

# Does Advanced Academic Study Help Middle-Achieving Students Prepare for University? Evidence from a Randomized Field Experiment

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# Context

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- Academic performance is an important determinant of PS attendance:
  - More important than parental income
  - As important as parental education
- How to reduce academic barriers to PS?

# AVID

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- Advancement Via Individual Determination (AVID)
- Serves 400,000 students in 4,500 schools worldwide
- Goal: raise academic performance, and subsequently, university attendance
- Targets students on the margin
  - Mostly Bs and Cs (middle-achieving)
  - No extreme behaviour issues
  - Desire to attend university

# AVID

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- What is AVID?
  - Academic intervention
  - Elective class (replacing a regular elective) offered throughout high school
  - Consists of:
    - Curriculum studies (40%)
    - Tutorials assisted by local college students (40%)
    - Motivational activities regarding PSE (20%)

# AVID

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- Mechanisms through which AVID may help students (Dunn et al., 2008)?
  - Study skills (time management, note taking, etc.)
  - “Untracking” students (students choosing advanced courses)
  - Mentoring effects (continued contact with AVID teacher and tutors)
  - Peer effects (continued contact with students sharing similar characteristics)

# AVID

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- Can AVID make a difference?
  - Cognitive skills are not malleable after age 14 (Heckman, 1995), when AVID begins
    - But AVID helps students use their existing cognitive skills more efficiently by helping them become better learners
  - Furthermore, non-cognitive skills (motivation, self-discipline) are controlled by the prefrontal cortex, which is malleable until late adolescence (Heckman, 2000; Shonkoff and Phillips, 2000)

# AVID

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- Non-experimental evidence on AVID's effectiveness:
  - Mehan et al. (1996):
    - Improvements in college participation
  - Watt et al. (2006)
    - AVID districts in Texas saw gains in graduation rates, advanced course enrollments, and international baccalaureate testing
  - Watt et al. (2007)
    - AVID participants had higher aspirations, knowledge about college, and academic preparation compared to peers
  - Nagaoka and LaForce (2010)
    - Propensity score matching study in Chicago
    - Small improvements in English and Math in grade 9; fewer absences
  
- All suffer from selection bias

- Those most likely to benefit from AVID will sign up

# BC AVID

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- First (and only) scientific evaluation of AVID
- Funded by the Canadian Millennium Scholarship Foundation
- Conducted by SRDC

# BC AVID

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- 1,241 students recruited at 14 BC high schools\*
  - Two cohorts (2005 and 2006) followed throughout HS and until university age
  - Administrative and survey data used for follow-up
- 'AVID eligible' students recruited through rigorous process:
  - Middle-achieving (mostly Bs and Cs)
  - No extreme behaviour issues
  - Desire to attend university

**\*Schools and students had to apply to participate and waiting lists were created when classes reached the limit of 30 (just like the real AVID). Informed consent was also required from the parents to collect data.**

# Evaluation approach

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- Random assignment within high schools
- Impact:
  - Treatment group outcome – Control group outcome
  - Controlling for baseline characteristics

# Did random assignment create similar treatment and control groups?

Table 1: Baseline characteristics by assignment group

	Treatment group		Control group		Treatment - Control	
	Mean	Standard error	Mean	Standard error	Mean	Standard error
Female	0.526	0.018	0.549	0.023	-0.023	0.029
Age	13.866	0.011	13.869	0.014	-0.003	0.018
Aboriginal	0.090	0.010	0.091	0.014	-0.001	0.017
ESL	0.038	0.007	0.051	0.010	-0.013	0.012
ESL missing	0.003	0.002	0.002	0.002	0.000	0.003
Letter grade below C	0.039	0.007	0.047	0.010	-0.007	0.012
Letter grade of B or C	0.827	0.013	0.833	0.018	-0.007	0.022
Letter grade A	0.133	0.012	0.120	0.015	0.013	0.020
Family income <\$25,000	0.077	0.009	0.076	0.012	0.002	0.016
\$25,000 ≤ Family income <\$50,000	0.173	0.013	0.169	0.018	0.004	0.022
\$50,000 ≤ Family income <\$75,000	0.211	0.015	0.196	0.019	0.016	0.024
\$75,000 ≤ Family income <\$100,000	0.204	0.014	0.187	0.018	0.017	0.023
Family income ≥ \$100,000	0.150	0.013	0.176	0.018	-0.025	0.022
Family income missing	0.185	0.014	0.198	0.019	-0.013	0.023
Parent with postsecondary	0.406	0.017	0.462	0.024	-0.056 *	0.029
Parental education missing	0.029	0.006	0.024	0.007	0.005	0.009
Family size	4.167	0.042	4.147	0.055	0.020	0.069
Single parent	0.204	0.014	0.187	0.018	0.017	0.023
Sample size	791		450			

Note: Significant differences in treatment and control baseline characteristics are denoted by '\*\*\*\*' (1%), '\*\*\*' (5%), and '\*\*' (10%).

# Focus of this study

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- Impact of the offer of AVID on necessary steps for university attendance:
  - Highest level of education aspired (main outcome for the moment)
  - Mediating factors:
    - On-time HS graduation
    - English marks (mandatory in grade 12)
    - Familiarity with student financial aid
  
- Future work will report on university attendance

# Large impact on university aspirations for boys and first-generation students

Table 2: Impact of offer of AVID on probability of aspiring to university

	Outcomes (%)			Impact
	Treatment	Control		
All	55.31	51.09	▲	4.23 (3.10)
Boys	53.31	45.68	▲	7.62 *
Girls	57.22	55.19	▲	2.03 (4.33)
No parent with postsecondary	52.09	43.32	▲	8.77 ** (4.45)
Parent with postsecondary	60.62	61.56	▲	-0.94 (4.68)

**Weaker AVID skills to begin with?**

All

Boys

Girls

No parent with postsecondary

Parent with postsecondary

Note: Standard errors are in parentheses. Significant impacts are denoted by '\*\*\*' (1%), '\*\*' (5%), and '\*' (10%).

# No impact on non-university PS

Table 3: Impact of offer of AVID on probability of aspiring to non-university postsecondary

	Outcomes (%)		
	Treatment	Control	Impact
All	39.37	41.86	▼ -2.49 ▼ (3.17)
Boys	42.86	44.78	▼ -1.92 ▼ (4.74)
Girls	36.09	40.01	▼ -3.93 ▼ (4.11)
No parent with postsecondary	42.79	47.57	▼ -4.79 ▼ (4.56)
Parent with postsecondary	34.14	33.45	▼ 0.69 ▼ (4.61)

Note: Standard errors are in parentheses. Significant impacts are denoted by '\*\*\*\*' (1%), '\*\*' (5%), and '\*' (10%).

# No impact on 'On-time' high school graduation

Table 4: Impact of offer of AVID on probability of graduating high school on time

	Outcomes (%)		
	Treatment	Control	Impact
All	82.85	80.82	▲ 2.03 ▲ (2.24)
Boys	82.53	77.59	▲ 4.94 ▲ (3.28)
Girls	83.24	83.29	▲ -0.05 ▲ (2.81)
No parent with postsecondary	81.88	78.24	▲ 3.64 ▲ (3.12)
Parent with postsecondary	84.97	84.26	▲ 0.71 ▲ (3.18)

Note: Standard errors are in parentheses. Significant impacts are denoted by '\*\*\*\*' (1%), '\*\*\*' (5%), and '\*' (10%).

# Delayed impact on academic performance for first-generation students

Table 5: Impact of offer of AVID on probability of obtaining 80% or more on grade 10 and 12 English course marks and on

	Grade 10 course mark Outcomes (%)			Grade 12 course mark Outcomes (%)			Grade 12 final mark Outcomes (%)		
	Treatment	Control	Impact	Treatment	Control	Impact	Treatment	Control	Impact
All	23.00	24.02	▼ -1.02 (2.38)	20.99	18.88	▼ 2.11 (2.10)	11.29	9.27	▼ 2.03 (1.59)
Boys	15.37	16.43	▼ -1.06 (3.29)	16.98	12.48	▼ 4.51 (3.07)	9.05	6.43	▼ 2.62 (2.41)
Girls	29.70	30.54	▼ -0.84 (3.62)	24.48	24.36	▼ 0.12 (3.39)	13.42	11.40	▼ 2.03 (2.73)
No parent with postsecondary	19.96	20.77	▼ -0.81 (3.10)	16.34	9.22	▼ 7.13 *** (2.52)	9.31	4.78	▼ 4.53 ** (1.88)
Parent with postsecondary	26.82	27.84	▼ -1.01 (3.84)	27.71	30.79	▼ -3.09 (4.19)	13.74	15.33	▼ -1.59 (3.29)

Note: Standard errors are in parentheses. Significant impacts are denoted by '\*\*\*\*' (1%), '\*\*\*' (5%), and '\*\*' (10%). The grade 12 English final is a weighted average of the grade 12 English course mark (80%) and the grade 12 English

# Large, broad-based impact on self-assessed familiarity with student financial aid

Table 6: Impact of offer of AVID on probability of being very familiar with student financial aid

	Outcomes (%)			Impact
	Treatment	Control		
All	18.94	10.36	▲	8.58 *** (2.36)
Boys	15.02	10.95	▲	4.07 (3.60)
Girls	22.01	10.37	▲	11.64 *** (3.23)
No parent with postsecondary	18.64	10.05	▲	8.59 *** (3.00)
Parent with postsecondary	19.47	11.96	▲	7.51 ** (3.39)

Note: Standard errors are in parentheses. Significant impacts are denoted by '\*\*\*' (1%), '\*\*' (5%), and '\*' (10%).

# Potential biases/evaluation challenges

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## Those we can rule out

- Program take-up
    - 96.7% accepted AVID offer
  - Spillover of AVID techniques
    - Very minor issue based on earlier comparison with similar non-AVID schools
  - Attrition bias (survey data analysis only)
    - 19.6% (treatment) vs 23.8% (control) between grade 9 and 12
    - No important changes in baseline characteristics
  - Teacher grading bias
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- AVID students are well known
  - Argument does not apply to differences in sub-group impacts

# Potential biases/evaluation challenges

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## Those we can not rule out

- Program drop-out
  - 37.6% withdrew by grade 12 (mostly in that year: wanted to pick other courses to apply skills)
  - Estimated impacts = Intention-to-treat effects
  
- Substitution bias (displacing non-experimental treatment)
  - Earlier report found reverse: course load was more challenging among treatment group
  
- Timing
  - Lagged effect
  - Students coped with more difficult course load as they were only beginning to learn AVID skills
  - AVID now being run before HS in some jurisdictions

# Potential biases/evaluation challenges

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## Those we can not rule out

- Reactions to inequity caused by randomization
  - Positive or negative impact on control group
  - Currently following outcomes of similar students in matched non-AVID schools
  
- Sample size
  - Affects statistical significance (especially in sub-group analysis)

# Future AVID work

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- Will particular AVID groups (boys and youth from first-generation PS household) attend university in larger numbers?
- Will AVID students make better use of student financial aid?
- Final report and cost-benefit study in 2012

# Appendix: Related academic interventions

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- QOP (Hahn et al., 1994; Rodriguez-Planas, 2010)
  - Includes financial incentives
- IHAD (Kahne and Bailey, 1999)
  - Includes early promise of 'last dollar scholarship'
- Career Academies (Kemple and Willner, 2008)
  - Focused on career themes
- GEAR UP ←
- Upward Bound (Seftor et al., 2009) ←
- Upward Bound Math-Science (Seftor and Calcagno, 2010) ←

**Treatment broadly similar to AVID, but focus on low-income students**