 cohort), using the specification of equation (1) with the same controls and clustering. Conditional on enrolling (N = 27,819), neither the probability of short-cycle enrollment (control mean 39.3%) nor of university enrollment (66.2%) responds to any arm or arm group: every coefficient lies within 0.8 percentage points of zero, $p \geq 0.76$. Dropout through 2019 among immediate enrollers (N = 19,702; control mean 15.2%) and program switching among enrollers (control mean 23.1%) are equally flat, with coefficients within 0.8 and 0.5 points of zero respectively and $p \geq 0.49$. Minimum detectable effects are roughly 3 points for dropout and 7–9 points for composition, so these are informative nulls at the scale of the celebrated literature though not at the scale of the design-based bounds in Section 3; the full-sample estimates, which ICFES can produce from the deposited code, would tighten them roughly threefold. Conditioning on enrollment is defensible here precisely because the extensive margin is a tight null: treatment barely moves who is in the conditioning set.

Table C1: Comparing the 2017 and 2018 experimental cohorts

Characteristic	Cohort Mean		Difference	P-value
	Fall 2017	Spring 2018		
Panel A: Demographics				
Male	0.544	0.494	-0.050	0.000
Not working	0.673	0.774	0.101	0.000
Urban school	0.854	0.878	0.024	0.000
Panel B: Socioeconomic Status				
SES Quartile 4 (highest)	0.077	0.453	0.376	0.000
SES Quartile 1 (lowest)	0.134	0.020	-0.114	0.000
Parents - Academic (all levels)	0.170	0.570	0.400	0.000
Parents - Primary only	0.349	0.097	-0.252	0.000
Panel C: Test Performance				
Score Quartile 4 (highest)	0.232	0.558	0.326	0.000
Score Quartile 1 (lowest)	0.266	0.130	-0.136	0.000
Panel D: Assets and Consumption				
Has computer	0.596	0.883	0.287	0.000
Has automobile	0.221	0.663	0.442	0.000
Has videogame console	0.214	0.584	0.370	0.000
Often consume milk	0.293	0.550	0.257	0.000
Often consume meat	0.381	0.638	0.257	0.000
Panel E: Enrollment Outcomes				
Access to higher education	0.551	0.710	0.159	0.000
Access to university	0.361	0.630	0.269	0.000
Access to short-cycle	0.222	0.094	-0.128	0.000
Sample size	502,494	16,861		

Notes: This table compares baseline characteristics and outcomes between the fall 2017 cohort (Experiment 1) and spring 2018 cohort (Experiment 2). P-values are from t-tests of differences in means. The compositional differences reflect institutional features of Colombia's education system (public and private schools follow different academic calendars) rather than selection into the experiments.

Table C2: Treatment divisions: mapping of 2017 arms to grouped indicators

No.	Type of message	Labels	First division groups	Labels	Second division groups	Labels	Third division groups
0	Control group						
1	Generic	-	Generic	-	Generic	-	Generic
2	Nationwide Levels Gain	Gain		Gain		Gain	
3	Nationwide Levels Loss	Loss	Gain	Loss	Nationwide	Loss	Levels
4	Nationwide Range Gain	R-Gain		R-Gain		R-Gain	
5	Nationwide Range Loss	R-Loss		R-Loss		R-Loss	
6	Statewide Levels Gain	P-Gain		P-Gain		P-Gain	
7	Statewide Levels Loss	P-Loss	Loss	P-Loss	Statewide	P-Loss	Range
8	Statewide Range Gain	P-R-Gain		P-R-Gain		P-R-Gain	
9	Statewide Range Loss	P-R-Loss		P-R-Loss		P-R-Loss	

Notes: The colors specify which treatment arms under Labels correspond to each division to the right.

Table C3: Behavioral take-up rates for the 2017 cohort

	Clicked on link			Clicked on link and provided email		
		Difference			Difference	
	(1) Take-up rate	(2) Percentage Points	(3) P-value	(4) Take-up rate	(5) Percentage Points	(6) P-value
Entire sample	0.152			0.086		
Student's Information						
Female	0.146			0.082		
Male	0.158	0.012	0.000	0.090	0.008	0.000
Score Q1	0.064			0.031		
Score Q2	0.111	0.047	0.000	0.059	0.028	0.000
Score Q3	0.166	0.101	0.000	0.094	0.062	0.000
Score Q4	0.281	0.217	0.000	0.169	0.137	0.000
Probability Q1	0.063			0.033		
Probability Q2	0.113	0.050	0.000	0.064	0.031	0.000
Probability Q3	0.172	0.109	0.000	0.099	0.066	0.000
Probability Q4	0.276	0.213	0.000	0.158	0.125	0.000
Family Information						
Parents without higher education	0.121			0.071		
Parents with higher education	0.212	0.091	0.000	0.116	0.044	0.000
Household Information						
No internet	0.094			0.055		
Internet	0.196	0.102	0.000	0.110	0.056	0.000
No PC	0.100			0.057		
PC	0.186	0.086	0.000	0.105	0.049	0.000
Low income	0.150			0.088		
High income	0.226	0.076	0.000	0.095	0.007	0.011
Geographic Information						
Other Cities	0.111			0.064		
23 Major Cities	0.188	0.077	0.000	0.106	0.042	0.000
Rural	0.076			0.042		
Urban	0.165	0.089	0.000	0.093	0.052	0.000

Table C4: Engagement effects: nationwide versus statewide information (2017)

	Clicked on link			Clicked on link and provided email		
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	All	Male	Female	All	Male	Female
Salient	0.209***	0.217***	0.201***	0.137***	0.143***	0.132***
	(0.012)	(0.012)	(0.011)	(0.009)	(0.009)	(0.008)
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Nationwide college premium	0.139***	0.143***	0.135***	0.072***	0.076***	0.069***
	(0.008)	(0.008)	(0.008)	(0.004)	(0.005)	(0.004)
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Statewide college premium	0.159***	0.164***	0.155***	0.090***	0.092***	0.087***
	(0.009)	(0.009)	(0.008)	(0.005)	(0.005)	(0.004)
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Ho: Salient=Nationwide	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ho: Salient=Statewide	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ho: Nationwide=Statewide	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	502,494	229,179	273,315	502,494	229,179	273,315
R-squared	0.075	0.075	0.074	0.048	0.049	0.047
Controls' Mean	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Clustered standard errors in parentheses. Numbers in brackets are p-values. The ones below the standard errors are after correcting for multiple testing. *** p<0.01, ** p<0.05, * p<0.1

Table C5: Engagement effects: range versus levels presentation (2017)

	Clicked on link			Clicked on link and provided email		
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	All	Male	Female	All	Male	Female
Salient	0.209***	0.217***	0.201***	0.137***	0.143***	0.132***
	(0.012)	(0.012)	(0.011)	(0.009)	(0.009)	(0.008)
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
P 90-10 college premium	0.145***	0.149***	0.141***	0.078***	0.081***	0.076***
	(0.008)	(0.008)	(0.008)	(0.005)	(0.005)	(0.004)
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Average college premium	0.153***	0.158***	0.149***	0.083***	0.087***	0.080***
	(0.008)	(0.009)	(0.008)	(0.005)	(0.005)	(0.004)
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Ho: Salient=P 90-10	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ho: Salient=Average	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ho: Average=P 90-10	[0.086]	[0.089]	[0.096]	[0.119]	[0.064]	[0.223]
Observations	502,494	229,179	273,315	502,494	229,179	273,315
R-squared	0.074	0.075	0.074	0.048	0.049	0.046
Controls' Mean	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Clustered standard errors in parentheses. Numbers in brackets are p-values. The ones below the standard errors are after correcting for multiple testing. *** p<0.01, ** p<0.05, * p<0.1

Table C6: Access to higher education: nationwide versus statewide information (2017)

	Access to higher education through 2019			Access to university through 2019			Access to short-cycle through 2019		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treatment	All	Male	Female	All	Male	Female	All	Male	Female
Salient	0.001	0.003	-0.001	-0.002	0.003	-0.006	0.002	-0.003	0.006
	(0.013)	(0.012)	(0.015)	(0.020)	(0.021)	(0.019)	(0.017)	(0.017)	(0.019)
	[0.939]	[0.803]	[0.947]	[0.920]	[0.886]	[0.752]	[0.906]	[0.860]	[0.752]
Nationwide college premium	-0.002	-0.002	-0.003	-0.009	-0.006	-0.011	0.007	0.004	0.009
	(0.010)	(0.010)	(0.011)	(0.016)	(0.017)	(0.015)	(0.014)	(0.013)	(0.015)
	[0.841]	[0.841]	[0.785]	[0.574]	[0.724]	[0.463]	[0.617]	[0.758]	[0.549]
Statewide college premium	-0.004	-0.005	-0.002	-0.010	-0.007	-0.012	0.006	0.001	0.010
	(0.010)	(0.010)	(0.011)	(0.015)	(0.016)	(0.014)	(0.013)	(0.013)	(0.014)
	[0.689]	[0.617]	[0.856]	[0.505]	[0.662]	[0.391]	[0.644]	[0.939]	[0.475]
Ho: Salient=Nationwide	[0.767]	[0.615]	[0.876]	[0.662]	[0.588]	[0.741]	[0.725]	[0.649]	[0.806]
Ho: Salient=Statewide	[0.645]	[0.353]	[0.891]	[0.599]	[0.511]	[0.704]	[0.759]	[0.759]	[0.778]
Ho: Nationwide=Statewide	[0.796]	[0.534]	[0.967]	[0.912]	[0.883]	[0.956]	[0.915]	[0.770]	[0.965]
Observations	502,494	229,179	273,315	502,494	229,179	273,315	502,494	229,179	273,315
R-squared	0.243	0.241	0.245	0.301	0.297	0.306	0.034	0.035	0.030
Controls' Mean	0.567	0.578	0.558	0.385	0.378	0.392	0.214	0.237	0.196

Notes: Standard errors, clustered at the message-by-department cell, in parentheses. P-values in brackets are computed directly from the reported coefficients and standard errors; no estimate approaches statistical significance before or after any multiple-testing adjustment. P-values in the *Ho* rows are from tests of equality of the indicated coefficients in the estimation output. *** p<0.01, ** p<0.05, * p<0.1

Table C7: Access to higher education: range versus levels presentation (2017)

	Access to higher education through 2019			Access to university through 2019			Access to short-cycle through 2019		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treatment	All	Male	Female	All	Male	Female	All	Male	Female
Salient	0.001	0.003	-0.001	-0.002	0.003	-0.006	0.002	-0.003	0.006
	(0.013)	(0.012)	(0.015)	(0.020)	(0.021)	(0.019)	(0.017)	(0.017)	(0.019)
	[0.939]	[0.803]	[0.947]	[0.920]	[0.886]	[0.752]	[0.906]	[0.860]	[0.752]
P 90-10 college premium	-0.004	-0.005	-0.004	-0.010	-0.007	-0.013	0.006	0.001	0.010
	(0.010)	(0.010)	(0.011)	(0.015)	(0.017)	(0.015)	(0.013)	(0.013)	(0.014)
	[0.689]	[0.617]	[0.716]	[0.505]	[0.681]	[0.386]	[0.644]	[0.939]	[0.475]
Average college premium	-0.001	-0.002	-0.001	-0.008	-0.006	-0.009	0.007	0.004	0.009
	(0.010)	(0.010)	(0.011)	(0.015)	(0.017)	(0.015)	(0.013)	(0.013)	(0.014)
	[0.920]	[0.841]	[0.928]	[0.594]	[0.724]	[0.549]	[0.590]	[0.758]	[0.520]
Ho: Salient=P 90-10	[0.760]	[0.609]	[0.872]	[0.749]	[0.711]	[0.772]	[0.852]	[0.852]	[0.865]
Ho: Salient=Average	[0.903]	[0.749]	[1.000]	[0.810]	[0.739]	[0.901]	[0.815]	[0.744]	[0.899]
Ho: Average=P 90-10	[0.832]	[0.832]	[0.847]	[0.925]	[0.967]	[0.850]	[0.957]	[0.870]	[0.960]
Observations	502,494	229,179	273,315	502,494	229,179	273,315	502,494	229,179	273,315
R-squared	0.243	0.241	0.245	0.301	0.297	0.307	0.034	0.035	0.030
Controls' Mean	0.567	0.578	0.558	0.385	0.378	0.392	0.214	0.237	0.196

Notes: Standard errors, clustered at the message-by-department cell, in parentheses. P-values in brackets are computed directly from the reported coefficients and standard errors; no estimate approaches statistical significance before or after any multiple-testing adjustment. P-values in the *Ho* rows are computed from the reported coefficients and standard errors treating the estimates as independent, which is conservative given the shared control group. *** p<0.01, ** p<0.05, * p<0.1

Table C8: Engagement regressions: plain invitation versus gain- and loss-framed variants (2017; underlying Figure 3, top panel)

	Clicked on link			Clicked on link and provided email		
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	All	Male	Female	All	Male	Female
Salient	0.209***	0.217***	0.201***	0.137***	0.143***	0.132***
	(0.012)	(0.012)	(0.011)	(0.009)	(0.009)	(0.008)
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
College premium framed as gain	0.167***	0.173***	0.162***	0.091***	0.096***	0.088***
	(0.008)	(0.008)	(0.008)	(0.005)	(0.005)	(0.004)
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
College premium framed as loss	0.131***	0.135***	0.129***	0.071***	0.073***	0.068***
	(0.008)	(0.008)	(0.008)	(0.004)	(0.004)	(0.004)
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Ho: Salient=Gain	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ho: Salient=Loss	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ho: Gain=Loss	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	502,494	229,179	273,315	502,494	229,179	273,315
R-squared	0.076	0.077	0.076	0.049	0.050	0.047
Controls' Mean	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Clustered standard errors in parentheses. Numbers in brackets are p-values. The ones below the standard errors are after correcting for multiple testing. *** p<0.01, ** p<0.05, * p<0.1

Table C9: Access to higher education: salient message versus gain- and loss-framed information (2017; full coefficients underlying Figure 4)

	Access to higher education through 2019			Access to university through 2019			Access to short-cycle through 2019		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treatment	All	Male	Female	All	Male	Female	All	Male	Female
Salient	0.001	0.003	-0.001	-0.002	0.003	-0.006	0.002	-0.003	0.006
	(0.013)	(0.012)	(0.015)	(0.020)	(0.021)	(0.019)	(0.017)	(0.017)	(0.019)
	[0.939]	[0.803]	[0.947]	[0.920]	[0.886]	[0.752]	[0.906]	[0.860]	[0.752]
College premium framed as gain	-0.004	-0.005	-0.003	-0.010	-0.009	-0.011	0.006	0.002	0.009
	(0.010)	(0.010)	(0.011)	(0.015)	(0.017)	(0.015)	(0.013)	(0.013)	(0.015)
	[0.689]	[0.617]	[0.785]	[0.505]	[0.597]	[0.463]	[0.644]	[0.878]	[0.549]
College premium framed as loss	-0.002	-0.001	-0.002	-0.008	-0.004	-0.011	0.007	0.003	0.010
	(0.010)	(0.010)	(0.011)	(0.015)	(0.017)	(0.015)	(0.013)	(0.013)	(0.014)
	[0.841]	[0.920]	[0.856]	[0.594]	[0.814]	[0.463]	[0.590]	[0.817]	[0.475]
Ho: Salient=Gain	[0.611]	[0.353]	[0.828]	[0.579]	[0.453]	[0.719]	[0.767]	[0.728]	[0.816]
Ho: Salient=Loss	[0.805]	[0.619]	[0.941]	[0.684]	[0.655]	[0.728]	[0.716]	[0.677]	[0.768]
Ho: Gain=Loss	[0.650]	[0.499]	[0.798]	[0.795]	[0.612]	[0.981]	[0.912]	[0.913]	[0.915]
Observations	502,494	229,179	273,315	502,494	229,179	273,315	502,494	229,179	273,315
R-squared	0.243	0.241	0.245	0.301	0.297	0.306	0.034	0.035	0.030
Controls' Mean	0.567	0.578	0.558	0.385	0.378	0.392	0.214	0.237	0.196

Notes: Standard errors, clustered at the message-by-department cell, in parentheses. P-values in brackets are computed directly from the reported coefficients and standard errors; no estimate approaches statistical significance before or after any multiple-testing adjustment. P-values in the *Ho* rows are from tests of equality of the indicated coefficients in the estimation output. *** p<0.01, ** p<0.05, * p<0.1

D Additional Results: 2018 Cohort

Table D1: Behavioral take-up rates for the 2018 cohort

	Clicked on link		
		Difference	
	(1) Take-up rate	(2) Percentage Points	(3) P-value
Entire sample	0.246		
Student's Information			
Female	0.257		
Male	0.235	-0.023	0.006
Score Q1	0.150		
Score Q2	0.229	0.079	0.000
Score Q3	0.234	0.085	0.000
Score Q4	0.278	0.128	0.000
Probability Q1	0.176		
Probability Q2	0.217	0.041	0.004
Probability Q3	0.257	0.081	0.000
Probability Q4	0.282	0.106	0.000
Family Information			
Parents without higher education	0.210		
Parents with higher education	0.262	0.052	0.000
Household Information			
No internet	0.160		
Internet	0.256	0.096	0.000
No PC	0.186		
PC	0.253	0.067	0.000
Low income	0.225		
High income	0.271	0.046	0.000
Geographic Information			
Other Cities	0.228		
23 Major Cities	0.250	0.022	0.043
Rural	0.263		
Urban	0.244	-0.019	0.129

Table D2: Engagement effects by treatment arm (2018; underlying Figure 3, bottom panel)

	Clicked on link		
	(1)	(2)	(3)
Treatment	All	Male	Female
Short without encour. (SnE)	0.248***	0.256***	0.240***
	(0.008)	(0.012)	(0.012)
	[0.001]	[0.001]	[0.001]
Long without encour. (LnE)	0.268***	0.244***	0.296***
	(0.010)	(0.013)	(0.015)
	[0.001]	[0.001]	[0.001]
Short with encour. (SE)	0.251***	0.252***	0.251***
	(0.008)	(0.012)	(0.012)
	[0.001]	[0.001]	[0.001]
Long with encour. framed as gain (LEgain)	0.240***	0.210***	0.270***
	(0.010)	(0.013)	(0.015)
	[0.001]	[0.001]	[0.001]
Long with encour. framed as loss (LEloss)	0.236***	0.216***	0.256***
	(0.010)	(0.013)	(0.014)
	[0.001]	[0.001]	[0.001]
Ho: SnE=LnE	[0.120]	[0.495]	[0.003]
Ho: SnE=SE	[0.812]	[0.789]	[0.519]
Ho: SnE=LEgain	[0.490]	[0.008]	[0.106]
Ho: SnE=LEloss	[0.328]	[0.022]	[0.393]
Ho: LnE=SE	[0.180]	[0.667]	[0.017]
Ho: LnE=LEgain	[0.037]	[0.065]	[0.223]
Ho: LnE=LEloss	[0.019]	[0.132]	[0.052]
Ho: SE=LEgain	[0.364]	[0.016]	[0.291]
Ho: SE=LEloss	[0.232]	[0.043]	[0.779]
Ho: LEgain=LEloss	[0.787]	[0.751]	[0.473]
Observations	16,861	8,526	8,335
R-squared	0.076	0.077	0.076
Controls' Mean	0.000	0.000	0.000

Notes: Robust standard errors in parentheses. Numbers in brackets are p-values. The ones below the standard errors are after correcting for multiple testing. *** p<0.01, ** p<0.05, * p<0.1

Table D3: Access to higher education (2018; full coefficients underlying Figure 4)

	Access to higher education through 2019			Access to university through 2019			Access to short-cycle through 2019		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treatment	All	Male	Female	All	Male	Female	All	Male	Female
Short without encour. (SnE)	0.003	-0.005	0.013	-0.002	-0.003	0.001	0.007	0.000	0.013
	(0.009)	(0.013)	(0.013)	(0.009)	(0.013)	(0.013)	(0.006)	(0.010)	(0.008)
	[1.000]	[1.000]	[0.998]	[1.000]	[1.000]	[1.000]	[0.996]	[1.000]	[0.941]
Long without encour. (LnE)	0.006	-0.002	0.015	-0.015	-0.026*	-0.002	0.028***	0.040***	0.015
	(0.011)	(0.016)	(0.015)	(0.011)	(0.015)	(0.015)	(0.008)	(0.012)	(0.010)
	[1.000]	[1.000]	[0.998]	[0.969]	[0.895]	[1.000]	[0.026]	[0.061]	[0.966]
Short with encour. (SE)	-0.006	-0.013	0.003	-0.003	0.001	-0.006	-0.002	-0.011	0.006
	(0.009)	(0.013)	(0.013)	(0.009)	(0.013)	(0.013)	(0.006)	(0.009)	(0.008)
	[1.000]	[0.998]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]	[0.993]	[1.000]
Long with encour. framed as gain (LEgain)	0.003	-0.012	0.019	-0.008	-0.020	0.006	0.013	0.015	0.009
	(0.011)	(0.015)	(0.015)	(0.011)	(0.015)	(0.015)	(0.008)	(0.012)	(0.010)
	[1.000]	[1.000]	[0.993]	[1.000]	[0.986]	[1.000]	[0.934]	[0.986]	[0.998]
Long with encour. framed as loss (LEloss)	0.007	0.018	-0.003	-0.006	-0.008	-0.005	0.013*	0.025**	0.001
	(0.011)	(0.015)	(0.015)	(0.011)	(0.015)	(0.015)	(0.008)	(0.012)	(0.010)
	[1.000]	[0.993]	[1.000]	[1.000]	[1.000]	[1.000]	[0.916]	[0.634]	[1.000]
Ho: SnE=LnE	[0.819]	[0.851]	[0.910]	[0.266]	[0.169]	[0.856]	[0.016]	[0.004]	[0.886]
Ho: SnE=SE	[0.414]	[0.589]	[0.522]	[0.906]	[0.802]	[0.661]	[0.227]	[0.308]	[0.480]
Ho: SnE=LEgain	[0.992]	[0.703]	[0.717]	[0.631]	[0.313]	[0.766]	[0.510]	[0.238]	[0.751]
Ho: SnE=LEloss	[0.740]	[0.185]	[0.370]	[0.708]	[0.755]	[0.732]	[0.482]	[0.058]	[0.292]
Ho: LnE=SE	[0.336]	[0.503]	[0.489]	[0.314]	[0.110]	[0.835]	[0.001]	[0.000]	[0.449]
Ho: LnE=LEgain	[0.826]	[0.602]	[0.817]	[0.559]	[0.730]	[0.662]	[0.116]	[0.109]	[0.678]
Ho: LnE=LEloss	[0.927]	[0.303]	[0.352]	[0.497]	[0.331]	[0.885]	[0.118]	[0.336]	[0.280]
Ho: SE=LEgain	[0.468]	[0.914]	[0.349]	[0.708]	[0.217]	[0.490]	[0.089]	[0.039]	[0.778]
Ho: SE=LEloss	[0.284]	[0.070]	[0.749]	[0.788]	[0.591]	[0.958]	[0.078]	[0.005]	[0.655]
Ho: LEgain=LEloss	[0.754]	[0.116]	[0.249]	[0.924]	[0.527]	[0.558]	[0.976]	[0.516]	[0.520]
Observations	16,861	8,526	8,335	16,861	8,526	8,335	16,861	8,526	8,335
R-squared	0.199	0.178	0.224	0.294	0.296	0.297	0.075	0.090	0.055
Controls' Mean	0.719	0.731	0.707	0.649	0.641	0.656	0.083	0.103	0.064

Notes: Robust standard errors in parentheses. Numbers in brackets are p-values adjusted for multiple testing.
*** p<0.01, ** p<0.05, * p<0.1

E Covariate Balance

Given random assignment on the platform, baseline characteristics should be similar across treatment arms. The figures in this section report balance tests for each cohort, estimated covariate-by-covariate and with seemingly unrelated regressions (SUR).

(a) Covariate-by-covariate

(b) Seemingly unrelated regressions

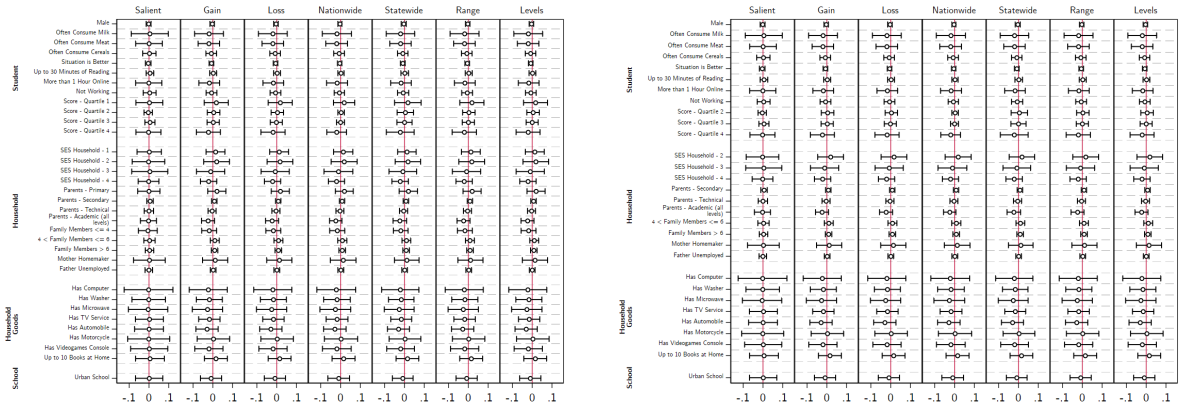


Figure E1: Covariate balance for the 2017 cohort

(a) Covariate-by-covariate

(b) Seemingly unrelated regressions

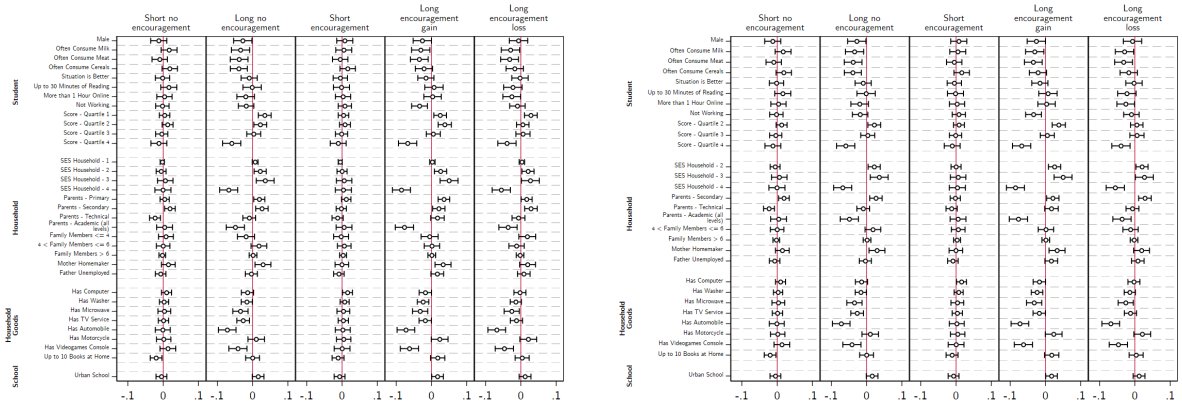


Figure E2: Covariate balance for the 2018 cohort

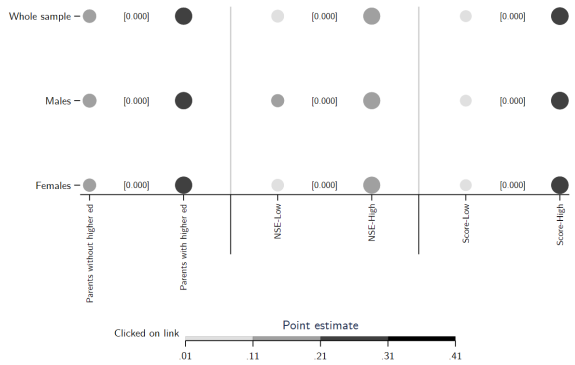
F Heterogeneous Effects

Socioeconomic level comes from ICFES's INSE index, estimated by item response theory from parental education, occupation, and household income, and grouped into four levels. The figures in this section plot treatment effects on engagement and enrollment outcomes by subgroup (socioeconomic level, test-score quartile, gender, parental education, and geography) for each cohort.

F.1 2017 cohort

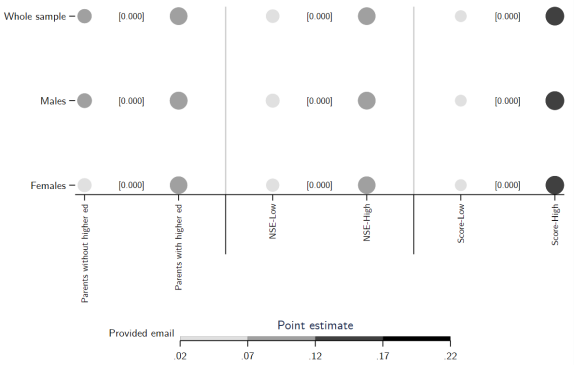
F.2 2018 cohort

(a) Clicked on link



Note: Numbers in squared brackets are the p-values denoting whether the interaction coefficient in the category is statistically significant.

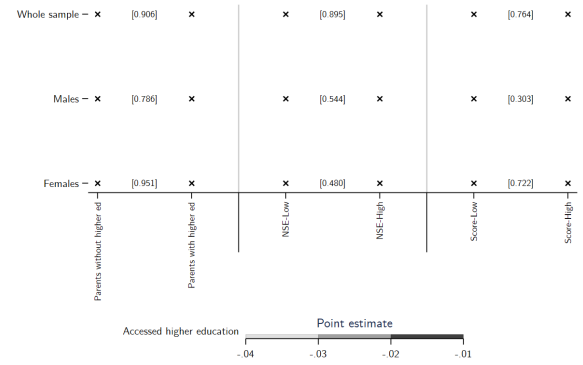
(b) Clicked and provided email



Note: Numbers in squared brackets are the p-values denoting whether the interaction coefficient in the category is statistically significant.

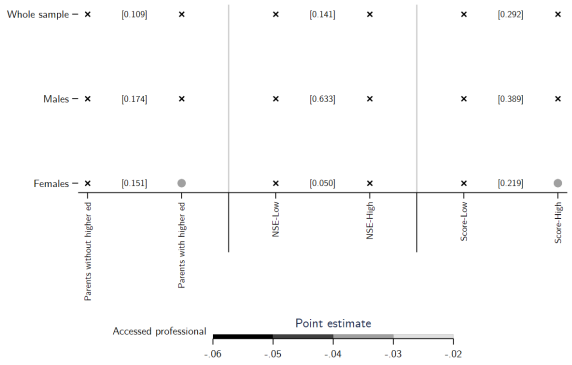
Figure F1: Engagement by subgroup (2017)

(a) Accessed higher education



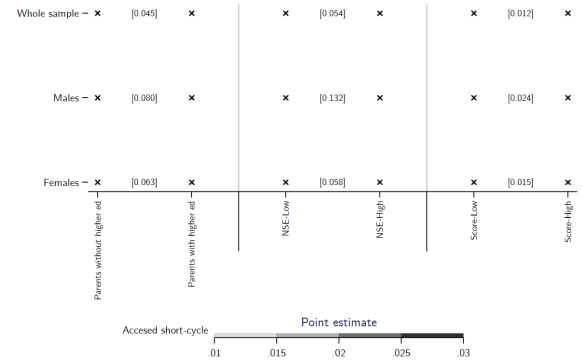
Note: Numbers in squared brackets are the p-values denoting whether the interaction coefficient in the category is statistically significant.

(b) Accessed university



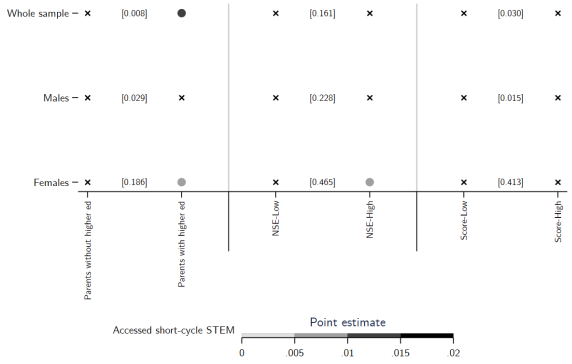
Note: Numbers in squared brackets are the p-values denoting whether the interaction coefficient in the category is statistically significant.

(c) Accessed short-cycle



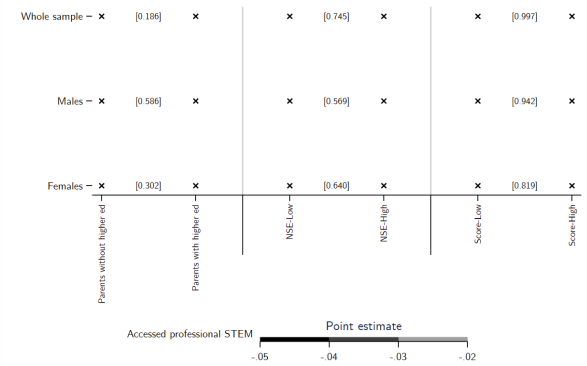
Note: Numbers in squared brackets are the p-values denoting whether the interaction coefficient in the category is statistically significant.

(d) Accessed short-cycle STEM



Note: Numbers in squared brackets are the p-values denoting whether the interaction coefficient in the category is statistically significant.

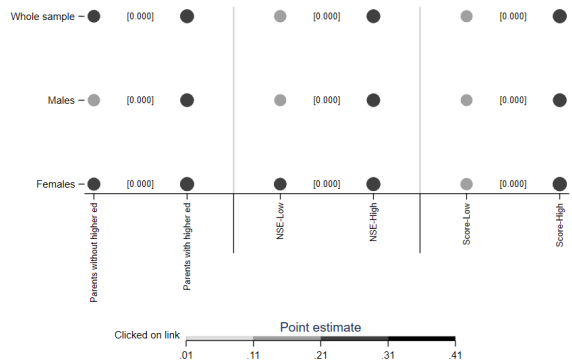
(e) Accessed university STEM



Note: Numbers in squared brackets are the p-values denoting whether the interaction coefficient in the category is statistically significant.

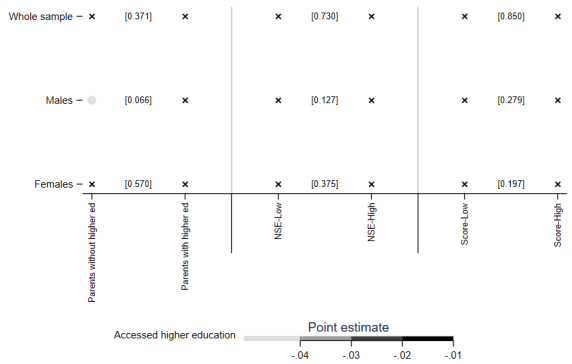
Figure F2: Enrollment outcomes by subgroup (2017)

(a) Clicked on link



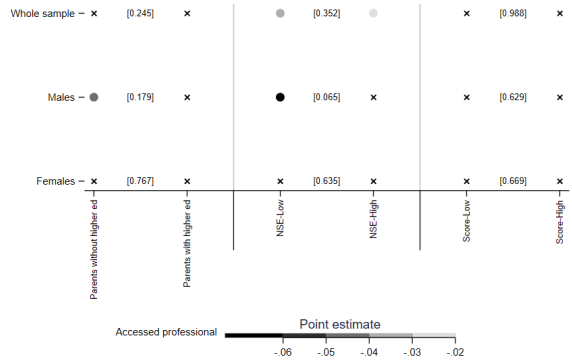
Note: Numbers in squared brackets are the p-values denoting whether the interaction coefficient in the category is statistically significant.

(b) Accessed higher education



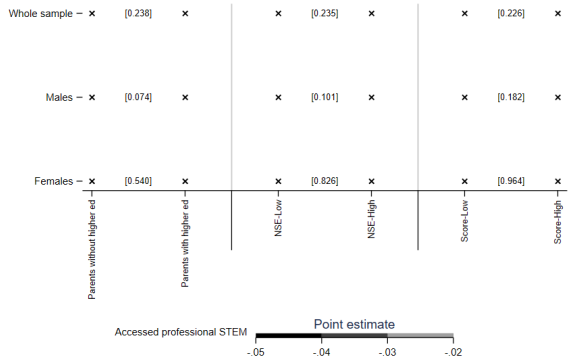
Note: Numbers in squared brackets are the p-values denoting whether the interaction coefficient in the category is statistically significant.

(c) Accessed university



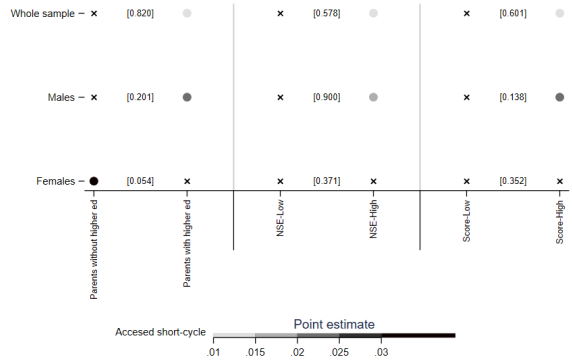
Note: Numbers in squared brackets are the p-values denoting whether the interaction coefficient in the category is statistically significant.

(d) Accessed university STEM



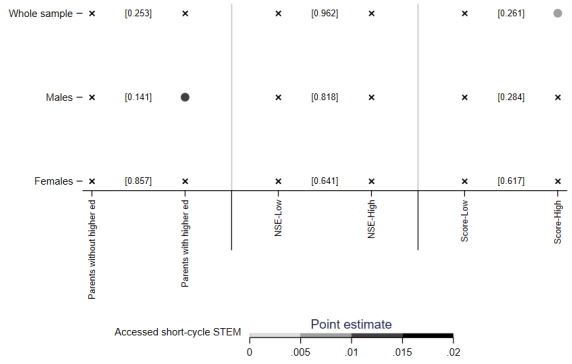
Note: Numbers in squared brackets are the p-values denoting whether the interaction coefficient in the category is statistically significant.

(e) Accessed short-cycle



Note: Numbers in squared brackets are the p-values denoting whether the interaction coefficient in the category is statistically significant.

(f) Accessed short-cycle STEM



Note: Numbers in squared brackets are the p-values denoting whether the interaction coefficient in the category is statistically significant.

Figure F3: Engagement and enrollment outcomes by subgroup (2018)

G Cost Accounting Detail

Fixed costs (one-time). Development of the informational website with program data, earnings statistics, and financial-aid information; programming of the pop-up randomization system and its integration with the ICFES website; assembly of earnings data and calculation of returns by program and region; and IRB approval and study protocols. Total setup: approximately $100,000.

Marginal costs (annual). Once built, operating the pop-up system—delivery, randomization, click tracking, and outcome measurement, all automated on existing infrastructure—costs less than $25,000 per year, or roughly $0.05 per student reached.

Cost per student and comparison to alternatives. Combined across both experiments, the all-in cost (setup plus operation) was roughly $125,000 for 519,355 randomized students, or about $0.25 per student. For comparison, the mailed intervention closest to ours in purpose—the ECO packets of Hoxby and Turner (2013), which mailed application and net-price information to high-achieving low-income students—cost roughly $6 per student in materials and postage. Delivering packets at that unit cost to the 500,000 students of a single Colombian cohort would run to roughly $3,000,000, more than twenty times the all-in cost of both experiments combined. We do not attempt a per-student cost for in-person counseling, which varies too widely across settings to anchor with a single figure.

Illustrative cost-effectiveness (2018). The "long without encouragement" arm increased short-cycle enrollment by 2.8 percentage points overall, driven by male students (+4.0 percentage points). The arm held 11.3% of the experiment's 16,861 students—roughly 1,900, of whom about half (950) were male; the male-specific effect therefore implies roughly 38 additional students enrolled in technical programs. Charging this arm its share of annual operating costs (11.3% of the $25,000 figure above, about $2,800) gives about $75 per additional student enrolled. Colombian technical degrees raise earnings by approximately 15–20% over a career (Camacho, Messina, & Uribe, 2017); even attributing only half the enrollment effect to truly additional enrollment, the implied benefit-cost ratio is very large. These calculations are illustrative: the 2018 effects are suggestive, we measure enrollment rather than completion, and the effects appear only in the more advantaged spring cohort.

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