Behavioral Economics of Education
Some Puzzles, Progress, and Possibilities

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Outline

1. **The puzzle of high returns to schooling**

2. **Why it's difficult to explain puzzle with traditional investment model**

3. **Concepts from psychology and sociology that may help**

4. **Some policy proposals based on the behavioral approach and empirical evidence**

5. **Possibilities for further research**

What do early school leavers forgo in earnings?

Compulsory schooling policies provide ideal instrument

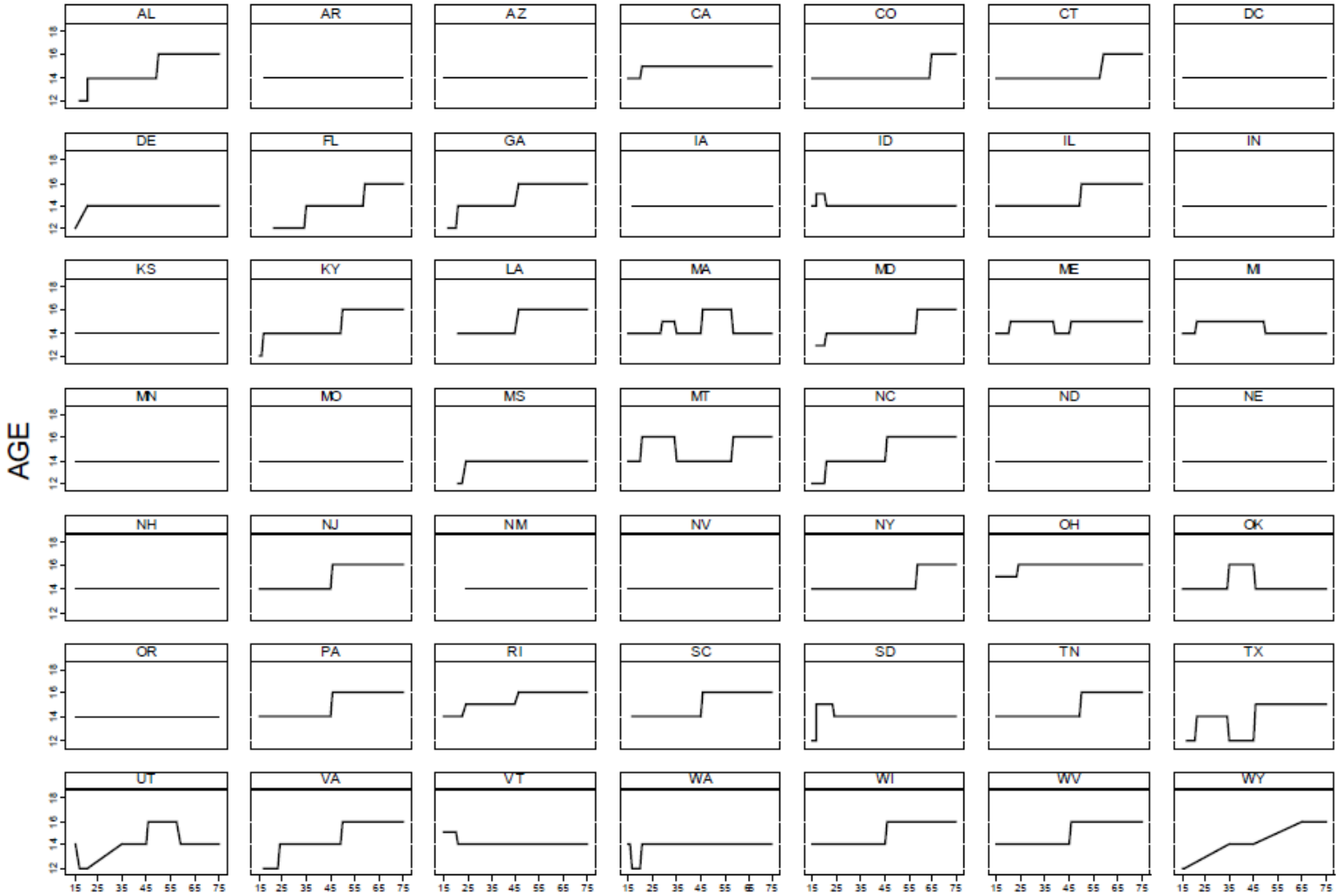
prevents some from voluntarily leaving by restricting choice

treatment from it is on 'noncompliers'

Strange policy from investment view of schooling

Motivation often from belief that early leavers not behaving in their own best interest

Minimum School Leaving Ages in the U.S. by State
1915 - 1975



Graphs by state abbreviation

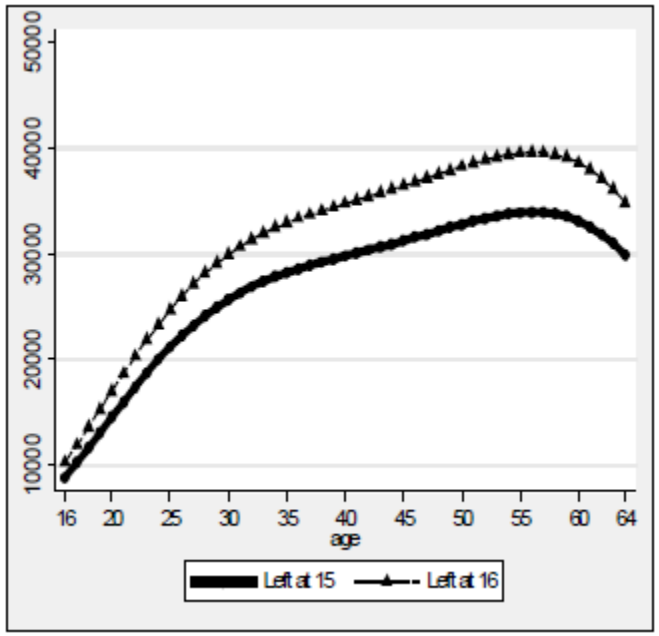
IV estimates of returns to compulsory schooling

7.4%-11,3%	Acemoglu and Angrist (1999), U.S. 1914-1972 laws
13.2%	Oreopoulos (2003) Canada
11.4%	Oreopoulos (2009), U.S. states, 1970 - 2001
10.1%	Angrist and Krueger (1991), QOB, U.S.

U.S. and Canadian robustness checks: laws don't affect immediate earlier cohorts, later education levels, and are not affected by trends, region controls

15.3%	Harmon and Walker (1995), Britain
12.5%	Oreopoulos (2007) UK, Britain
4%	Devereux and Hart (2008) Britain
1.6 - 5.6%	Pischke and Wachter (2009) Germany
3 - 7%	Grenet (2009) France, and Britain
9.4%	Aakvik, Salvanes, and Vaage (2010) Norway

Projected Annual Earnings Profile for U.S. Males Leaving School at Ages 15 and 16 (2000 U.S. dollars)



Percent increase in present value wealth from one year of compulsory schooling

	(1)	(2)	(3)
	Discount rate		
	0.03	0.05	0.08
Percent change in present value wealth, OLS estimate	11.0%	10.8%	8.5%
Percent change in present value wealth, IV estimate	17.6%	16.9%	16.0%
Percent change in present value wealth, assuming 8% return	7.1%	6.4%	5.6%
Hurdle rate	1.20%	1.80%	2.60%

Estimated Effects from an Extra Year of Compulsory Schooling Before and After Conditioning on Income (Oreopoulos and Salvanes, JEP forthcoming)

Outcome	Mean	Change in mean from 1 Year of Comp. Schooling Before Inc. Controls	Change in mean from 1 Year of Comp. Schooling After Inc. Controls	Sample Specification
Log weekly income	3.06	0.131 [.006]***	NA	Working
Log Occupational Prestige Score	3.27	0.063 [.003]***	0.046 [.003]***	Working
Unemployed	0.045	-0.005 [.002]***	NA	Full
On welfare	0.019	-0.015 [.002]***	NA	Full
In Jail	0.027	-0.006 [.003]*	NA	Black men 21-65 yrs old
In mental institute	0.003	-0.001 [.000]*	NA	Full
Probability of dying within 10 years (^)	0.11	-0.037 [.006]***	NA	14 yrs old in 1914-1939 in 1960-1980 Censuses

Traditional model of school attainment

Efficient Models of School Choice

Maximize lifetime utility, $V(S,t)$, by choosing Whether to take 1 more year of school (S = 1), or not (S = 0)

$$V(S,t) = u(c(0)) - \phi(S) + \sum_{t=1}^{T} \delta^t E\left[u(c(t)) + \theta(S,t)\right]$$

Subject to: $\sum_{t=1}^{T} R^t c(t) = \sum_{t=1}^{T} R^t y(S,t)$

$$c(0) = y(S,0)$$

$u(c(t)) \equiv$ year t utility from consumptio n

$\theta(S,t) \equiv$ non - pecuniary utility from school (not related to income)

$\delta^t \equiv$ geometric discount rate on future utility

$y(S,t) \equiv$ school dependent income in year t

$R^t \equiv$ financial discount rate

Optimal School Choice is to drop out (S=0) if:

$$-\frac{1}{\lambda^*}\frac{\partial u(y(S,0))}{\partial S}+\frac{1}{\lambda^*}\frac{\partial \phi(S)}{\partial S}>\sum_{t=1}^{T}R^t\frac{\partial y(S,t)}{\partial S}+\frac{1}{\lambda^*}\sum_{t=1}^{T}\delta^t\frac{\partial E\theta(S,t)}{\partial S}$$

Disutility from Forgone Earnings +
Effort Cost from Additional School

greater than

Expected PV Earnings Gains +
Expected PV Non-Pecuniary Gains

What explains why some forgo very large returns?

Risk aversion explanation?

wider distribution of outcomes lowers interest in higher returns

but little evidence of higher variance for HS grads (Chen, 2006)

Individuals may abhor school

enough to be willing to forgo lifetime benefits?

dropouts tend to describe school as uninteresting rather than stressful (Bridgeland et al., 2006)

Similar considerations for other academic decisions?

less convincing evidence of high returns at higher levels, but estimates generally point in that direction

Same for effort?

Behavioral explanations of dropout and other early school leaving decisions

Myopia

Human nature to focus on the present, especially when faced with immediate costs or uncertain gains (Frederick et al, 2002)

'Affective' part of brain values immediate rewards more than delayed rewards (McClure et al., 2004)

Ability deliberative' part of brain to resist affective desires may depend on stress or circumstance (Fudenberg and Levine, 2005)

Adolescents more predisposed to making decisions based on spontaneous reactions (Spear 2000)

74% of dropouts regret not staying in school (Bridgeland 2006)

Behavioral explanations of dropout and other early school leaving decisions

Identity (sense of where one fits in society)

Strong need for students to feel part of a group (Bishop and Bishop, 2002)

wanting to be popular may require acceptance by leading crows and school norms (Akerlof and Kranton, 2010)

Lack of support for continuing may diminish students' interests from staying on

Projecting the belief that peer group will stay the same in the future may incorrectly diminish perceived long-term benefits from additional schooling

Behavioral explanations of dropout and other early school leaving decisions

Psychologically large transaction costs

Seemingly small differences in sign-up procedures and marketing lead to large differences in participation (e.g. Opt-in versus opt-out pension program, Beshears et al., 2006a)

Programs (or products) that are less salient or more difficult to quality for appear to have less impact (Tversky and Shafir, 1992)

Many individuals are passive or take a long time to change course in long-term decisions (Beshears et al., 2007)

More choice often leads to poorer decisions or failure to make decision at all (Schwartz, 2004)

Some Examples of Applying Behavioral Theory to Education Policy

1. Myopia

immediate incentives to offset immediate costs

Programs to help students think more long term when making decisions

2. Identiy

helping students avoid sterotyping themselves as poor students

3. Psychologically large transaction costs

simplifying the college/university application process

Angrist, Lang, and Oreopoulos (2009) AEJ: Applied

Financial incentives for academic achievement

~$1,000 for B-, B, ~$5,000 for B+ or more

randomly offered to first year university students (SFP)

additional email advisor program randomly offered (SSP)

some got both (SFSP)

Goal is to offset immediate costs and lack of motivation by offering immediate incentives to help realize longer-term benefits

Foster study skills, confidence, or academic-identity along the way to cause longer term performance improvement after incentive

TABLE 5—TREATMENT EFFECTS ON FIRST YEAR OUTCOMES IN THE SAMPLE WITH FALL GRADES

	SFP by type			Any SFP		
	All (1)	Men (2)	Women (3)	All (4)	Men (5)	Women (6)
Panel A. Fall grade						
Control mean	64.225	65.935	62.958	64.225	65.935	62.958
	(11.902)	(11.340)	(12.160)	(11.902)	(11.340)	(12.160)
SSP	0.349	−0.027	0.737	0.344	−0.014	0.738
	[0.917]	[1.334]	[1.275]	[0.917]	[1.332]	[1.274]
SFP	1.824	0.331	2.602			
	[0.847]**	[1.233]	[1.176]**			
SFSP	2.702	−0.573	4.205			
	[1.124]**	[2.010]	[1.325]***			
SFP (any)				2.125	0.016	3.141
				[0.731]***	[1.164]	[0.972]***
Observations	1,255	526	729	1,255	526	729
Panel B. First year GPA						
Control mean	1.805	1.908	1.728	1.797	1.885	1.731
	(0.902)	(0.908)	(0.891)	(0.904)	(0.910)	(0.894)
SSP	0.073	0.011	0.116	0.071	0.008	0.116
	[0.066]	[0.107]	[0.082]	[0.066]	[0.107]	[0.082]
SFP	0.010	−0.110	0.086			
	[0.064]	[0.103]	[0.084]			
SFSP	0.210	0.084	0.267			
	[0.092]**	[0.162]	[0.117]**			
SFP (any)				0.079	−0.042	0.147
				[0.056]	[0.095]	[0.073]**
Observations	1,255	526	729	1,255	526	729

TABLE 6—TREATMENT EFFECTS ON FIRST AND SECOND YEAR OUTCOMES

	Year 1			Year 2		
	All (1)	Men (2)	Women (3)	All (4)	Men (5)	Women (6)
Panel A. GPA						
Control mean	1.794	1.871	1.739	2.040	2.084	2.008
	(0.915)	(0.904)	(0.920)	(0.884)	(0.901)	(0.871)
SSP	0.011	0.017	0.002	0.050	−0.021	0.090
	[0.063]	[0.102]	[0.080]	[0.074]	[0.121]	[0.092]
SFP	−0.040	−0.144	0.038	−0.018	−0.081	0.030
	[0.061]	[0.098]	[0.080]	[0.066]	[0.108]	[0.085]
SFSP	0.168	0.016	0.244	0.072	−0.170	0.276
	[0.086]*	[0.146]	[0.111]**	[0.091]	[0.161]	[0.106]***
Observations	1,399	577	822	1,241	521	720

So far, financial incentives approach has not proved successful overall (Angrist et al., 2002, 2009, 2010, Fryer, 2010, and Bettinger, 2008), but perhaps kinds of incentives and who is offered them important

Morisano et al. (2010) Journal of Applied Psychology

undergrads at McGill with GPAs below 3.0 randomly given online goal-oriented exercises: e.g. close your eyes and imagine your ideal future, write about it for 15 minutes not concerned with grammar or spelling. What things do you imagine doing to meet your goals 5 years from now, 1 year from now?

Goal is to help students clearly define and articulate goals, giving more meaning and purpose to current activities

2.5 hour intervention

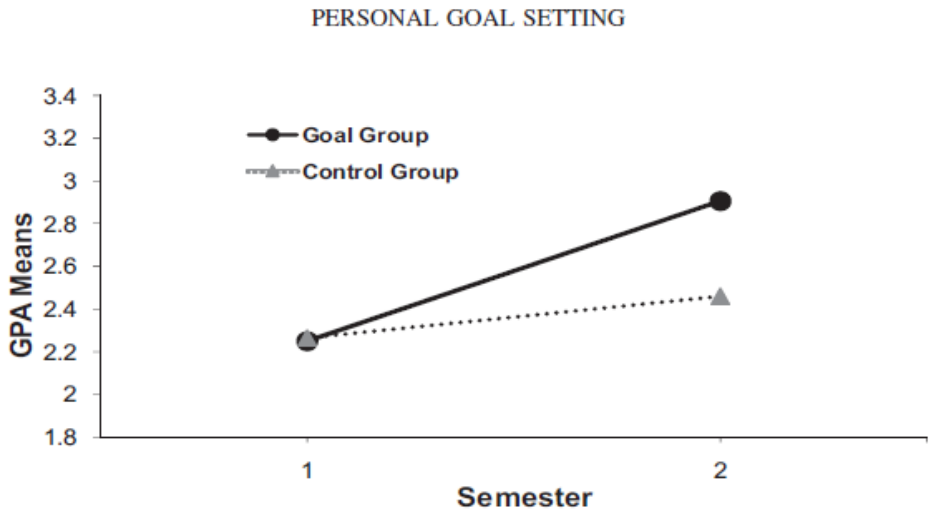
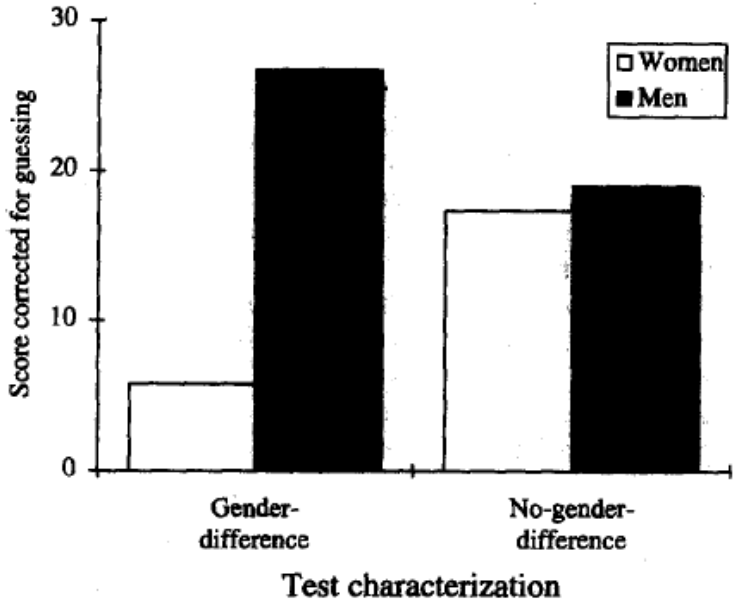


Figure 1. Group differences in grade-point average (GPA) change postintervention.

Stereotype Threat: Steele, C. M. (1997). American Psychologist

male and female undergrads performed difficult math test, randomly told that test produces gender differences, versus told test insensitive to gender differences

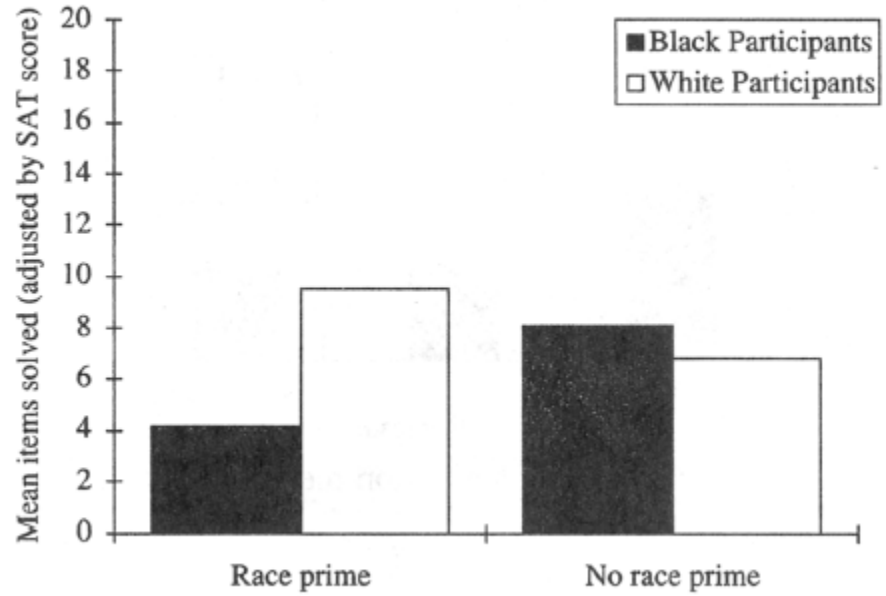
Figure 1
Mean Performance on a Difficult Math Test as a Function of Gender and Test Characterization



Steel and Aronson (1995) Journal of Personality and Social Psychology

'primed' before test to remind subjects of racial stereotypes (e.g. fill in blanks __ce, la__, or __or) versus asking students beforehand how much they preferred various types of music sports

Mean Performance on a Difficult Verbal Test as a Function of Whether Race Was Primed



Note. SAT = Scholastic Assessment Test.

Aronson, Fried, and Good (2001)

Pen Pal exercise for poor performing undergraduates:

asked to write letters to struggling high school students

Shown video about how brain is malleable, 'like a muscle'

Asked to include this theme in letter (that intelligence is not finite)

Similar procedure over 3 classes

9 weeks later surveyed on academic attitudes

Short-Term and Long-Term Effects of Intervention

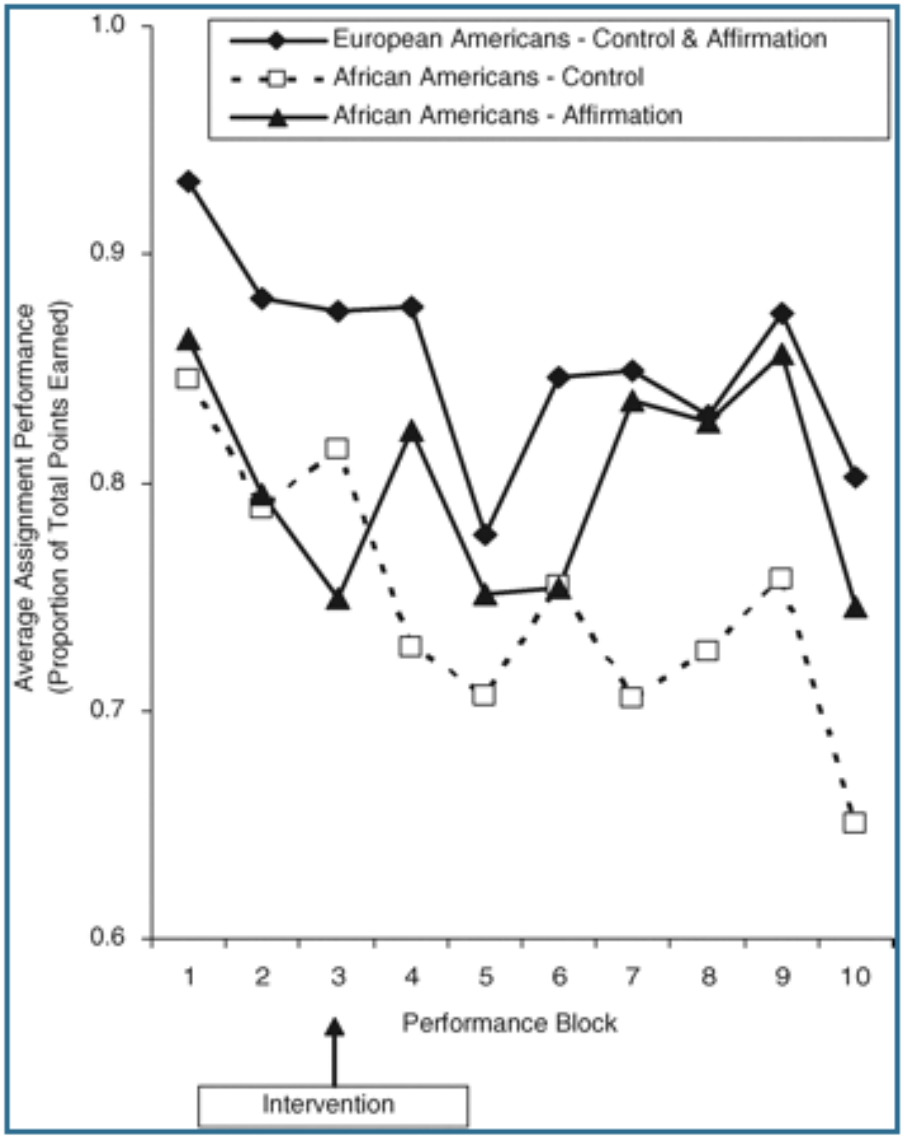
	Experimental condition			
	Malleable pen pal		Control pen pal	
Measure	Blacks (n = 16)	Whites (n = 12)	Blacks (n = 12)	Whites (n = 11)
Short-term malleability beliefs	5.04^{a}	4.81^{ac}	4.40^{ab}	4.07^{ab}
Long-term malleability beliefs	5.42^{a}	4.70^{ab}	4.31^{bc}	3.79^{cd}
Enjoy academics	4.38^{b}	5.43^{ad}	3.47^{c}	4.89^{ab}
Academics are important	4.77^{b}	5.61^{a}	3.89^{c}	5.67^{ab}
Perceived stereotype threat	5.22^{a}	1.62^{b}	4.70^{a}	1.42^{b}
Spring quarter GPA	3.32^{a}	3.55^{a}	3.05^{b}	3.34^{ac}

Cohen et al, 2006, Sceince

7th graders randomly asked to write about a personally important value, such as religion or relationships with friends, and integrate how value helped them overcome difficult situation(s)

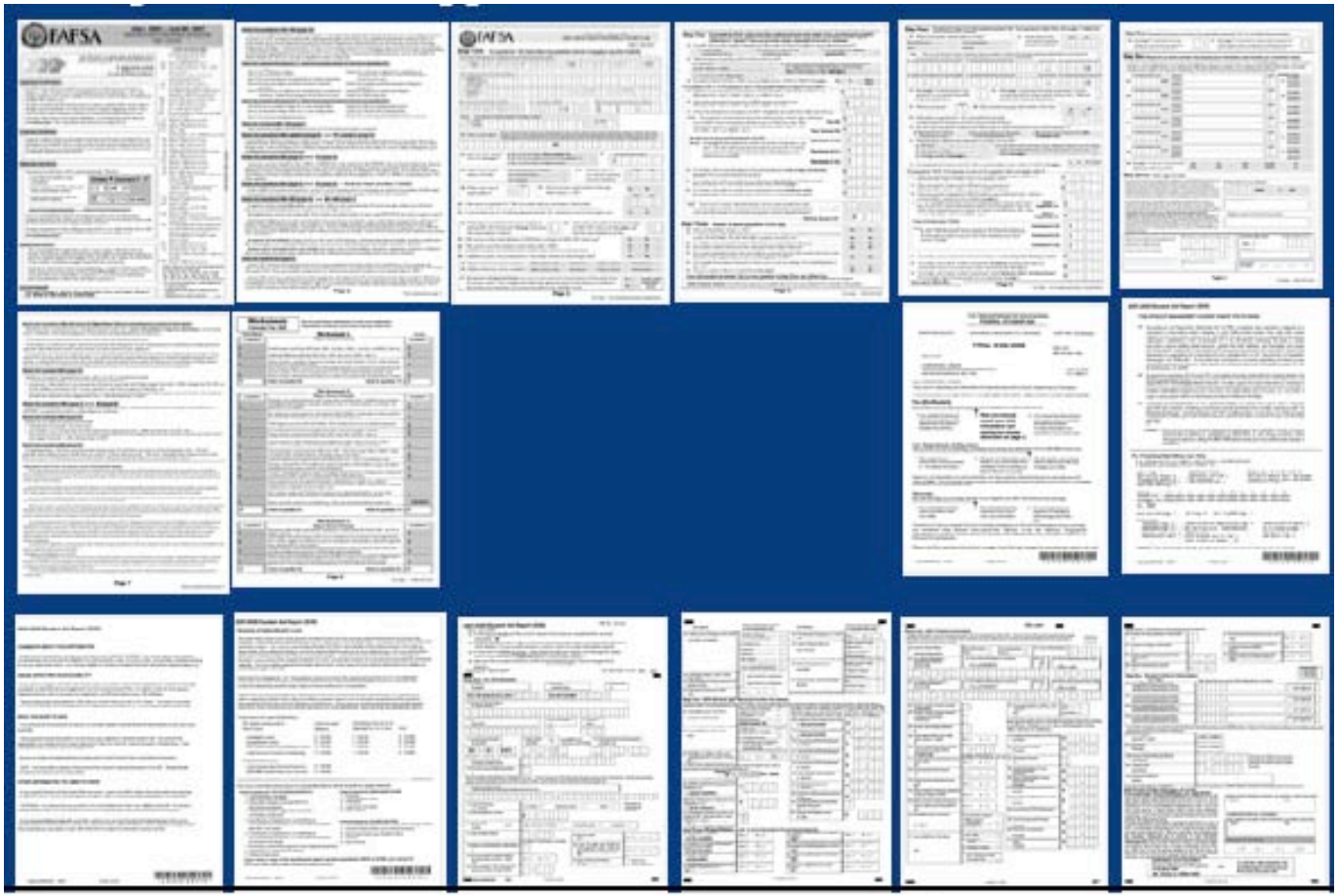
E.g. Art is important to me because it makes me feel calm. or "My friends and family are most important to me when I have difficult situation that needs to be talked about. My friends give me companionship and courage. My family gives me love and understanding".

Black/white GPA gap reduced by 40% and effect lasts over 2 years



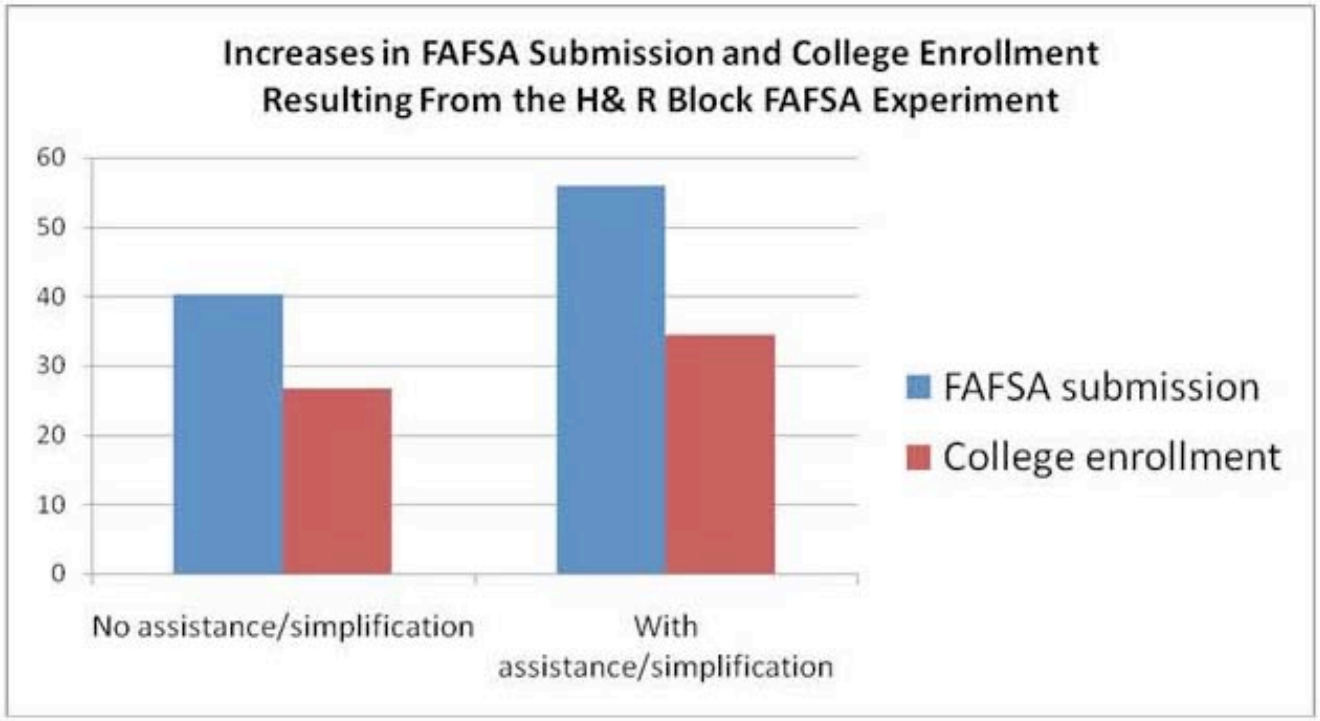
Bettinger, Long, Oreopoulos, and Sanbumatsu (2009)

Provided assistance and simplification in completing the Free Application for Federal student Aid (FAFSA)



Integrated tax-interview and software at H&R Block (tax preparation service company) office with the FAFSA application

main results for Grade 12s:



For indep. Program increased enrollment from ~3 to 4%

Oreopoulos and Ford (in progress)

Make college/university application process part of class for all HS students

Conclusions

For some, returns to schooling appear too large to be explained away through traditional investment models of school attainment decisions

Behavioral theories from psychology and sociology may be better suited to explain adolescent behavior over model of rational long-term optimization

Myopia, identity, large psychological transaction costs are some examples

Schooling may even affect preferences in a way that justifies staying on longer (eg. fosters love of learning, or improves patience)

Potentially inexpensive policies to improve academic achievement (and long term well-being) may exist - need for further research