



Exploring college remediation & social mobility

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Background

- Between 40% and 60% of all first-year students arrive at college unprepared and require some form of remediation (Bettinger & Long, 2009; Long & Boatman, 2013; Scott-Clayton & Rodriguez, 2012).
- There is an incentive to make remediation optional, lower standards for entrance into traditional college courses, or pursue other measures that will protect states from the myriad costs associated with remediation (Mangan, 2014).
- Only one other study has examined remediation and labor market outcomes (Martorell and McFarlin, 2011).
- Few, if any, studies, have looked at the role remediation plays in creating pathways for social mobility



Purpose

- This grant project uses NCES' Educational Longitudinal Study of 2002 to explore college remediation and social mobility
 - Examine individual and high school context variables that predict remedial course enrollment
 - Understand the effect of remedial course enrollment on social mobility
 - Explore whether remedial course enrollment has heterogeneous effects on those from different backgrounds



Remediation and college access: The role of preparation, family, and high school context

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Motivation

- We know surprisingly little about what factors are associated with the need to enroll in college remedial courses
- We also know little about the ways in which students assigned to remediation in college are different from those who do not attend at all
- This information is vital to current policy discussions about remediation and the extent to which remediation provides access to college.

Research questions

- What individual factors (e.g., preparation, social capital, cultural capital, socio-economic status) are associated with enrolling in remedial classes while in college?
- To what extent is high school context (e.g., advanced course offerings, socio-economic status, cultural and social capital aggregates) associated with enrolling in remedial classes while in college?
- In what ways do individual and high school factors predict whether someone does not attend college or attends college but needs remediation?

	<i>Compared to remediation in college</i>	
	Did not attend college	Attended college (no remediation)
<i>Demographics</i>		
Asian	-	
African American		
Latino		-
Other race		
SES	-	+
Female	-	
<i>Preparation</i>		
Math assessment	-	+
English assessment	-	+
Highest math (trig, pre-calc, calc)	-	+
<i>Habitus</i>		
Expect college degree	-	+
Expect white collar job by age 30		
<i>Social capital</i>		
Construct	-	+
Parental involvement in community		
<i>Cultural capital</i>		
Construct	-	+
Attend plays, theater, concerts		

Compared to remediation in college

Did not attend college Attended college (no remediation)

Demographics

Percent minority

Percent free/reduced lunch

-

+

Preparation

Percent AP/IB

Average math assessment

Average English

Percent highest math (trig, pre-calc, calc)

-

-

-

+

+

+

Habitus

Percent expect college degree

Percent expect white collar by age 30

-

+

Social capital

Average construct

Average parental community involvement

-

Cultural capital

Average construct

Average attend plays, theater, concerts

-

Discussion and implications

- Preparation is vitally important, but it does not tell the whole story
- Equity considerations
 - Student and high school SES play an important role
- Policy implications
 - Students from low SES families and from families with low levels of cultural and social capital could be better educated about the role remediation as a pathway to college
 - Study reiterates the important function of remediation as a gateway to higher education, particularly among students from low-resourced schools and from low SES families



Postsecondary Opportunities for the Underprepared: Effects of Remediation on Educational and Labor Market Outcomes

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Copy of the paper available at
<http://paul-umbach.com/research/>



Motivation

- We know surprisingly little labor market outcomes and college remediation
- Most of the work compares remedial college students to those who do not need remediation
 - This paints an incomplete picture about the role remediation plays in pathways to college and college outcomes
- Study seeks to begin to provide evidence about the role remediation has in social mobility

Purpose & research questions

- **Purpose:** Use ELS: 2002 to explore the effect of remedial course enrollment on labor market outcomes (earnings and employment status) and baccalaureate degree attainment.
- **R1:** Compared to those who do not attend college, do those who enroll in college and require remediation differ in their earnings and employment status eight years after high school graduation?
- **R2:** Among college students, do those enrolling in remedial classes have different labor market and educational outcomes than those who do not?

Data: Variables (from ELS:2002)

Treatment-remediation

- Any
- Reading
- Writing
- Math

Dependent

- Earnings
- Unemployment
- Baccalaureate degree attainment

Covariates

- Gender
- Race
- SES
- Reading achievement test
- Math achievement test
- Highest math in HS
- Hours studying in HS
- Hours working in HS
- Social capital composite
- Cultural capital composite
- Expectations about degree
- Education needed for job at 30
- HS fixed effects



Comparison groups, subgroups

- Comparison groups:
 - Non-college group
 - College students without remediation
- Subgroup analyses: URM, SES, BA/BS earners, non-degree earners

Analytical approach

- The challenge we face in studying the effects of remediation is selection bias
 - Those who select in and/or are assigned to remedial coursework are substantively different than those who do not, in ways that affect outcomes
 - e.g., preparation, family background
- Gold standard would be to randomly assign students to remediation, but this is not practical
- Use propensity score analysis to reduce the effects of selection bias
 - Use PSA to find controls who look just like treated, assume their outcome is good counterfactual for treated
 - Intuition: PSA tries to replicate a random experiment

Inverse probability weighting

- A type of propensity score analysis
- Two stage:
 1. Model treatment and save probabilities

$$\text{logit}(\text{remediation} = 1) = \beta_0 + \beta_1(x_i) + \beta_2(x_i) + \dots \beta_k(x_{ki})$$

2. Run model with covariates and inverse probability of treatment as a weight

How do the weights work

- Control units who look more like treated units are given larger weights
- ATET weights: Treated units = 1, Control units = $p / (1 - p)$
- What type of units are weighted heavily?

p	Weights	
	Treated	Control
0.05	1.00	0.05
0.25	1.00	0.33
0.50	1.00	1.00
0.75	1.00	3.00
0.95	1.00	19.00

Advantages of IPW over other matching methods

- Other methods remove individuals from sample, which raises concerns about external validity
- Other methods offer a dizzying array of choices
 - Size of caliper? How many matches per treated? Should I use with or without replacement?
- Doubly robust
 - Because you have to do some type of statistical analysis after matching, why limit yourself to a t-test?
 - Using regression will allow you to control for remaining differences between the two groups after matching
 - Thus, a matching procedure that easily allows the researcher to run a multivariate model on the matched dataset should be preferred
- Ease of use and transparency

Example of balance

	Not weighted		Weighted	Unweighted diff.	Weighted diff.
	No college	Remediation	No college	Rem-No coll	Rem-No coll
Reading test	24.443	30.118	30.131	5.676	-0.012
Math test	38.709	49.240	49.251	10.531	-0.011
High math - Alg 2	0.260	0.326	0.340	0.066	-0.014
High math - Trig	0.161	0.459	0.474	0.298	-0.016
HS GPA	2.973	4.190	4.200	1.217	-0.010

Non-college comparison group

Effect of any remediation on earnings

	All		4-year college		Community College	
	All obs.	Earnings>0	All obs.	Earnings>0	All obs.	Earnings>0
All students	6758.96 *** (514.76)	4835.82 *** (602.40)	9669.12 *** (685.93)	6905.18 *** (791.4)	4887.52 *** (576.47)	3979.33 *** (537.56)
URMs	4978.82 *** (715.31)	3499.48 *** (854.72)	7266.13 *** (968.76)	4824.55 *** (1160.14)	3894.50 *** (849.92)	3191.12 *** (748.92)
Low SES	6001.38 *** (826.37)	5073.54 *** (1029.75)	7388.06 *** (1278.51)	7848.74 *** (1633.375)	5405.33 *** (1086.90)	5000.07 *** (812.94)
High SES	7913.38 *** (1413.46)	4421.62 ** (1587.29)	10978.21 *** (1726.62)	6115.61 ** (1884.14)	5128.18 ** (1906.98)	4795.19 * (1878.57)
No BA/BS	3307.08 *** (502.70)	3509.38 *** (603.86)	2786.99 *** (655.75)	4440.93 *** (789.96)	3579.65 *** (531.67)	3117.05 *** (640.31)

*p<.05, **p<.01, ***p<.001

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*p<.05, **p<.01, ***p<.001

Non-college comparison group

Effect of any remediation on unemployment

	All obs.	4yr-college	Community college
All students	-0.360* (0.143)	-0.264 (0.244)	-0.447*** (0.122)
URMs	-0.34* (0.154)	-0.27 (0.258)	-0.362* (0.158)
Low SES	-0.34 (0.198)	-0.34 (0.197)	-0.440* (0.202)
High SES	-0.54 (0.376)	-0.19 (0.480)	-0.870* (0.381)

*p<.05, **p<.01, ***p<.001

College comparison group

Effect of any remediation on earnings

	All		4-year college		Community College	
	All obs.	Earnings>0	All obs.	Earnings>0	All obs.	Earnings>0
All students	559.50 (471.96)	163.74 (510.23)	1218.01 (639.48)	629.25 (673.32)	-106.27 (695.85)	-299.22 (774.61)
URMs	-387.10 (764.70)	-393.43 (837.43)	623.05 (1154.19)	-679.95 (1223.98)	618.80 (1028.67)	170.41 (1147.81)
Low SES	965.46 (1097.62)	800.45 (1234.59)	2440.00 (1717.08)	1602.39 (1900.53)	-34.89 (1388.91)	121.06 (1559.59)
High SES	1132.79 (887.22)	523.04 (942.14)	2111.34* (1009.75)	1660.60 (1050.35)	-703.20 (1821.20)	-1924.22 (2032.56)
	1095.62 (756.03)	222.96 (762.40)	1614.27 (857.28)	465.13 (864.16)	-1055.87 (1541.03)	-1103.05 (1550.25)

*p<.05, **p<.01, ***p<.001

College comparison group

Effect of any remediation on unemployment

	All obs.	4yr-college	Community college
All students	-0.009 (0.088)	0.066 (0.118)	-0.096 (0.132)
URMs	-0.045 (0.144)	-0.143 (0.222)	-0.043 (0.199)
Low SES	-0.023 (0.194)	-0.207 (0.291)	0.094 (0.269)
High SES	-0.223 (0.175)	0.003 (0.205)	-0.611 (0.369)

*p<.05, **p<.01, ***p<.001

Effect of remediation on baccalaureate attainment

	All	4yr-college	Community college
All students	0.030 (0.053)	0.007 (.063)	0.095 (.099)
URMs	0.132 (0.103)	-0.043 (.126)	0.510** (.189)
Low SES	-0.076 (0.147)	-0.216 (.120)	0.004 (.237)
High SES	-0.053 (.086)	-0.042 (.098)	0.060 (.193)

*p<.05, **p<.01, ***p<.001

Effect of different remediation subjects on earnings

Remediation subject	Comparison group			
	No College		College	
	All obs.	Salary>0	All obs.	Salary>0
Reading	4796.13 *** (706.76)	3698.01 *** (702.27)	52.30 (464.55)	-343.00 (502.32)
Writing	5629.65 *** (576.32)	4441.70 *** (679.79)	914.25 (475.75)	-1.65 (513.12)
Mathematics	7138.53 *** (545.45)	5231.28 ** (638.84)	1159.84 * (466.94)	811.36 (502.98)

*p<.05, **p<.01, ***p<.001

Effect of different remediation subjects on unemployment

Remediation subject	Comparison group	
	No college	College
Reading	-0.355* (.151)	-0.025 (.102)
Writing	-0.396* (.165)	-0.100 (.093)
Mathematics	-0.343* (.146)	0.039 (.090)

*p<.05, **p<.01, ***p<.001



Discussion

- We provide some evidence to suggest that remediation does not seem to be as problematic as perceived by many
- Remediation appears to provide opportunities and may be a way toward upward mobility



Implications

- Perhaps encourage high school students on the margins to attend college and seek remediation
- Policies should not limit capacity/access to remediation
- Invest financially in remediation and find ways to improve remedial coursework



Limitations

- Difficult to argue that we've fully removed selection bias
- Right now, we're relying on self-reported participation in remediation

What's next?

- Working to further refine models
- Sensitivity analysis
- We're waiting for college transcript data
 - Explore dosage effects
 - Spend a bit more time analyzing subject specific effects
- Related work:
 - Community college's labor market outcomes
 - Accelerated math remediation – summer intensive program
 - Local school district looking at college readiness



Questions and Comments

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