What you know can't hurt you (for long):
A field experiment on relative feedback performance information

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Introduction

• Feedback information on **individual performance** is often provided in many professional/educational environments:
  • Students get *report cards*.
  • Teachers get *teaching evaluations*.
  • Employees get *revenue/sales* data.

• In addition to this information, sometimes individuals may also receive information about their **performance relative to a reference group**
  • E.g., students learn their class rank
Feedback Information

- We are going to consider a setup where feedback on relative performance is private information:
  - Rankings are not made public
  - It is not "status" per se (e.g., different from *McDonald stars*)
- We focus on relative performance feedback information as extra information that facilitates social comparison:
  - Individual performance is compared with the performance of a reference group
  - It is not explicitly rewarded (e.g., with a bonus)
- No tournament reward scheme
- The treatment typically has two components:
  - The information itself
  - The agent will receive this information again in the future
Theory

- No reaction to feedback
  - Private information, not rewarded, no (obvious) consequence

- Competitive Preferences

- Self-Perceived Ability

- Satisficing behavior
  - Simon (1956)

- Overall, the effect depends of individuals’ prior information and their preferences
Empirical evidence

- **Lab experiments**
  - Azmat and Iriberri 2014

- **Natural experiments**
  - Blanes-i-Vidal and Nossol 2011
  - Azmat and Iriberri 2010

- **Randomized field experiment**
  - Barankay 2011

➡️ What is impact of receiving feedback on relative performance?
  - Priors? Preferences? Technology?
Our Approach

- Conduct a field experiment over three years (2010-2013) in a large university
- A cohort of students (approx. 1,000) were randomly assigned into treatment and control groups
- **Control:** Students receive information on their own performance (as is the norm)
- **Treatment:** Additionally, provide students with information on their relative performance
Timing

- We follow the 2009 cohort of students until graduation

- 2009-2010 (1st year): **No treatment**
- 2010-2011 (2nd year): **Treatment** (twice)
- 2011-2012 (3rd year): **Treatment** (twice)
- 2012-2013 (4th year): **Treatment** (twice)
Our Study

- The treated student receive an email message from a corporate account saying:

“This email is part of a pilot project of academic assessment management. If you want to see your average grade, and your relative position in terms of average grade among the students that started the degree the same year you did, you can do it by clicking here:<link given>”
After logging in....
Our Questions

What is the effect of relative performance feedback information on:

1. Performance over time

2. Individual satisfaction

3. Labour market outcomes (not today!)
Data
Outcome Variables

- Academic Performance: 2010-2013
  - Exams taken and exams passed
  - Accumulated GPA
  - Course choice

- Teaching Evaluations: 2010-2011
  - Overall satisfaction with the course
  - Number of hours of study
  - Grading is adequate
Other Variables

- Entry test score (similar to SAT)
- First year grades
- Gender
- Foreigner to institution
- Area of residence
Assignment to Treatment
Assignment of students to groups

Within each year, degree, campus and language, students are assigned to different lecture groups based on their surname.

### Example for 2010, first year, Business Administration, Getafe, Spanish

<table>
<thead>
<tr>
<th>First letters of student's surname</th>
<th>Schedule</th>
<th>Tutorial</th>
<th>Main lecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA-BZ</td>
<td>Morning</td>
<td>74</td>
<td>A</td>
</tr>
<tr>
<td>CA-FEIZ</td>
<td>Morning</td>
<td>75</td>
<td>B</td>
</tr>
<tr>
<td>FEJ-GONZAZ</td>
<td>Morning</td>
<td>76</td>
<td></td>
</tr>
<tr>
<td>GONZB-LIZ</td>
<td>Afternoon</td>
<td>77</td>
<td></td>
</tr>
<tr>
<td>LJ-MORZ</td>
<td>Afternoon</td>
<td>78</td>
<td></td>
</tr>
<tr>
<td>MOS-POZ</td>
<td>Afternoon</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>PR-SAM</td>
<td>Morning</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>SAN-ZZ</td>
<td>Morning</td>
<td>81</td>
<td></td>
</tr>
</tbody>
</table>
## Assignment to Treatment (Groups)

<table>
<thead>
<tr>
<th></th>
<th>South Madrid</th>
<th>North Madrid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treatment</td>
<td>Control</td>
</tr>
<tr>
<td>Finance and Accounting</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Economics</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Business</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Law</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Law and Business</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
# Assignment to Treatment (Students)

<table>
<thead>
<tr>
<th></th>
<th>South Madrid</th>
<th>North Madrid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treatment</td>
<td>Control</td>
</tr>
<tr>
<td>Finance and Accounting</td>
<td>36</td>
<td>59</td>
</tr>
<tr>
<td>Economics</td>
<td>47</td>
<td>187</td>
</tr>
<tr>
<td>Business</td>
<td>60</td>
<td>121</td>
</tr>
<tr>
<td>Law</td>
<td>60</td>
<td>132</td>
</tr>
<tr>
<td>Law and Business</td>
<td>50</td>
<td>49</td>
</tr>
</tbody>
</table>
## Randomization

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th>SAT</th>
<th>AGPA 1st Year</th>
<th>Percentile 1st Year</th>
<th>Credits 1st Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatment</strong></td>
<td>0.027</td>
<td>-0.102*</td>
<td>-0.0493</td>
<td>-0.0157</td>
<td>-0.518</td>
</tr>
<tr>
<td></td>
<td>[0.0342]</td>
<td>[0.0565]</td>
<td>[0.0648]</td>
<td>[0.0188]</td>
<td>[1.108]</td>
</tr>
<tr>
<td><strong>Constant</strong></td>
<td>0.531***</td>
<td>7.276***</td>
<td>0.0179</td>
<td>0.543***</td>
<td>58.10***</td>
</tr>
<tr>
<td></td>
<td>[0.0201]</td>
<td>[0.0330]</td>
<td>[0.0381]</td>
<td>[0.0111]</td>
<td>[0.651]</td>
</tr>
<tr>
<td><strong>Observations</strong></td>
<td>977</td>
<td>966</td>
<td>977</td>
<td>977</td>
<td>977</td>
</tr>
<tr>
<td><strong>R-squared</strong></td>
<td>0.024</td>
<td>0.333</td>
<td>0.128</td>
<td>0.002</td>
<td>0.07</td>
</tr>
</tbody>
</table>
Results
Is the treatment informative?

- Do students actually access the information (i.e., take-up rate)?

- Who accesses the information?

- How informed are students about their relative performance before the treatment?

- How informed are treated (and non-treated) students after the treatment?
## Take-up of Information

<table>
<thead>
<tr>
<th>Who checks the information?</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>0.106**</td>
<td>0.085*</td>
</tr>
<tr>
<td></td>
<td>[0.047]</td>
<td>[0.045]</td>
</tr>
<tr>
<td>AGPA</td>
<td>0.145***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0.021]</td>
<td></td>
</tr>
<tr>
<td>Entry grade</td>
<td>-0.060*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0.034]</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.665***</td>
<td>0.238</td>
</tr>
<tr>
<td></td>
<td>[0.034]</td>
<td>[0.216]</td>
</tr>
<tr>
<td>Observations</td>
<td>354</td>
<td>347</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.084</td>
<td>0.182</td>
</tr>
</tbody>
</table>
Self-Assessment

BEFORE EXPERIMENT:

- Survey the 2010 cohort at beginning of their second year students (Economics degree only)

We ask: “When you enrolled one year ago in this degree your cohort included 300 students. If we were to rank all students in this cohort by their Accumulated Grade Point Average (AGPA), such that number 1 is the student with the highest AGPA and number 300 is the student with the lowest AGPA. In which position do you think you would be?”
Self-Assessment Before Treatment

Average error: -0.18; Absolute error: 0.22
Self-Assessment

AFTER TREATMENT:

• Survey the 2009 cohort at the end of their fourth year (summer 2013)

• Economics and Business degrees only

• Includes treatment and control groups
Self-Assessment After Treatment: Control Group

Average error: -0.11; Absolute error: 0.15
Self-Assessment After Treatment: Treatment Group

Average error: -0.06; Absolute error: 0.09
Feedback Effect on Academic Performance

Effect on Performance:

\[ Y_{s,d,g,t+i} = \alpha + \beta Y_{s,t} + \gamma \text{Treatment}_{d,g} + X_d \lambda + \epsilon_{s,d,g,t+i} \]
Exams Passed

Semester 1 and 2 exams

Resit exams
Exams Taken

![Graph showing the exams taken over time with data points for May 2010, June 2010, Jan 2011, May 2011, June 2011, Jan 2012, May 2012, June 2012, Jan 2013, May 2013, June 2013.]
Accumulated GPA
Heterogeneity analysis

<table>
<thead>
<tr>
<th>Sample:</th>
<th>Overall</th>
<th>Good News</th>
<th>Bad News</th>
<th>Female</th>
<th>Male</th>
<th>Above Mean</th>
<th>Below Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>-0.408**</td>
<td>-0.448*</td>
<td>-0.020</td>
<td>-0.465*</td>
<td>-0.324</td>
<td>-0.363</td>
<td>-0.308</td>
</tr>
<tr>
<td></td>
<td>(0.179)</td>
<td>(0.224)</td>
<td>(0.369)</td>
<td>(0.263)</td>
<td>(0.259)</td>
<td>(0.266)</td>
<td>(0.235)</td>
</tr>
<tr>
<td>N</td>
<td>977</td>
<td>729</td>
<td>248</td>
<td>528</td>
<td>449</td>
<td>442</td>
<td>535</td>
</tr>
</tbody>
</table>

Dep. variable: Exams passed the 2nd year
Other performance variables

- **Dropout**
  - No effect

- **Graduation rate**
  - No effect

- **Choice of electives**
  - No effect of treatment on the selection of “easy” versus “difficult” course
Student Satisfaction

- Students complete teaching evaluations twice a year.
- The timing is such that:
  - Evaluations are anonymous but we can identify the treatment and control groups
  - Can only do it for 2\textsuperscript{nd} year
    - 3\textsuperscript{rd} and 4\textsuperscript{th} year students take electives
Feedback Effect on Student Satisfaction

- Effect on Performance:

\[ Y_{m,d,g,t+i} = \alpha + \gamma \text{Treatment}_{d,g} + X_{d}\lambda + \varepsilon_{m,d,g,t+i} \]

*Satisfaction, hours of study, or ease of course for student enrolled in module m, degree d and group g, at time t+i*
## Results: Student Satisfaction

<table>
<thead>
<tr>
<th></th>
<th>Pre-Treatment Semester</th>
<th>Post-Treatment Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hrs of Study</td>
<td>Satisfaction</td>
</tr>
<tr>
<td>Treatment</td>
<td>0.126</td>
<td>0.0134</td>
</tr>
<tr>
<td></td>
<td>[0.0680]</td>
<td>[0.121]</td>
</tr>
<tr>
<td>Constant</td>
<td>2.866***</td>
<td>3.868***</td>
</tr>
<tr>
<td></td>
<td>[0.0409]</td>
<td>[0.0740]</td>
</tr>
<tr>
<td>Observations</td>
<td>182</td>
<td>182</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.143</td>
<td>0.028</td>
</tr>
</tbody>
</table>
Other Analysis

- **Placebo regressions**
  - No impact of treatment on other cohorts (unaffected by treatment)

- **Analysis of using as IV assignment to treatment**
  - Coefficients are 30 percent larger

- **Randomisation inference (Rosenbaum 2002)**
  - Standard errors slightly larger (6% significance level)
Summary and Conclusion
Summary

- Students appear to be uniformed about the relative performance and tend to be underconfident.
- Providing feedback has:
  - Positive effect on self-reported student satisfaction
  - No significant effect on self-reported effort
  - Negative effect on performance
- Effects on performance are short-term and disappear after first year of treatment.
- No long-term effect on the likelihood to graduate or GPA at end of degree.
Conclusion

- The impact of feedback of relative performance may depend crucially on individuals’ *prior information* and their *preferences*
  - Field experiments might be very useful

- What can we learn about *students’ preferences*:
  - Competitive preferences? Apparently not
  - Satisficing heuristics? Perhaps
Thanks!