

1 Project ICFES: Evidence from a referral field experiment* 1

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4 **Abstract** 4

5 Lorem Ipsum ([Beaman, Keleher, & Magruder, 2018](#)) 5

6 **JEL Classification:** C93, D03, D83, J24 6

7 **Keywords:** productivity beliefs, referrals, field experiment, skill identification, social
8 class 7 8

*We obtained Institutional Review Board approvals from NYU Abu Dhabi (HRPP 2024-50) and the University of Luxembourg (ERP 24-028). The study design was preregistered in the OSF Registries prior to data collection (see <https://doi.org/10.17605/OSF.IO/V9T3W>).

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9 **1 Introduction**

9

10 **2 Background and Setting**

10

11 **3 Design**

11

12 **4 Results**

12

Table 1: Selection into the experiment

	Admin Data	Sample	p
Reading score (z-score)	0.000	0.264	0.000
Math score (z-score)	0.000	0.295	0.000
GPA (z-score)	0.000	0.156	0.000
Low-SES	0.343	0.410	0.000
Female	0.567	0.530	0.060
Age	21.154	20.651	0.000
Observations	4,417	734	5,151

Note: This table compares characteristics between the full administrative sample and the experimental sample. *p*-values for binary outcomes (Low-SES, Female) are from two-sample tests of proportions; for continuous variables, from two-sample *t*-tests with unequal variances. All reported *p*-values are two-tailed. GPA and test scores are standardized to have mean zero and standard deviation one in the administrative sample.

Table 2: Balance between treatments

	Baseline	Bonus	<i>p</i>
Reading score (z-score)	0.212	0.320	0.116
Math score (z-score)	0.285	0.307	0.753
GPA (z-score)	0.126	0.187	0.393
# connections	346.80	353.75	0.574
Tie strength	3.665	3.565	0.798
Low-SES	0.419	0.401	0.615
Female	0.529	0.531	0.947
Age	20.576	20.733	0.380
Observations	382	352	734

Note: This table presents balance tests between **Baseline** and **Bonus** conditions. *p*-values for binary outcomes are from two-sample tests of proportions; for continuous variables, from two-sample *t*-tests with unequal variances. All reported *p*-values are two-tailed. GPA and test scores are standardized to have mean zero and standard deviation one in the administrative sample. Tie strength refers to the number of classes taken together. # connections refers to the number of individuals in referrer choice sets, otherwise called the “network degree”. Low-SES is a binary variable indicating the share of participants in estrato 1 or 2.

Table 3: Summary statistics for referred and not referred

	Verbal		Math	
	Not Referred	Referred	Not Referred	Referred
Reading score (z-score)	0.165 (0.003)	0.547 (0.034)	0.164 (0.003)	0.501 (0.035)
Math score (z-score)	0.201 (0.002)	0.513 (0.035)	0.204 (0.002)	0.624 (0.036)
GPA (z-score)	-0.144 (0.003)	0.579 (0.038)	-0.151 (0.003)	0.580 (0.039)
Tie strength	3.163 (0.013)	14.467 (0.362)	3.161 (0.013)	13.822 (0.359)
Low-SES	0.334 (0.001)	0.374 (0.019)	0.338 (0.001)	0.384 (0.019)
Female	0.524 (0.001)	0.562 (0.019)	0.520 (0.001)	0.428 (0.019)
Age	20.945 (0.006)	20.501 (0.104)	20.961 (0.006)	20.490 (0.099)
Observations	128,174	673	127,481	669

Note: Standard errors in parentheses. All scores are standardized (z-scores). Tie strength measures the number of courses taken together. Low-SES indicates the share of participants in estrato 1 or 2. # connections represents the size of the choice set.

Table 4: Math Referrals by own SES and Treatment

	Baseline		Bonus	
	Choice Set	Nominated	Choice Set	Nominated
Low-SES	0.358	0.483	0.368	0.508
Middle-SES	0.527	0.595	0.517	0.527
High-SES	0.202	0.161	0.196	0.259
Observations	65,103	348	62,378	321

Table 5: Verbal Referrals by own SES and Treatment

	Baseline		Bonus	
	Choice Set	Nominated	Choice Set	Nominated
Low-SES	0.365	0.464	0.370	0.554
Middle-SES	0.527	0.570	0.513	0.512
High-SES	0.199	0.200	0.192	0.310
Observations	66,674	351	61,500	322

13 **5 Conclusion**

13

¹⁴ **References**

- ¹⁵ Beaman, L., Keleher, N., & Magruder, J. (2018). Do Job Networks Disadvantage ¹⁵
¹⁶ Women? Evidence from a Recruitment Experiment in Malawi. *Journal of Labor* ¹⁶
¹⁷ *Economics*, 36(1), 121–157. doi: 10.1086/693869 ¹⁷

¹⁸ **A Additional Figures and Tables**

¹⁸

¹⁹ **A.1 Additional Figures**

¹⁹

20 **B Experiment**

20

21 We include the English version of the instructions used in Qualtrics. Participants saw 21
22 the Spanish version. Horizontal lines in the text indicate page breaks and clarifying 22
23 comments are inside brackets. 23

24 **Consent**

24

25 You have been invited to participate in this decision-making study. This study is directed 25
26 by [omitted for anonymous review] and organized with the support of the Social Bee Lab 26
27 (Social Behavior and Experimental Economics Laboratory) at UNAB. 27

28 In this study, we will pay **one (1)** out of every **ten (10)** participants, who will be 28
29 randomly selected. Each selected person will receive a fixed payment of **70,000** (seventy 29
30 thousand pesos) for completing the study. Additionally, they can earn up to **270,000** 30
31 (two hundred and seventy thousand pesos), depending on their decisions. So, in total, 31
32 if you are selected to receive payment, you can earn up to **340,000** (three hundred and 32
33 forty thousand pesos) for completing this study. 33

34 If you are selected, you can claim your payment at any Banco de Bogotá office by 34
35 presenting your ID. Your participation in this study is voluntary and you can leave the 35
36 study at any time. If you withdraw before completing the study, you will not receive 36
37 any payment. 37

38 The estimated duration of this study is 20 minutes. 38

39 The purpose of this study is to understand how people make decisions. For this, we will 39
40 use administrative information from the university such as the SABER 11 test scores of 40
41 various students (including you). Your responses will not be shared with anyone and your 41
42 participation will not affect your academic records. To maintain strict confidentiality, the 42
43 research results will not be associated at any time with information that could personally 43

44 identify you. 44

45 There are no risks associated with your participation in this study beyond everyday risks. 45

46 However, if you wish to report any problems, you can contact Professor [omitted for 46

47 anonymous review]. For questions related to your rights as a research study participant, 47

48 you can contact the IRB office of [omitted for anonymous review]. 48

49 By selecting the option “I want to participate in the study” below, you give your con- 49

50 sent to participate in this study and allow us to compare your responses with some 50

51 administrative records from the university. 51

52 • I want to participate in the study [advances to next page] 52

53 • I do not want to participate in the study 53

54 —————— 54

55 Student Information 55

56 Please write your student code. In case you are enrolled in more than one program 56
57 simultaneously, write the code of the first program you entered: 57

58 [Student ID code] 58

59 What semester are you currently in? 59

60 [Slider ranging from 1 to 11] 60

61 —————— 61

62 [Random assignment to treatment or control] 62

63 **Instructions**

63

64 The instructions for this study are presented in the following video. Please watch it 64
65 carefully. We will explain your participation and how earnings are determined if you are 65
66 selected to receive payment. 66

67 [Treatment-specific instructions in video format] 67

68 If you want to read the text of the instructions narrated in the video, press the “Read 68
69 instruction text” button. Also know that in each question, there will be a button with 69
70 information that will remind you if that question has earnings and how it is calculated, 70
71 in case you have any doubts. 71

72 • I want to read the instructions text [text version below] 72

73

73

74 In this study, you will respond to three types of questions. First, are the belief questions. 74
75 For belief questions, we will use as reference the results of the SABER 11 test that you 75
76 and other students took to enter the university, focused on three areas of the exam: 76
77 mathematics, reading, and English. 77

78 For each area, we will take the scores of all university students and order them from 78
79 lowest to highest. We will then group them into 100 percentiles. The percentile is a 79
80 position measure that indicates the percentage of students with an exam score that is 80
81 above or below a value. 81

82 For example, if your score in mathematics is in the 20th percentile, it means that 20 82
83 percent of university students have a score lower than yours and the remaining 80 percent 83
84 have a higher score. A sample belief question is: “compared to university students, in 84
85 what percentile is your score for mathematics?” 85

86 If your answer is correct, you can earn 20 thousand pesos. We say your answer is correct 86

87 if the difference between the percentile you suggest and the actual percentile of your 87
88 score is not greater than 7 units. For example, if you have a score that is in the 33rd 88
89 percentile and you say it is in the 38th, the answer is correct because the difference is 89
90 less than 7. But if you answer that it is in the 41st, the difference is greater than 7 and 90
91 the answer is incorrect. 91

92 The second type of questions are recommendation questions and are also based on the 92
93 mathematics, reading, and English areas of the SABER 11 test. We will ask you to think 93
94 about the students with whom you have taken or are taking classes, to recommend from 94
95 among them the person you consider best at solving problems similar to those on the 95
96 SABER 11 test. 96

97 When you start typing the name of your recommended person, the computer will show 97
98 suggestions with the full name, program, and university entry year of different students. 98
99 Choose the person you want to recommend. If the name doesn't appear, check that you 99
100 are writing it correctly. Do not use accents and use 'n' instead of 'ñ'. If it still doesn't 100
101 appear, it may be because that person is not enrolled this semester or because they did 101
102 not take the SABER 11 test. In that case, recommend someone else. 102

103 You can earn up to 250,000 pesos for your recommendation. We will multiply your 103
104 recommended person's score by 100 pesos if they are in the first 50 percentiles. We will 104
105 multiply it by 500 pesos if your recommended person's score is between the 51st and 105
106 65th percentile. If it is between the 66th and 80th percentile, we will multiply your 106
107 recommended person's score by 1000 pesos. If the score is between the 81st and 90th 107
108 percentile, you earn 1500 pesos multiplied by your recommended person's score. And if 108
109 the score is between the 91st and 100th percentile, we will multiply your recommended 109
110 person's score by 2500 pesos to determine the earnings. 110

111 The third type of questions are information questions and focus on aspects of your 111
112 personal life or your relationship with the people you have recommended. 112

Earnings

Now we will explain who gets paid for participating and how the earnings for this study are assigned. The computer will randomly select one out of every 10 participants to pay for their responses. For selected individuals, the computer will randomly choose one of the three areas, and from that chosen area, it will pay for one of the belief questions.

Similarly, the computer will randomly select one of the three areas to pay for one of the recommendation questions.

Additionally, if you are selected to receive payment, your recommended person in the chosen area will receive a fixed payment of 100 thousand pesos.
[Only seen if assigned to the treatment]

Each person selected to receive payment for this study can earn: up to 20 thousand pesos for one of the belief questions, up to 250 thousand pesos for one of the recommendation questions, and a fixed payment of 70 thousand pesos for completing the study.

Selected individuals can earn up to 340 thousand pesos.

[Participants go through all three Subject Areas in randomized order]

Subject Areas

Critical Reading

For this section, we will use as reference the Critical Reading test from SABER 11, which evaluates the necessary competencies to understand, interpret, and evaluate texts that can be found in everyday life and in non-specialized academic fields.

[Clicking shows the example question from SABER 11 below]

135 Although the democratic political tradition dates back to ancient Greece, political 135
136 thinkers did not address the democratic cause until the 19th century. Until then, democ- 136
137 racy had been rejected as the government of the ignorant and unenlightened masses. 137
138 Today it seems that we have all become democrats without having solid arguments in 138
139 favor. Liberals, conservatives, socialists, communists, anarchists, and even fascists have 139
140 rushed to proclaim the virtues of democracy and to show their democratic credentials 140
141 (Andrew Heywood). According to the text, which political positions identify themselves 141
142 as democratic? 142

- 143 • Only political positions that are not extremist 143
144 • The most recent political positions historically 144
145 • The majority of existing political positions 145
146 • The totality of possible political currents 146

147 —————— 147

148 **Mathematics** 148

149 This section references the Mathematics test from SABER 11, which evaluates people's 149
150 competencies to face situations that can be resolved using certain mathematical tools. 150

151 [Clicking shows the example question from SABER 11 below] 151

152 A person living in Colombia has investments in dollars in the United States and knows 152
153 that the exchange rate of the dollar against the Colombian peso will remain constant 153
154 this month, with 1 dollar equivalent to 2,000 Colombian pesos. Their investment, in 154
155 dollars, will yield profits of 3% in the same period. A friend assures them that their 155
156 profits in pesos will also be 3%. Their friend's statement is: 156

- 157 • Correct. The proportion in which the investment increases in dollars is the same 157
158 as in pesos. 158

- Incorrect. The exact value of the investment should be known. 159
 - Correct. 3% is a fixed proportion in either currency. 160
 - Incorrect. 3% is a larger increase in Colombian pesos. 161

162 162

163 English 163

164 This section uses the English test from SABER 11 as a reference, which evaluates that 164
165 the person demonstrates their communicative abilities in reading and language use in 165
166 this language. 166

¹⁶⁷ [Clicking shows the example question from SABER 11 below] 167

168 Complete the conversations by marking the correct option. 168

177

179 **Your Score**

179

180 Compared to university students, in which percentile do you think your [Subject Area] 180
181 test score falls (1 is the lowest percentile and 100 the highest)? 181

182 [Clicking shows the explanations below] 182

183 How is a percentile calculated? 183

184 A percentile is a position measurement. To calculate it, we take the test scores for all 184
185 students currently enrolled in the university and order them from lowest to highest. The 185
186 percentile value you choose refers to the percentage of students whose score is below 186
187 yours. For example, if you choose the 20th percentile, you're indicating that 20% of 187
188 students have a score lower than yours and the remaining 80% have a score higher than 188
189 yours. 189

190 What can I earn for this question? 190

191 For your answer, you can earn **20,000 (twenty thousand) PESOS**, but only if the 191
192 difference between your response and the correct percentile is less than 7. For example, if 192
193 the percentile where your score falls is 33 and you respond with 38 (or 28), the difference 193
194 is 5 and the answer is considered correct. But if you respond with 41 or more (or 25 or 194
195 less), for example, the difference would be greater than 7 and the answer is incorrect. 195

196 Please move the sphere to indicate which percentile you think your score falls in: 196

197 [Slider with values from 0 to 100] 197

198

 198

199 **Recommendation**

199

200 Among the people with whom you have taken any class at the university, who is your 200
201 recommendation for the [Subject Area] test? Please write that person's name in the 201
202 box below: 202

203 **Important:** You will not be considered for payment unless the recommended 203
204 person is someone with whom you have taken at least one class during your 204
205 studies. 205

206 Your response is only a recommendation for the purposes of this study and we will **not** 206
207 contact your recommended person at any time. 207

208 [Clicking shows the explanations below] 208

209 Who can I recommend? 209

210 Your recommendation **must** be someone with whom you have taken (or are taking) a 210
211 class. If not, your answer will not be considered for payment. The person you recommend 211
212 will not be contacted or receive any benefit from your recommendation. 212

213 As you write, you will see up to 7 suggested student names containing the letters you 213
214 have entered. The more you write, the more accurate the suggestions will be. Please 214
215 write **without** accents and use the letter 'n' instead of 'ñ'. If the name of the person 215
216 you're writing doesn't appear, it could be because you made an error while writing the 216
217 name. 217

218 If the name is correct and still doesn't appear, it could be because the student is not en- 218
219 rolled this semester or didn't take the SABER 11 test. In that case, you must recommend 219
220 someone else. 220

221 My earnings for this question? 221

222 For your recommendation, you could receive earnings of up to 250,000 (two hundred and 222
223 fifty thousand) PESOS. The earnings are calculated based on your recommendation's 223
224 score and the percentile of that score compared to other UNAB students, as follows: 224

- 225 • We will multiply your recommendation's score by \$100 (one hundred) pesos if it's 225
226 between the 1st and 50th percentiles 226
- 227 • We will multiply your recommendation's score by \$500 (five hundred) pesos if it's 227
228 between the 51st and 65th percentiles 228
- 229 • We will multiply your recommendation's score by \$1000 (one thousand) pesos if 229
230 it's between the 66th and 80th percentiles 230
- 231 • We will multiply your recommendation's score by \$1500 (one thousand five hun- 231
232 dred) pesos if it's between the 81st and 90th percentiles 232
- 233 • We will multiply your recommendation's score by \$2500 (two thousand five hun- 233
234 dred) pesos if it's between the 91st and 100th percentiles 234

235 This is illustrated in the image below: 235

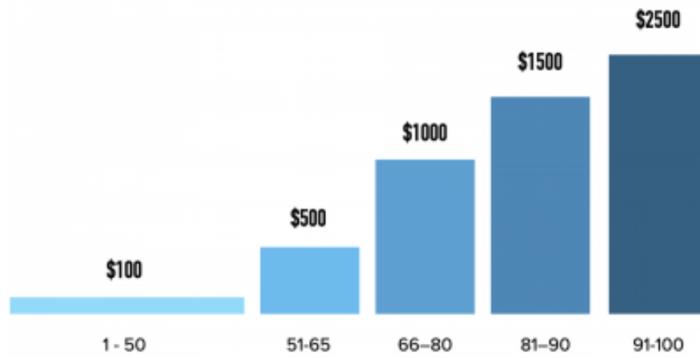


Figure B.1: Earnings for recommendation questions

236 For example, if your recommendation got 54 points and the score is in the 48th percentile, 236

237 you could earn $54 \times 100 = 5400$ PESOS. But, if the same score of 54 points were in the 237
238 98th percentile, you could earn $54 \times 2500 = 135,000$ PESOS. 238

239 [Text field with student name suggestions popping up as participant types] 239

240 _____ 240

241 Relationship with your recommendation 241

242 How close is your relationship with your recommendedation: “[Name of the student 242
243 selected from earlier]”? (0 indicates you are barely acquaintances and 10 means you are 243
244 very close) 244

245 [Slider with values from 0 to 10] 245

246 _____ 246

247 Your recommendation's score 247

248 Compared to university students, in which percentile do you think [Name of the student 248
249 selected from earlier]’s score falls in the **[Subject Area]** test (1 is the lowest percentile 249
250 and 100 the highest)? 250

251 [Clicking shows the explanations below] 251

252 How is a percentile calculated? 252

253 A percentile is a position measurement. To calculate it, we take the test scores for all 253
254 students currently enrolled in the university and order them from lowest to highest. The 254
255 percentile value you choose refers to the percentage of students whose score is below 255
256 yours. For example, if you choose the 20th percentile, you’re indicating that 20% of 256
257 students have a score lower than yours and the remaining 80% have a score higher than 257
258 yours. 258

259 What can I earn for this question?

259

260 For your answer, you can earn **20,000 (twenty thousand) PESOS**, but only if the 260
261 difference between your response and the correct percentile is less than 7. For example, 261
262 if the percentile where your recommended person's score falls is 33 and you respond with 262
263 38 (or 28), the difference is 5 and the answer is considered correct. But if you respond 263
264 with 41 or more (or 25 or less), for example, the difference would be greater than 7 and 264
265 the answer is incorrect. 265

266 Please move the sphere to indicate which percentile you think your recommended per- 266
267 son's score falls in: 267

268 [Slider with values from 0 to 100] 268

269 ————— 269

270 Demographic Information 270

271 What is the highest level of education achieved by your father? 271

272 [Primary, High School, University, Graduate Studies, Not Applicable] 272

273 What is the highest level of education achieved by your mother? 273

274 [Primary, High School, University, Graduate Studies, Not Applicable] 274

275 Please indicate the socio-economic group to which your family belongs: 275

276 [Group A (Strata 1 or 2), Group B (Strata 3 or 4), Group C (Strata 5 or 6)] 276

277 ————— 277

278 **UNAB Students Distribution**

278

279 Thinking about UNAB students, in your opinion, what percentage belongs to each socio- 279
280 economic group? The total must sum to 100%: 280

- 281 [Group A (Strata 1 or 2) percentage input area] 281
282 [Group B (Strata 3 or 4) percentage input area] 282
283 [Group C (Strata 5 or 6) percentage input area] 283
284 [Shows sum of above percentages] 284

285

 285

286 **End of the Experiment** 286

287 Thank you for participating in this study. 287

288 If you are chosen to receive payment for your participation, you will receive a confirma- 288
289 tion to your UNAB email and a link to fill out a form with your information. The process 289
290 of processing payments is done through Nequi and takes approximately 15 business days, 290
291 counted from the day of your participation. 291

292 [Clicking shows the explanations below] 292

293 Who gets paid and how is it decided? 293

294 The computer will randomly select one out of every ten participants in this study to be 294
295 paid for their decisions. 295

296 For selected individuals, the computer will randomly select one area: mathematics, 296
297 reading, or English, and from that area will select one of the belief questions. If the 297
298 answer to that question is correct, the participant will receive 20,000 pesos. 298

299 The computer will randomly select an area (mathematics, critical reading, or English) to 299
300 pay for one of the recommendation questions. The area chosen for the recommendation 300
301 question is independent of the area chosen for the belief question. The computer will 301
302 take one of the two recommendations you have made for the chosen area. Depending on 302
303 your recommendation's score, you could win up to 250,000 pesos. 303

304 Additionally, people selected to receive payment for their participation will have a fixed 304
305 earnings of 70,000 pesos for completing the study. 305

306 _____ 306

307 **Participation** 307

308 In the future, we will conduct studies similar to this one where people can earn money 308
309 for their participation. The participation in these studies is by invitation only. Please 309
310 indicate if you are interested in being invited to other studies similar to this one: 310

311 [Yes, No] 311