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# **Incentives for High School and College Achievement: Results from Randomized Trials**

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J. Angrist, with  
Victor Lavy, and with  
Phil Oreopoulos and Dan Lang

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## EDUCATION INCENTIVES ON THE RISE

- Lets make schoolwork pay! Interest in secondary-school achievement awards is growing
    - NYC public schools are piloting an ambitious pay-for-performance scheme in elementary and middle schools
    - Plans to pay those who take AP tests is in the works as well; Dallas has already tried this
  - PSE . . . Georgia-Hope programs for tuition and scholarships at state schools are multiplying
  - Schools and universities have long awarded top performers with scholarship money and prizes
    - Innovation: push awards down to potential under-achievers
    - The scholarship fig leaf is coming off
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# AGENDA: TWO EXPERIMENTS

- Update results from a 2001 experiment on incentives for *high school achievement* (with Victor Lavy)
    - NEW results for post-secondary schooling outcomes
  - Update results from a more recent experiment on incentives and services for *college achievement* (with D. Lang and Phil Oreopoulos)
  - A striking parallel: Girls get it; boys don't
  - Other findings
    - An *ex ante* chance of a success is required for incentives alone to be effective
    - Services and incentives may work better than either alone
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# ACHIEVEMENT AWARDS:

## Incentives for High-Stakes Testing

- ◆ The most important education milestone in Israel is the Bagrut, or matriculation certificate, awarded on the basis of tests in grades 10-12 (mostly 12)
  - ◆ The Bagrut is required for most PSE and some jobs
  - ◆ About half of seniors get a Bagrut, but rates are much lower in some schools and groups, especially rural, predominantly AA, immigrant, and Arab
  - ◆ In an effort to increase Bagrut rates, we tried demonstration projects that offered cash incentives for low-SES pupils to take and pass Bagrut exams
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# DESIGN OF THE INTERVENTION

- ◆ HS Seniors graduating in 2001 received NIS 6,000 when awarded Bagrut (about US\$1,400)
  - ◆ A school-based GRT: We identified 40 schools with low 1999 Bagrut rates, but above 3%. Treatment randomly assigned to all students in 20 schools
    - ◆ Schools were paired on the basis of their 1999 Bagrut rates, with one treatment school in each pair to improve T-C balance
    - ◆ Sample included 10 Arab schools and 10 religious schools; 5 treated schools are *non-compliers*
  - ◆ Data from 2000 and 2002 are used as a check since GRT did not balance T-C perfectly
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# ACHIEVEMENT AWARDS RESULTS

- Descriptive stats: [Bonuses Table 1](#)
  - Treatment effects: [Bonuses Table 2](#)
    - OLS and Logit
    - Boys and Girls
  - Results by covariate by lagged score: [Bonuses Table 4](#)
    - Only those in the top half of the lagged score distribution benefit
    - Again, only girls
    - Possible spurious effects in 2000
  - Stacked estimates adjust for 2000 imbalance with school fixed effects: [Bonuses Table 5](#)
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# POST-SECONDARY OUTCOMES

- Bagrut rates go up for girls – a fairly clear finding; effects are on the order of .1 in the upper half of the lagged score distribution
    - Compare to a base rate of .5 in this group
    - Larger effects using 2002 control for school effects (about .15)
  - So what?! Bagrut for it's own sake may be worth little
    - Ideally, Bagrut opens doors to higher ed
    - We link our experimental sample to PSE outcomes using data from the National Insurance Institute
  - Results: [Bonuses Table 8](#)
    - Our subjects do not go to Hebrew U (or Oberlin College!). But the treated were more likely to go on to some kind of PSE
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# THE STUDENT ACHIEVEMENT AND RETENTION PROJECT (STAR)

- A randomized evaluation of two strategies designed to improve achievement and retention in the first year of university
  - The Student Support Program (SSP; services):
    - Peer advising (in-person and by email)
    - Supplemental Instruction (Facilitated Study Groups)
  - The Student Fellowship Program (SFP; incentives):
    - Merit-scholarship for maintaining **solid** GPA in first year and enrolling in full-time second year studies
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# MOTIVATION

- Many post-secondary students perform poorly, repeat courses, drop courses, or drop out entirely
    - Average 1st year dropout rate at public NA universities: 15%
    - Average 6-year non-completion at public NA universities: 35%
  - Enrollment is increasing, but completion rates are decreasing
  - Dropout/incompletes are usually seen as wasteful . . . .
    - because students don't account for sheepskin effects
    - because better grades and more credits might mean a higher return to schooling
    - time in school is subsidized in public systems
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# WHAT'S TO BE DONE?

## (I) Traditional Support Services

- Academic advising (peer and professional)
- Orientation classes
- Content-based tutoring
- Supplemental instruction (meant to develop general skills like critical thinking and reasoning)
- Writing workshops

*These efforts focus on skills.*

\$1 billion spent annually on remedial services at public colleges (Bettinger and Long, 2005)

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## (II) Merit Awards

- Traditional awards have gone to top achievers
    - US National merit awards are for an elite handful
  - Recent years have seen the rise of college scholarships for all students with a B average
    - Modeled on Georgia's Hope scholarship
  - A number of demonstration projects in the US and UK, (EMA, Louisiana, Dallas) and Israel
  - Many more in the works or just taking off (e.g., NYC)  
*These efforts focus on motivation.*
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# STAR COMPONENTS:

## (1a) SSP Peer Advising

### Advisors:

- Trained/paid upperclassmen who offer academic counselling
  - Communicate with advisees by email or in person
  - Email advisees bi-weekly
  - Encourage advisees to use campus-wide student services, and to attend tutorial sessions and office hours
  - Discuss questions about university assimilation, scheduling, studying, and time-management
  - Scout other support issues, such as learning disabilities, academic advising, personal counselling and other issues
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## (1b) SSP Facilitated Study Groups (FSG's)

- A type of Supplemental Instruction (SI): voluntary course-centered sessions open to all students;
  - Facilitated by a trained upper year student who previously completed course (successfully), who also attends class and interacts with instructor
  - Goals are to foster critical thinking and reasoning skills; not meant to be content-based
  - Used by hundreds of institutions and recognized by US Department of Education (Martin & Arendale, 1993)
  - Grades increase 5-10 points among SI attendees compared to non-attendees, with and w/o background controls (Arendale, 2005)
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## (2) SFP Grade-Based Merit Awards

- \$1,000 - \$5,000 merit-scholarships for meeting GPA target in first year (and enrolling full-time in second year)
  - Trade-off in choosing GPA target:
    - High GPA, less costly, few low skilled students able to qualify
    - Low GPA, more costly, more low skilled students able to qualify
  - \$5,000 targets set so that 7-8% awarded based on 2003-4;  
\$1,000 targets set so that 26-8% awarded based on 2003-4  
\$2,500 intermediate target for half
  - In practice, 2005 award rates were lower (5.4% and 18%)
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# SFP Award Schedule

| <b>Previous H.S.<br/>Grade average<br/>Quartile</b> | <b>(for 1/2 in SFP)</b>                      |  |  |
|---|--|--|--|
|   | <b>\$1,000<br/>for reaching a<br/>GPA of</b> | <b>\$2,500<br/>for reaching a<br/>GPA of</b> | <b>\$5,000<br/>for reaching a<br/>GPA of</b> |
| <b>0 – 25<sup>th</sup> percentile</b>               | <b>2.3 (C+)</b>                              | <b>2.7 (B-)</b>                              | <b>3.0 (B)</b>                               |
| <b>25 – 50<sup>th</sup> percentile</b>              | <b>2.7 (B-)</b>                              | <b>3.0 (B)</b>                               | <b>3.3 (B+)</b>                              |
| <b>50<sup>th</sup> – 75<sup>th</sup> percentile</b> | <b>3.0 (B)</b>                               | <b>3.3 (B+)</b>                              | <b>3.7 (A-)</b>                              |

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# THE STAR STUDY POPULATION

## ■ Student Characteristics

- 77% commute from parents' home
- 76% plan to work at least part-time
- 42% plan to work more than 10 hours per week
- 45% non-English speakers at home
- 64% say they intend to obtain more than bachelors degree
- 83% say they intend to complete BA in 4 years

## ■ Retention and Achievement

- 12% year one dropout rate (11% at main campus)
  - 29% 6-year non-completion rate (25% at main campus)
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# RESEARCH DESIGN AND IMPLEMENTATION

- July 2005: background online and phone survey of all incoming first year students (90% response).
  - August: Population of incoming first year students identified and categorized by high school grade quartile; top quartile dropped
  - Random assignment:
    - 250 offered SSP
    - 250 offered SFP
    - 150 offered both (SFSP)
  - Remaining (~1,000) selected as control group
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# STAR RESULTS

- Descriptive stats: [STAR Table 1](#)
  - Take-up and service use: [STAR Table 3](#)
    - Effects on consent by program and sex
    - Use of SSP service components
  - Impact on Fall grades: [STAR Table 4](#)
    - This is the most immediate impact; shows effects for incentives and incentives/services on girls
  - Impact on First-year GPA: [Panel B in Table 4](#), results for the Fall grades sample
    - SFP effects on women have faded, none materialize for men
    - We are left with a large SFSP effect on women; See also [Fig. 1](#)
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## STAR RESULTS (CONT.)

- Full set of first- and second-year impacts: STAR Table 5 (GPA, academic probation & standing, credits earned)
    - The pattern from Table 4B remains: little action except for SFSP women
    - A surprise . . . SFSP had a lasting impact on women, though the program ran for 1 year only
  - We also looked at Quantile regression estimates in a stacked model: Revision Table 7
    - The SFSP result is surprisingly close to a “location shift” (clearer here than in the figure)
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## 2SLS Estimates

- Intention-to-treat effects are diluted by the fact that some treated students failed to sign up (non-participants) and therefore get no services/awards
- Estimates of the effect of on participants were constructed using 2SLS:

$$y_{it} = X_i' \delta_t + \alpha ssp_i^* + \beta sfp_i^* + \gamma sfsp_i^* + \epsilon_i + \eta_{it}$$

where  $ssp_i^*$ ,  $sfp_i^*$ ,  $sfsp_i^*$  are endog. participantation vars

- We also tried an over-identified model w/  $\beta = \gamma$ :

$$y_{it} = X_i' \delta_t + \alpha ssp_i^* + \gamma (sfp_i^* + sfsp_i^*) + \epsilon_i + \eta_{it}$$

- Table 8: Effects are bigger; over-id marginal/fails

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# CONCLUSIONS

- Achievement incentives may work for some . . . but its not as easy as we thought it would be!
  - Like training programs, the overall impact is modest, though effects can be large for some groups (of women)
  - Better targeting, earlier and more attainable awards seem likely to give a bigger boost
  - Coupling incentives and services seems especially promising, and certainly boosted service-use
  - As Amy Winehouse says, “What is it about men?” We’ll be looking into that further!
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