Using School Administrative Data to Measure Non-Cognitive Skills

Tim Kautz and Wladimir Zanoni
Mathematica Policy Research
Chapin Hall

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Outline

Explore Alternative Measures Available to Schools

- "Real-world," non-cognitive skill measures: grades, absences, credits earned, disciplinary infractions
- Predict outcomes?
- Capture "non-cognitive" skills? (Does it matter?)
- Change the results of assessments and evaluations?

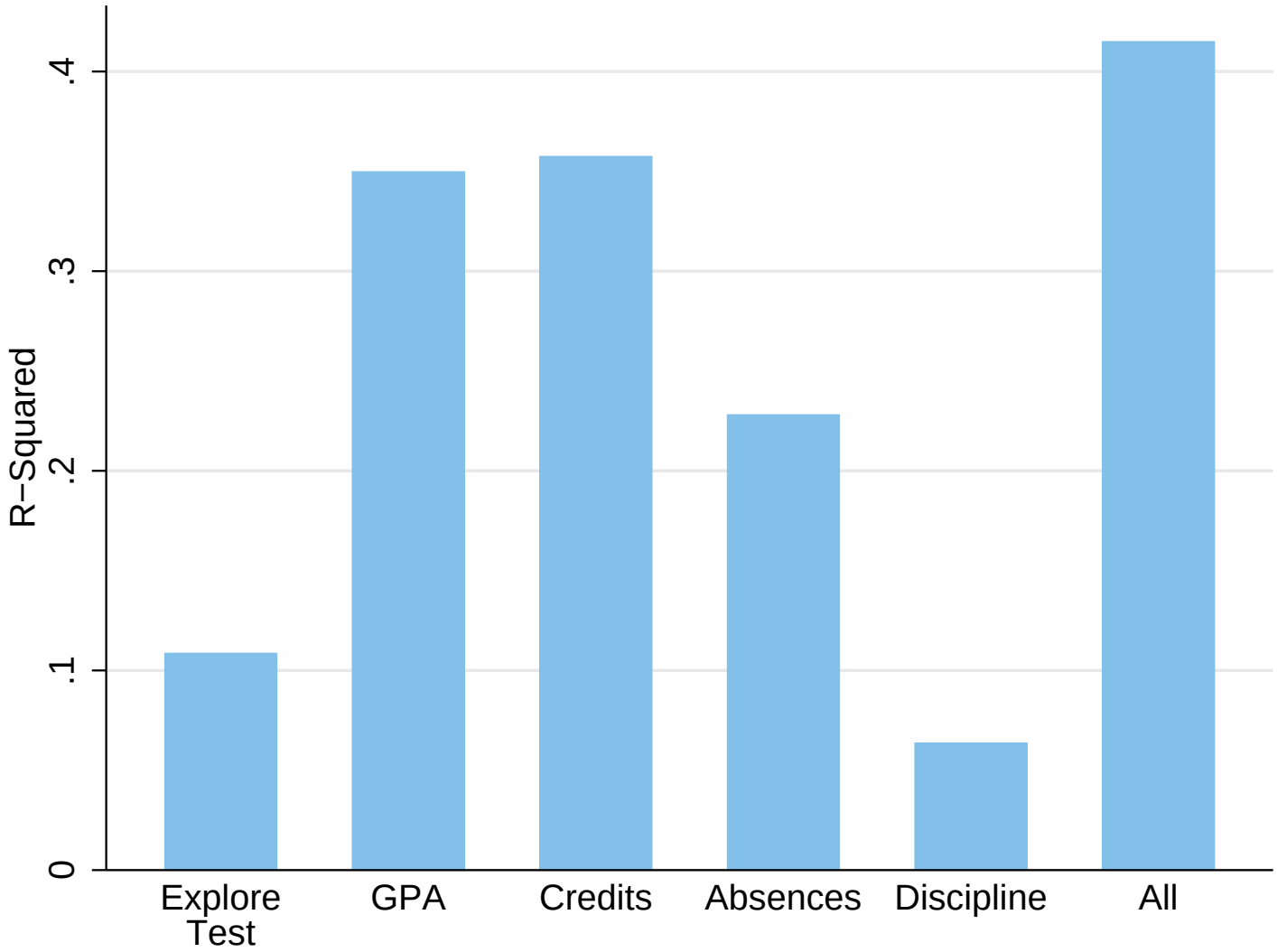
Current Study

- Use administrative data from Chicago Public Schools to study:
  1. The properties of grades, absences, credits earned, and disciplinary infractions and how to distill measures to "cognitive" and "non-cognitive" factors
  2. An evaluation of OneGoal (non-cognitive development program) that shows the importance of using these measures

These Other Measures Are Useful

- Capture something besides test scores
- Have high predictive power and incremental predictive power
- Build on work from the CCSR that shows the importance of these measures (Allensworth and Easton, 2007, 2005)

Figure 1: Predictive Validities of 9th Grade Measures for High School Graduation



Do These Measures Capture Non-Cognitive Skills? Does it matter?

- Apply insight from Duckworth et al. (2012); Borghans et al. (2011) that have shown that traditional measures of non-cognitive skills are correlated with academic measures
- Removes the cognitive component from these other measures to make them non-cognitive
- Whether "non-cognitive skill" is the best term, these measures are useful additions to achievement test scores

Using Non-Cognitive Measures Changes the Results of Evaluation

- OneGoal helps disadvantaged students enroll and persist in college by teaching non-cognitive skills
- Improves college enrollment by 10–20 percentage points
- Little evidence of selection based on test scores but much on "non-cognitive" dimensions (grades, absences, credits, discipline)
- 10%-30% of the effects can be explained by improvements in non-cognitive skills (behaviors)

Broader Implications

- Test scores miss important dimensions of skill
- Non-cognitive skills (or something like them) can be measured using readily available data

Outline

- Data
- Predictive Validities and Measurement Approach
- OneGoal Evaluation as a Case Study

Outline

Construct a Large Administrative Data Set

- Data sources: OneGoal, Chicago Public Schools (CPS), Chicago Police Department (CPD), National Student Clearinghouse (NSC), and American Community Survey (ACS)
- Contains records of all CPS students starting in the 2003–2004 school year through Fall of 2013 (over 200,000 observations)

Chicago Public School Data

- Includes detailed records of absences, GPA, achievement test scores (9th, 10th, and 11th grades), credits earned, disciplinary infractions, and race
- Match 99% of OneGoal participants to the administrative data
- Measurement error lower than in NLSY79

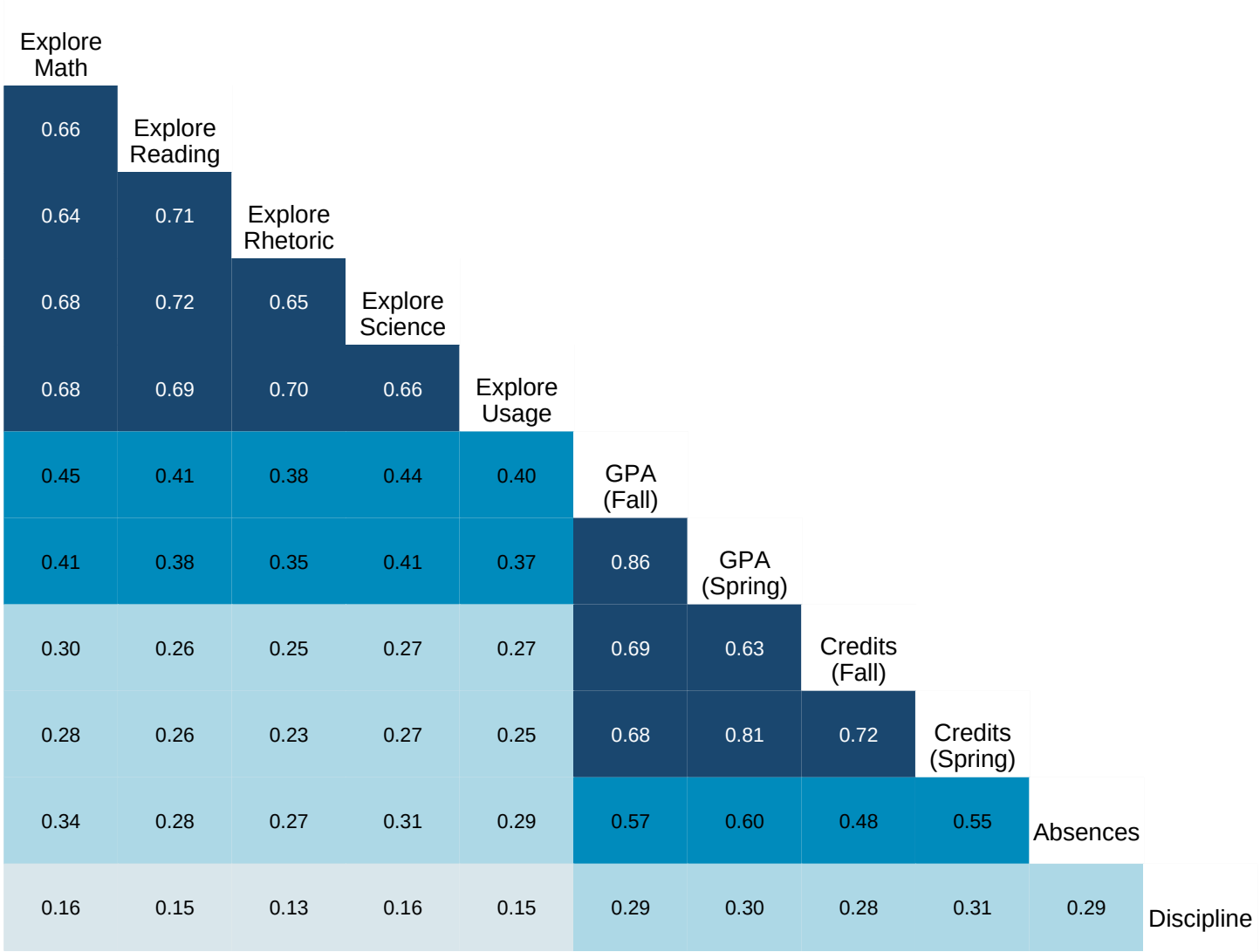
Outcomes

- Has information on all arrests in Chicago starting in 1999 from the Chicago Police Department
- Track student enrollment in college using the National Student Clearinghouse (NSC)

Outline

- Non-cognitive measures are not very correlated with test scores

Figure 2: Correlations between Ninth Grade Measures



- Non-cognitive measures predict outcomes that matter

Table 1: Predictive Validity (R^2) from Ninth-Grade Measures on Various Outcomes

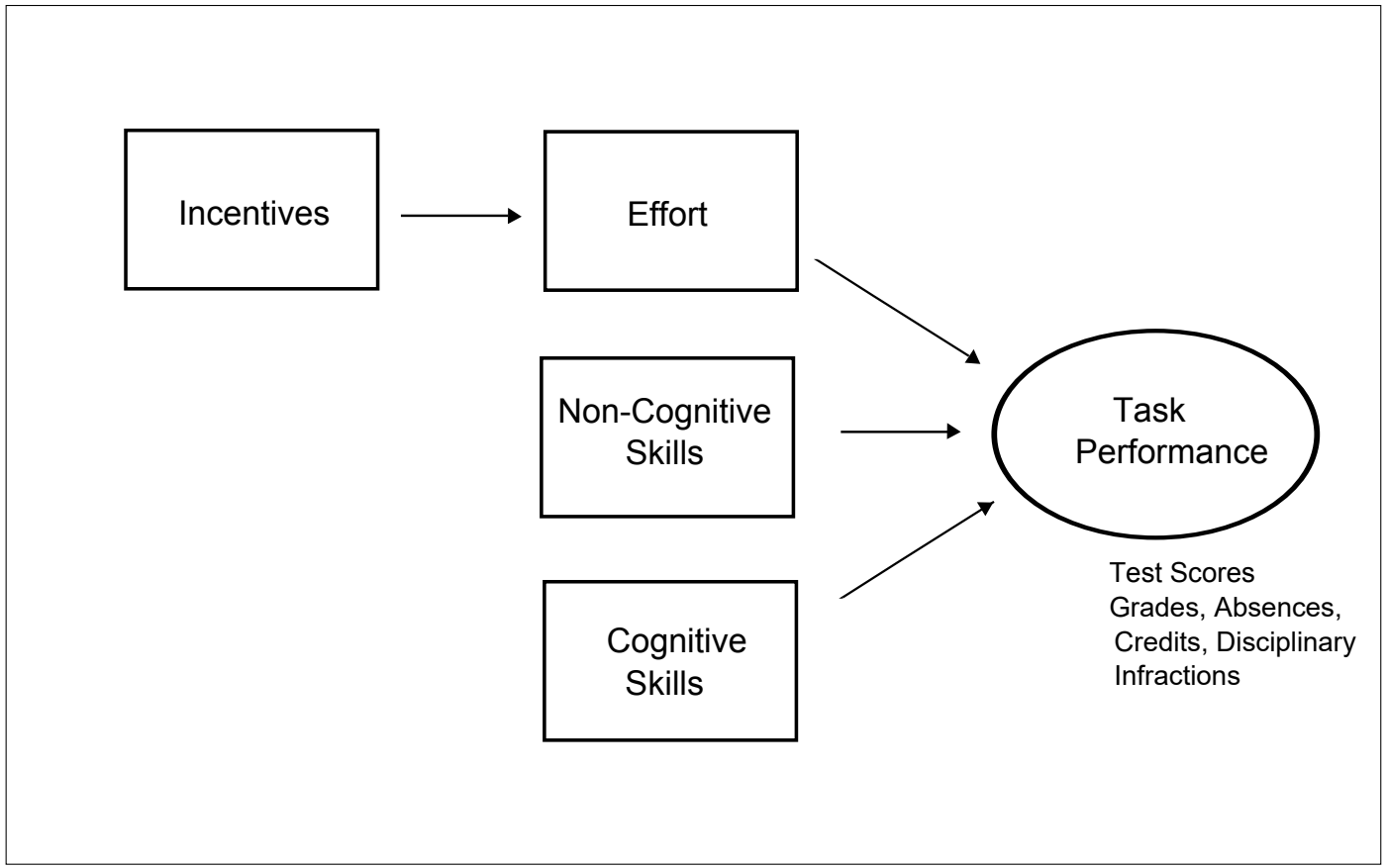
	Ninth-Grade Measure					
Outcome	Explore Test	GPA	Credits	Absences	Discipline	All
ACT Score (Grade 11)	**0.78**	0.22	0.05	0.10	0.02	**0.79**
GPA (Grade 11)	0.21	0.49	0.28	0.20	0.05	0.52
Absences (Grade 11)	0.09	0.22	0.12	0.35	0.03	0.39
Arrested within 4 Years	0.06	0.14	0.12	0.10	0.10	0.20
Grad HS within 5 Years	**0.11**	**0.35**	**0.36**	**0.23**	0.06	**0.41**
Enroll College within 6 Years	0.15	0.20	0.16	0.12	0.03	0.25
Grad College within 10 Years	0.17	0.17	0.07	0.09	0.01	0.23

The Approach to Non-Cognitive Skill Measurement

- Use absences, credits, GPA, discipline as non-cognitive skill
  LINK TO EVIDENCE ON GRADES AND NON-COGNITIVE SKILL.
- Two latent factors explain the data LINK TO SCREE PLOT.
- Apply a factor model to reduce measurement error, improve interpretation, and standardize for other skills

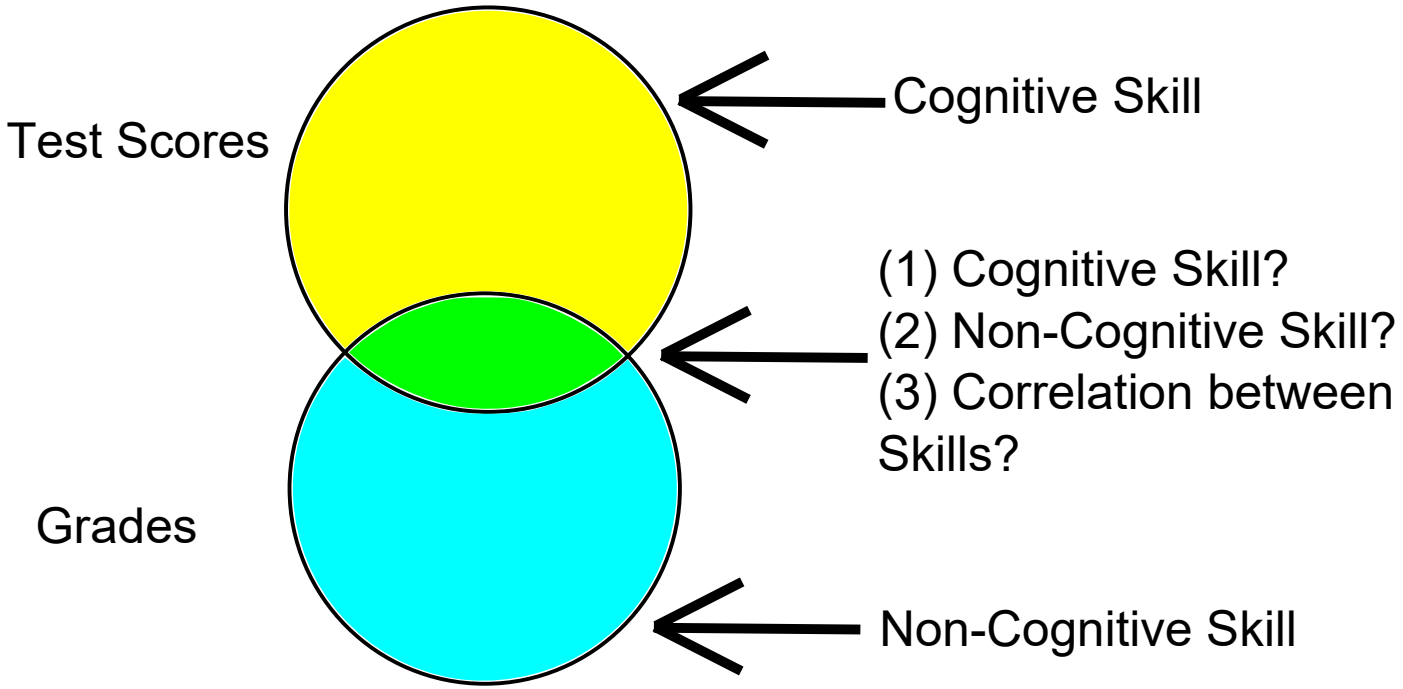
Identification Problems (and Solutions)

Figure 3: Determinants of Task Performance



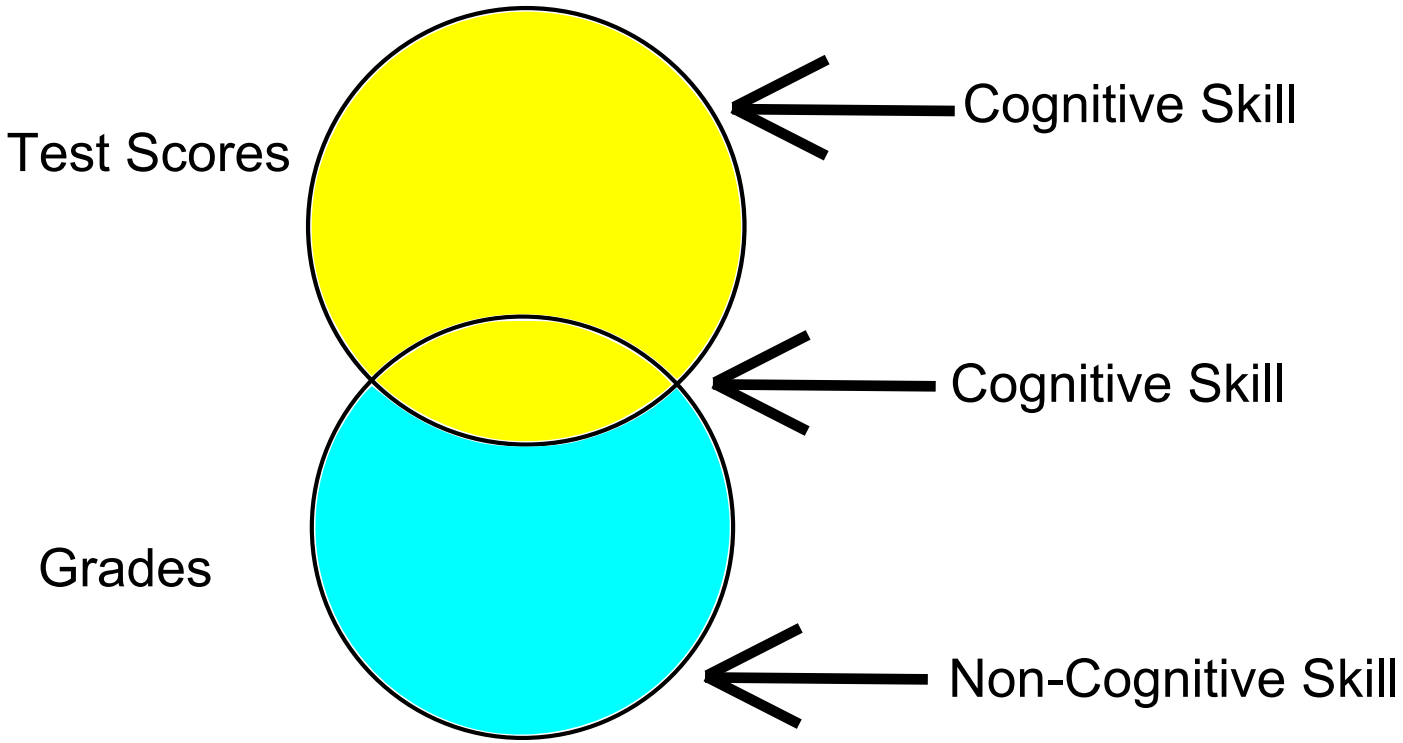
More Identification Problems

Figure 4: How to handle correlations between measures?



Normalization Assumption

Figure 5: Normalization



The Measurement System

For achievement test scores:

$$M_j = \alpha_{C,j} \underbrace{\theta_C}_{\text{Cognitive Skill}} + \varepsilon_j.$$

For credits, absences, grades, discipline:

$$M_j = \alpha_{C,j} \underbrace{\theta_C}_{\text{Cognitive Skill}} + \alpha_{N,j} \underbrace{\theta_N}_{\text{Non-Cognitive Skill}} + \alpha_{I,j} \underbrace{X}_{\text{Incentives}} + \varepsilon_j.$$

– Errors and factors are mutually independent
– Identification follows from Williams (2013)
– LINK TO VARIANCE DECOMPOSITION.

Figure 6: Predictive Validity of Cognitive and Non-Cognitive Skill for High School Graduation

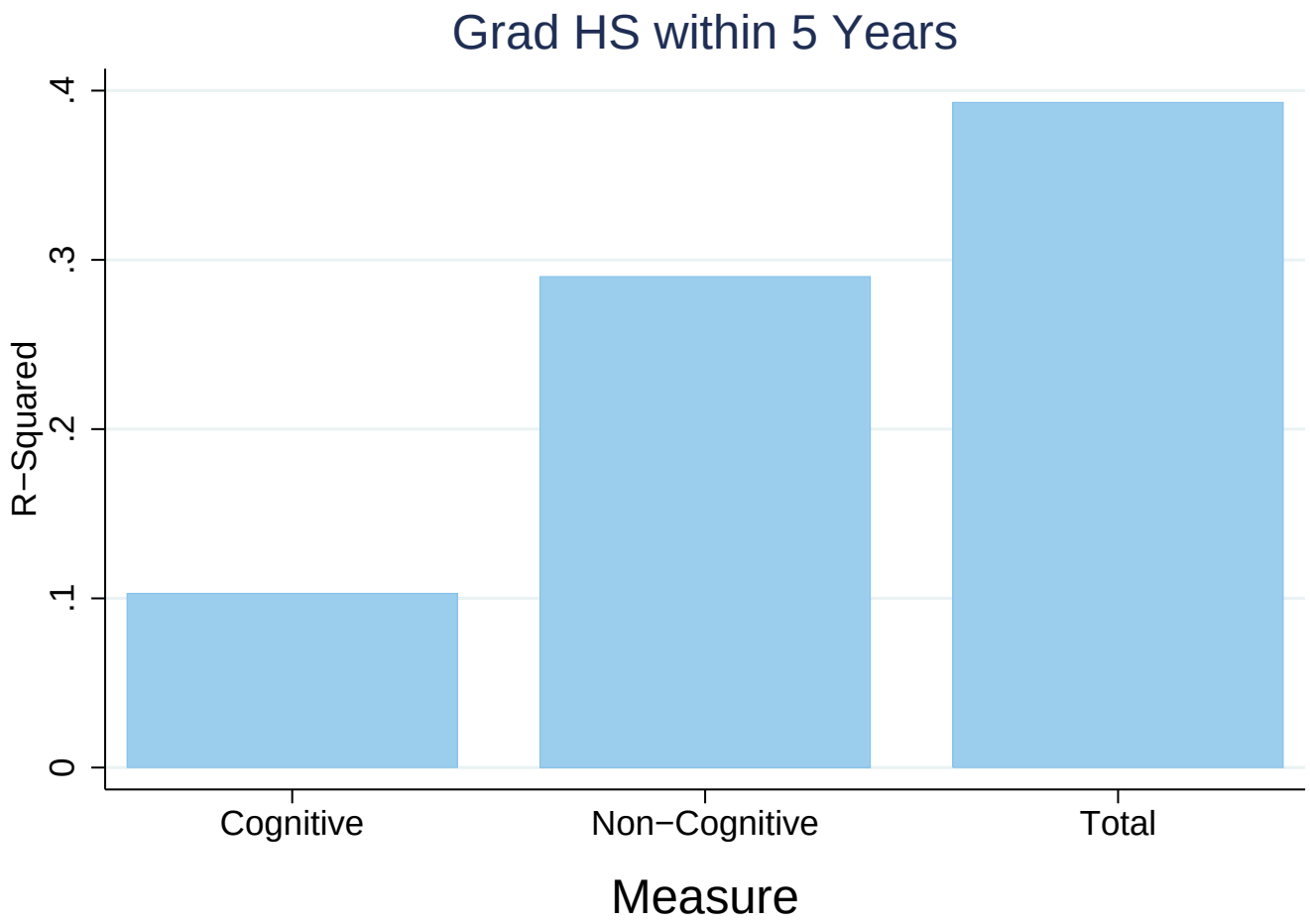


Figure 7: Predictive Validity of Cognitive and Non-Cognitive Skill for Arrest Rates

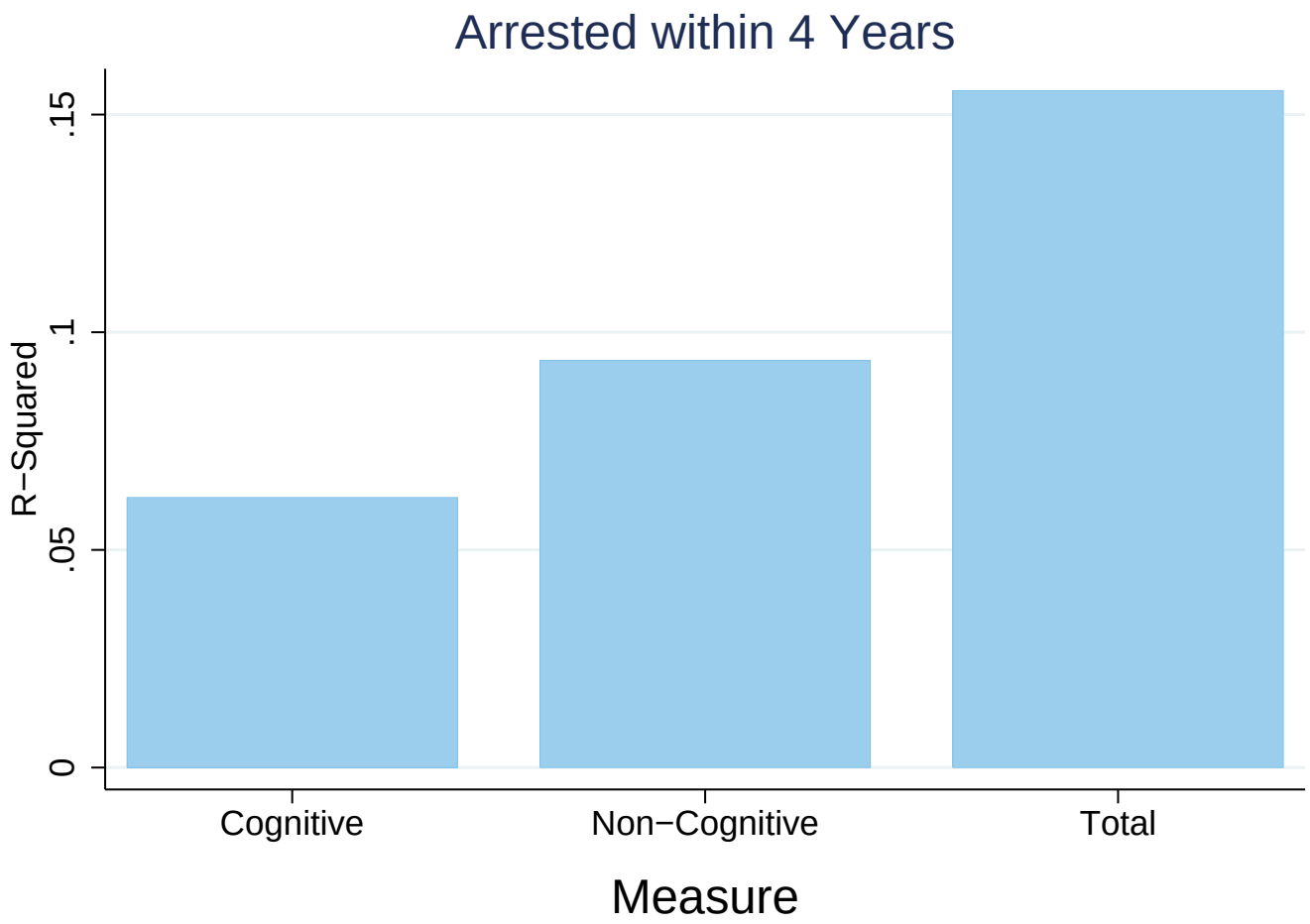
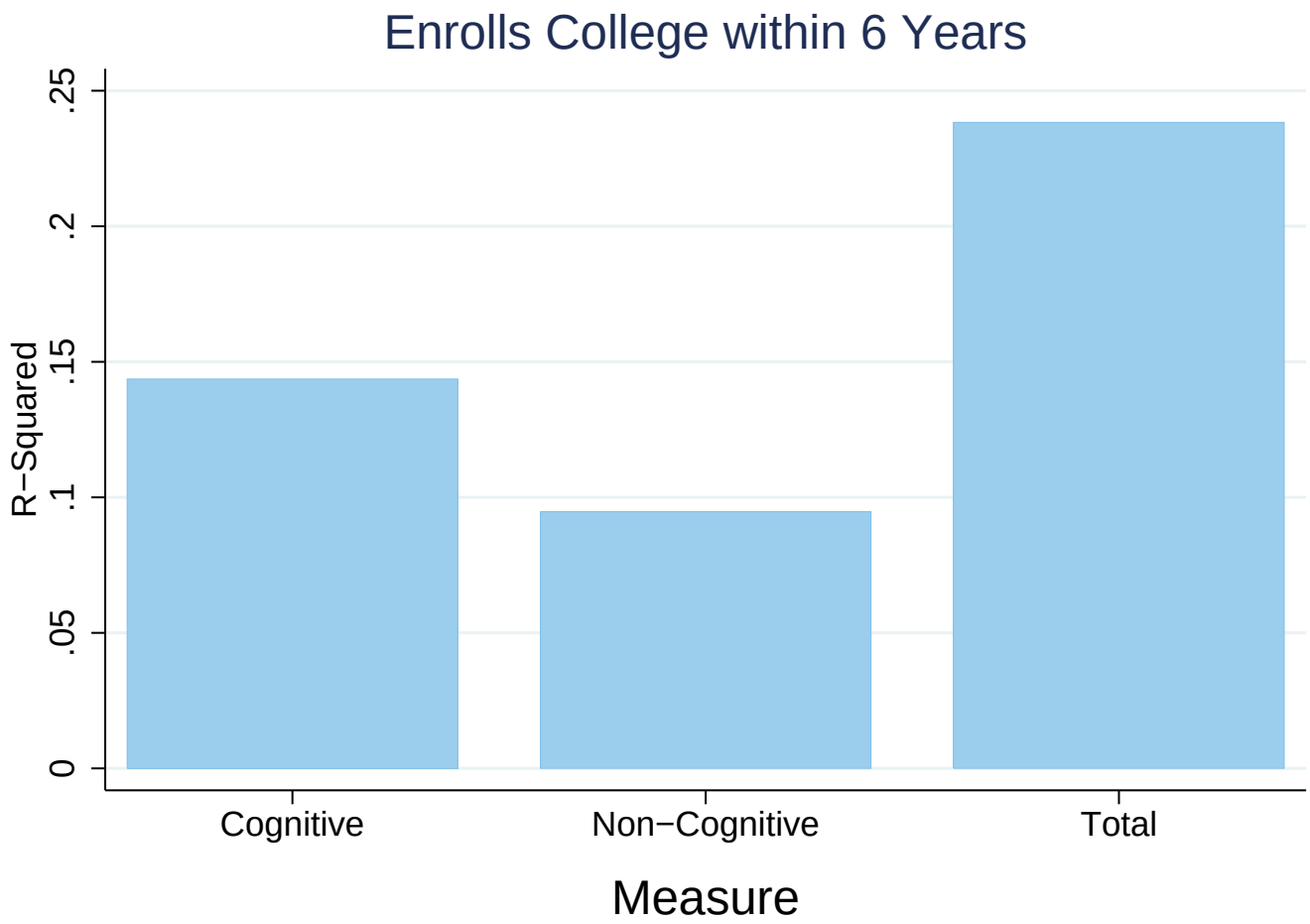


Figure 8: Predictive Validity of Cognitive and Non-Cognitive Skill for College Enrollment



Outline

OneGoal Programming

- Two-year, daily class taught by a OneGoal-trained CPS teacher, starting in 11th grade
- Improves "college access" (completing financial aid forms, teaching how to write college essays, and discussing college choices)
- Teaches specific non-cognitive skills LINK TO SIMILAR PROGRAMS.
- Mentor relationship lasts throughout the 1st year of college
- OneGoal might select more motivated students

Main Approach: Controlling for Pre-Program Skills and Demographics

- Demographics: race, cohort, neighborhood characteristics (median income, average employment rate, % of single parent households)
- Cognitive and non-cognitive skills based on 10th grade achievement test scores (Plan Test), grades, absences, credits earned, disciplinary infractions
- Use factor model to correct for measurement error in pre-program academic indicators

Figure 9: Effect of OneGoal on Outcomes (Males)

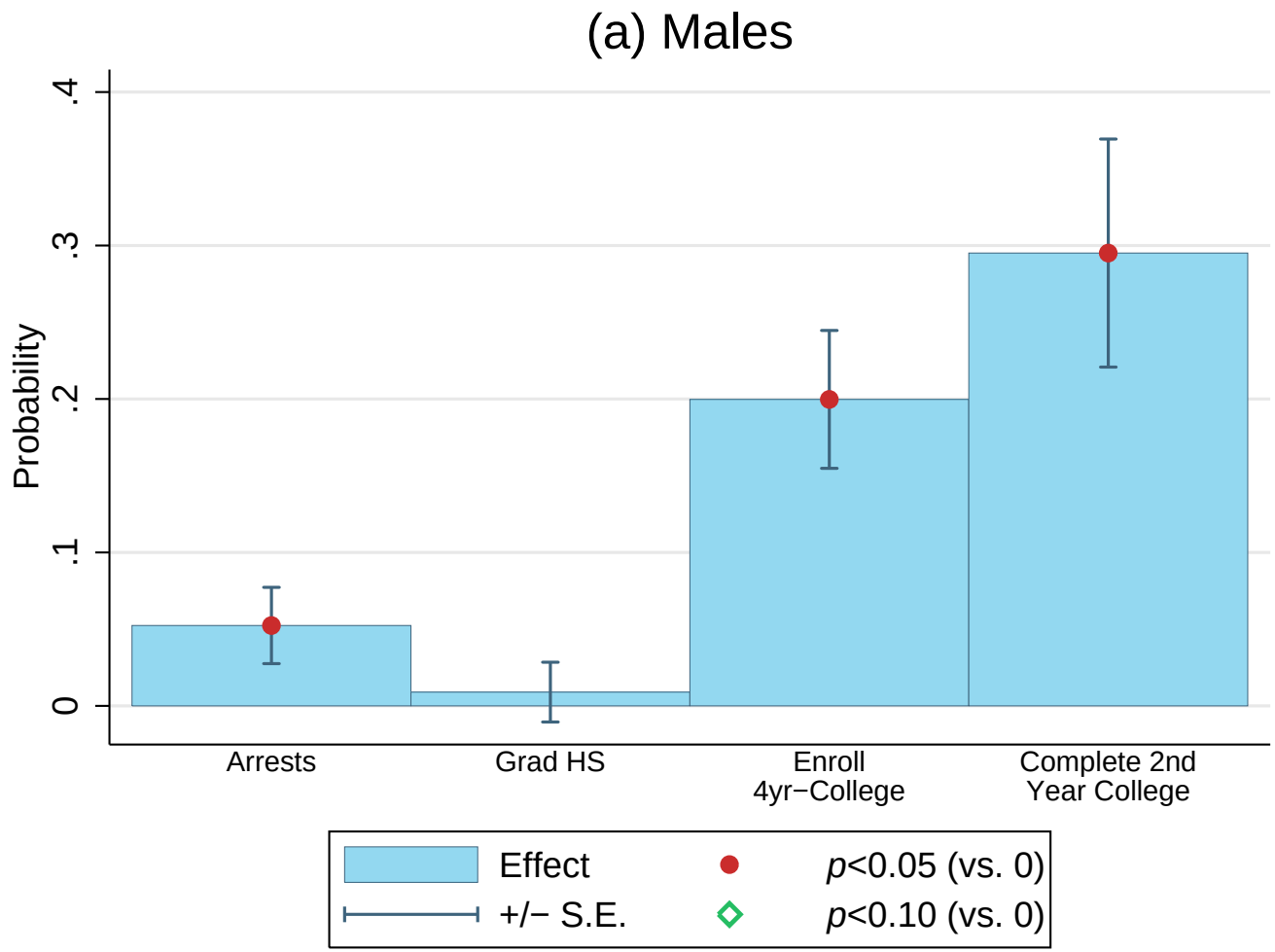
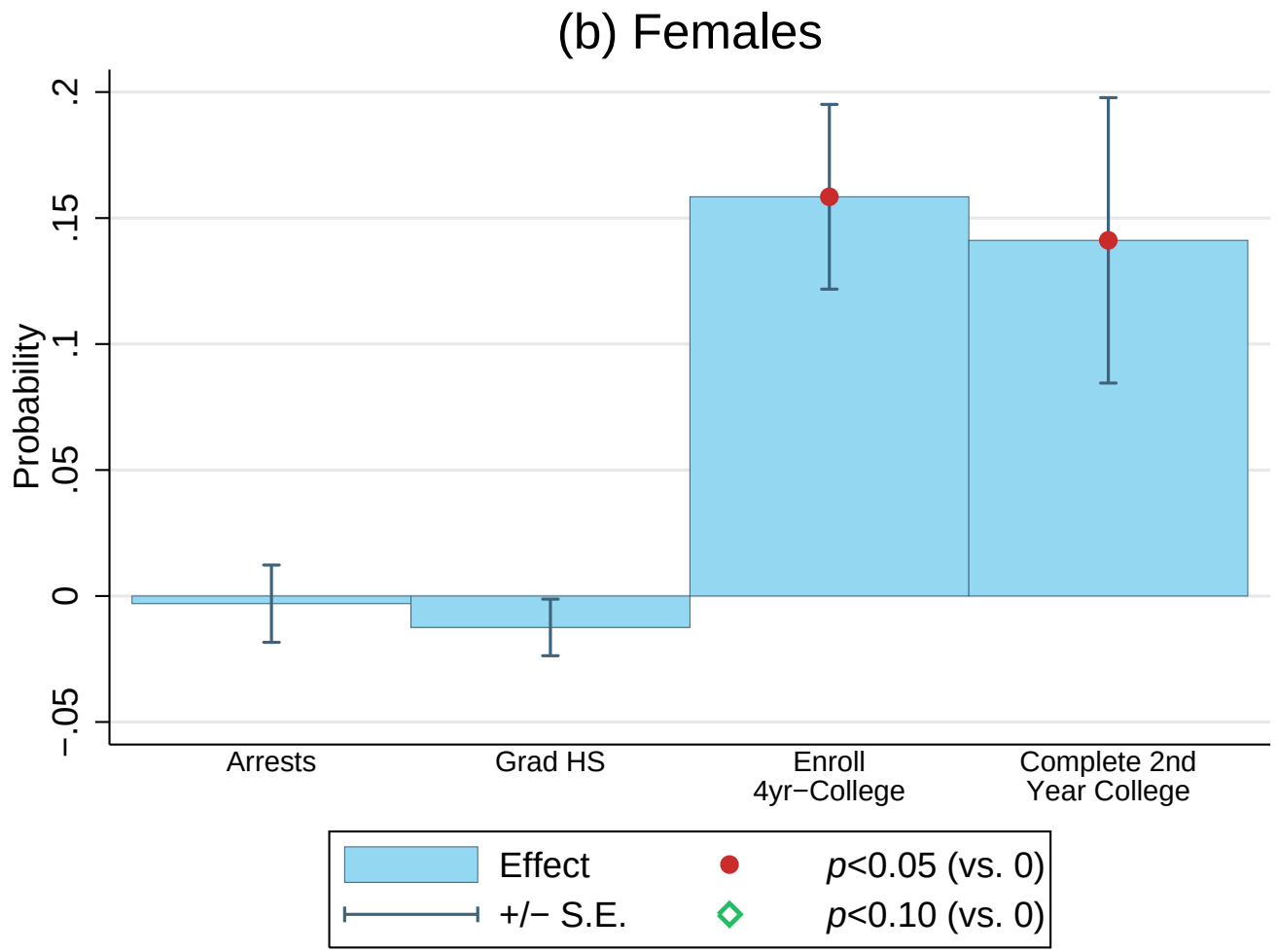


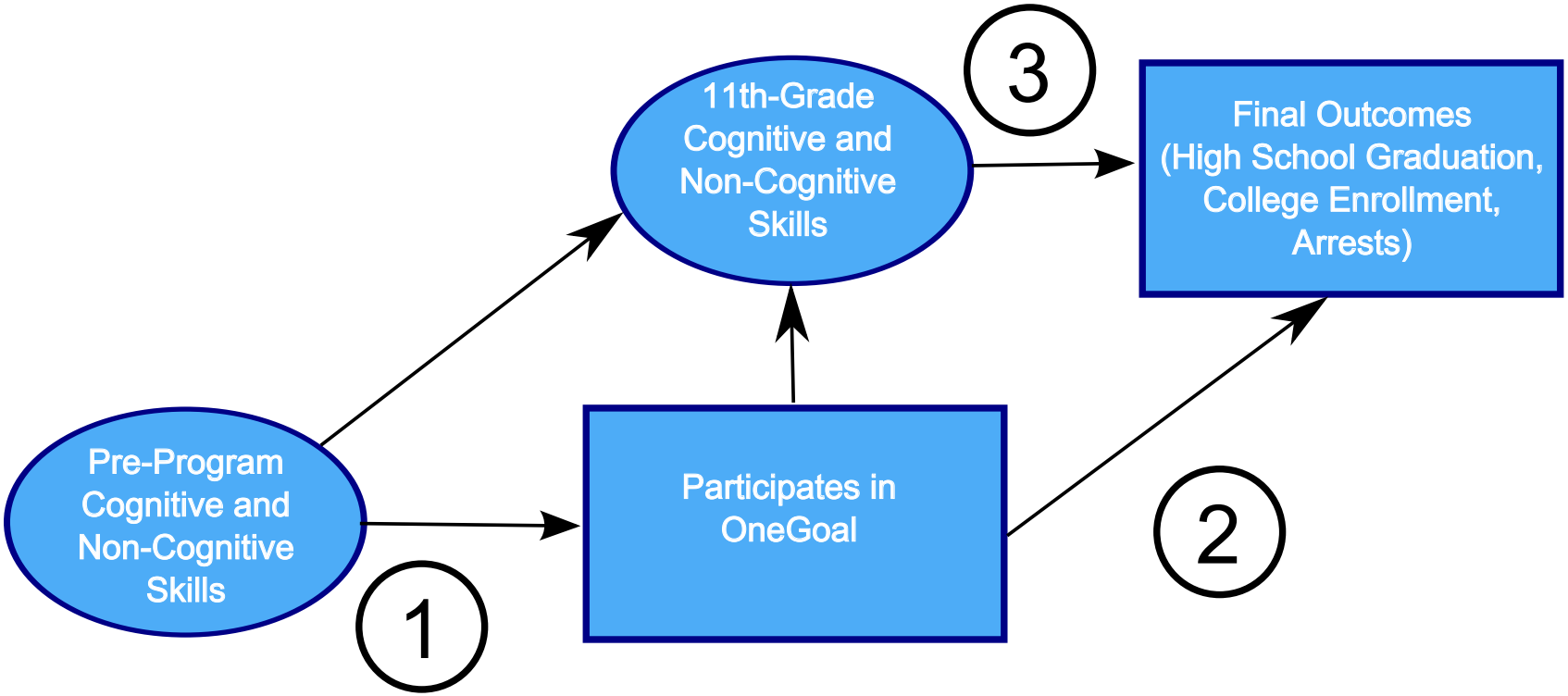
Figure 10: Effect of OneGoal on Outcomes (Females)



Sensitivity Checks

- Propensity score matching works because of full support within treatment group LINK TO MATCHING DETAILS.
- Non-linear parametric models using a two step MLE procedure (integrate out over distribution of factors) LINK TO MLE DETAILS.
- Same story if controlling for school fixed effects or using all CPS schools LINK TO SENSITIVITY.
- Similar results when using IV difference-in-difference method

Basic Framework



The Importance of Including Non-Cognitive Skills

1. **Evidence of selection on skills**
2. The effect of OneGoal on skills

Is There Evidence of Selection?

- OneGoal participants have average achievement test scores before entering the program but above average grades, absences, disciplinary infractions, and credits

Figure 11: Distribution of Pre-Program Cognitive Skills in Tenth Grade for OneGoal Participants and Non-Participants

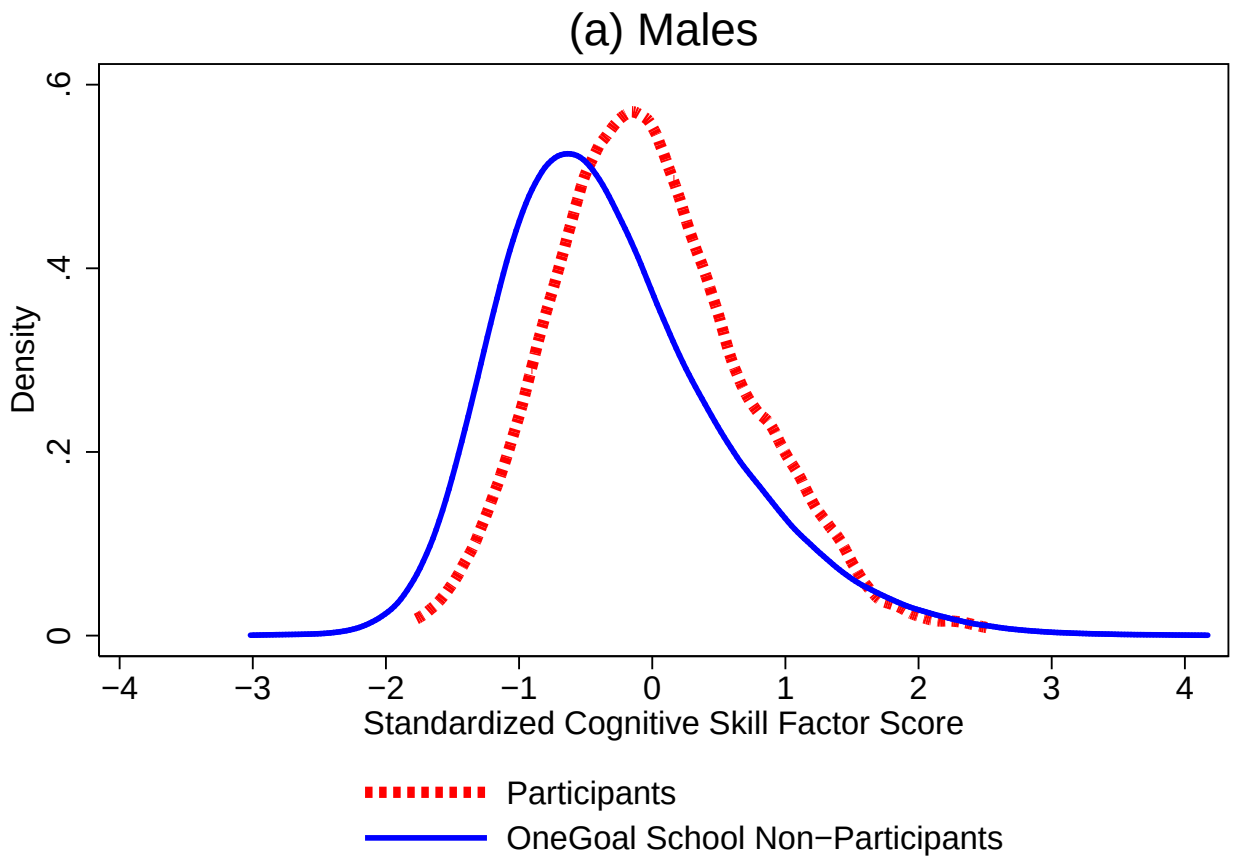


Figure 12: Distribution of Pre-Program Cognitive Skills in Tenth Grade for OneGoal Participants and Non-Participants

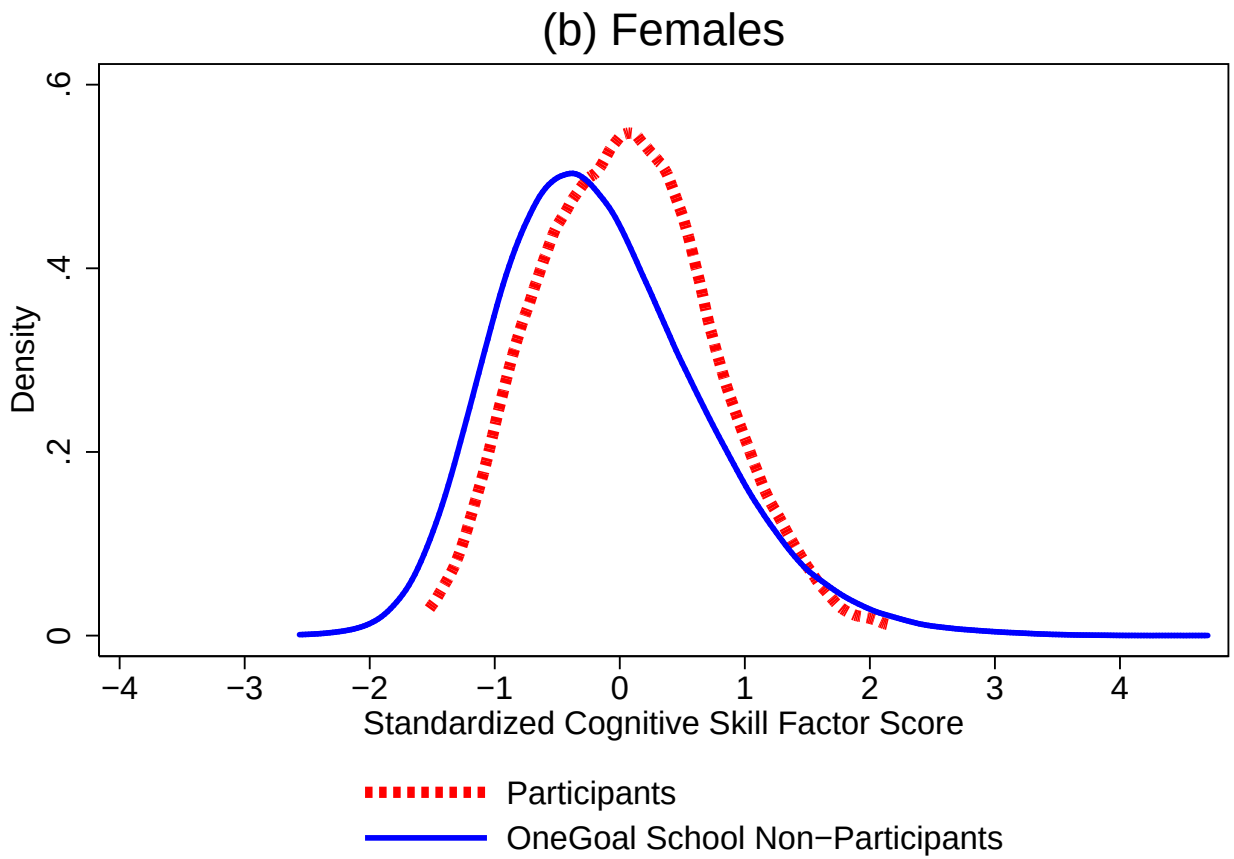


Figure 13: Distribution of Pre-Program Non-Cognitive Skills in Tenth Grade for OneGoal Participants and Non-Participants

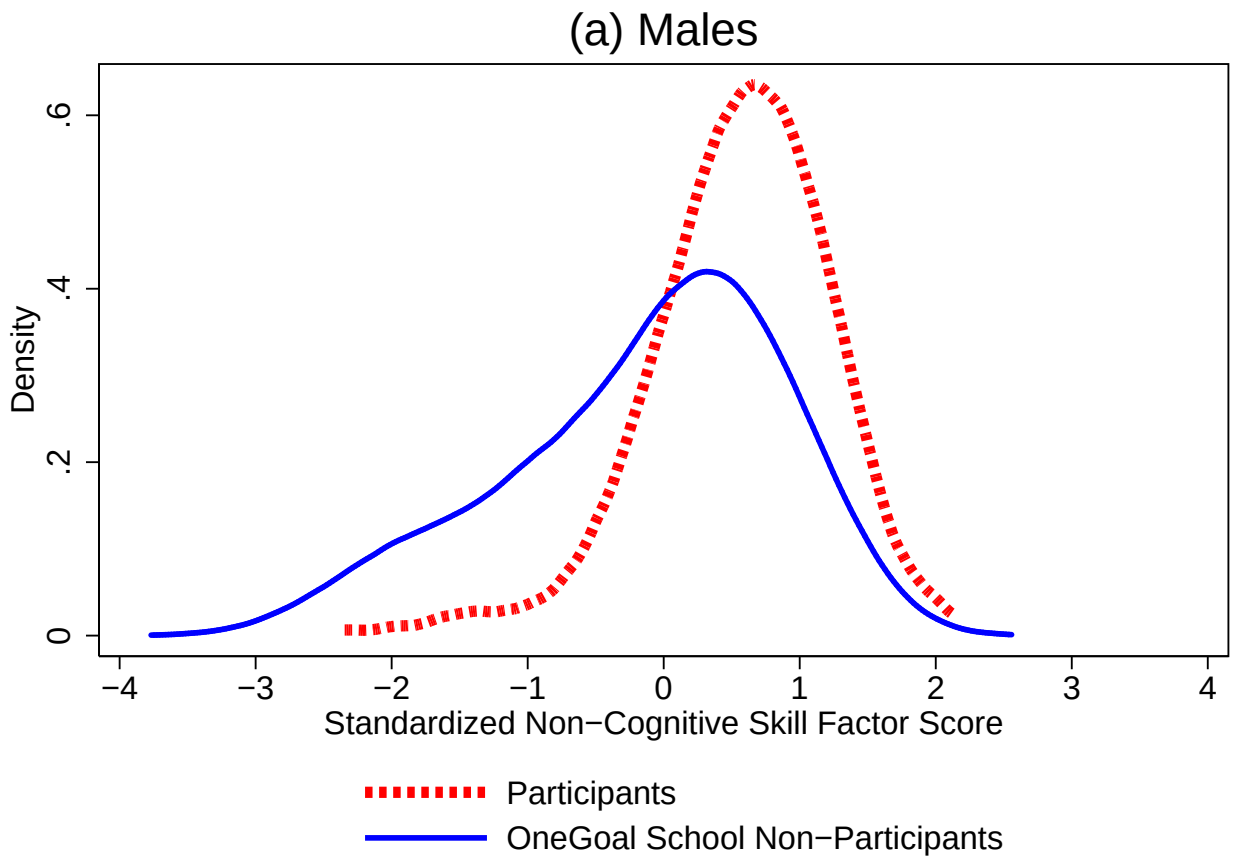


Figure 14: Distribution of Pre-Program Non-Cognitive Skills in Tenth Grade for OneGoal Participants and Non-Participants

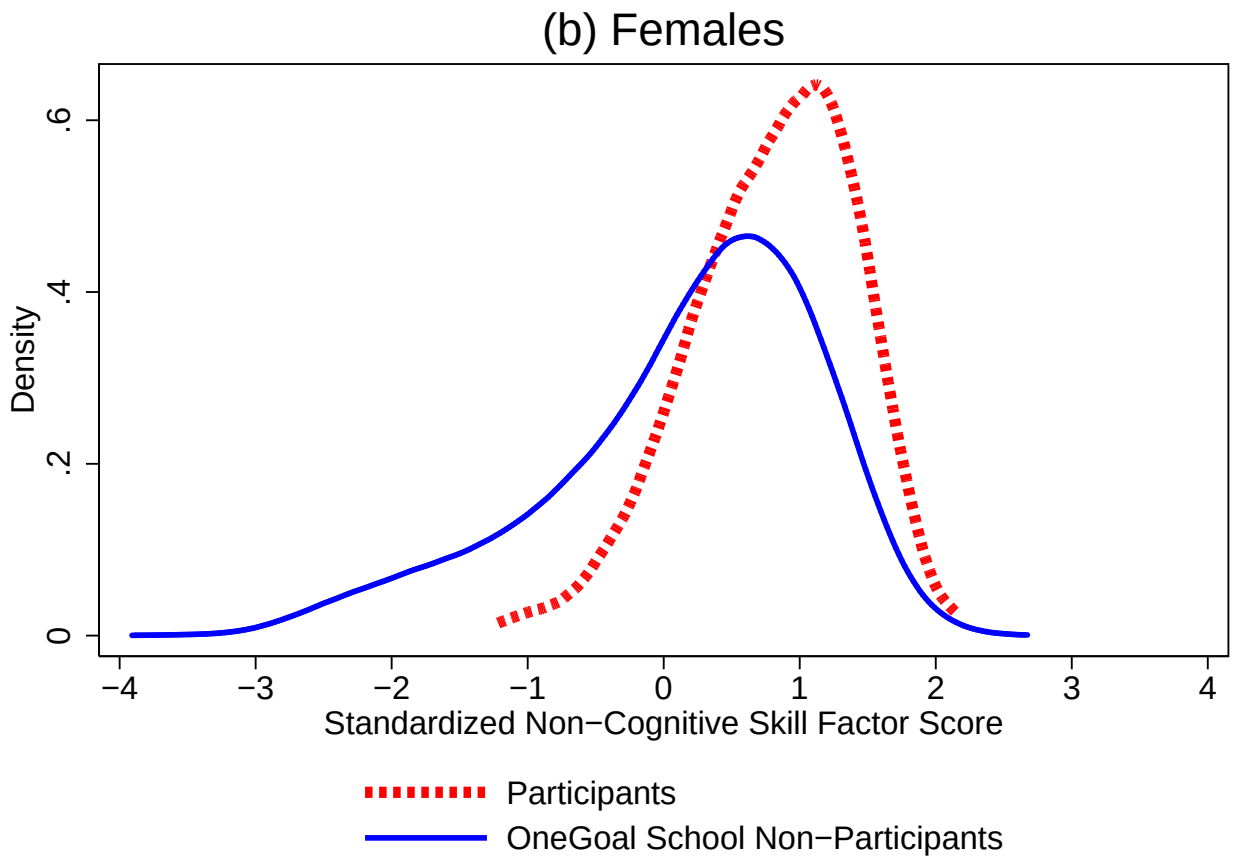
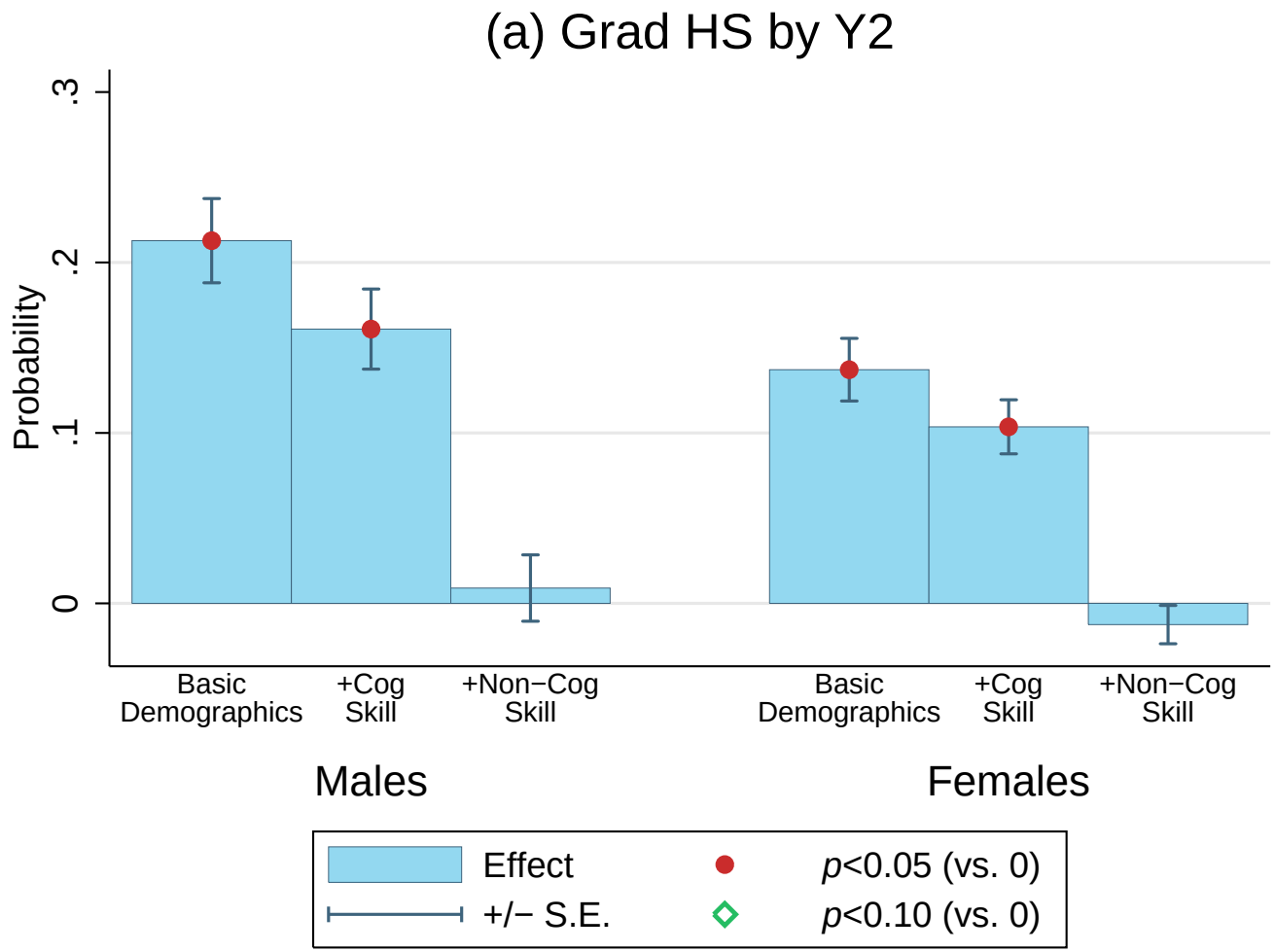


Figure 15: Effect of OneGoal on High School Graduation



How Does OneGoal Work?

1. Evidence of selection on skills
2. **The effect of OneGoal on skills**

Figure 16: Effect of OneGoal on Eleventh-Grade Cognitive and Non-Cognitive Skills

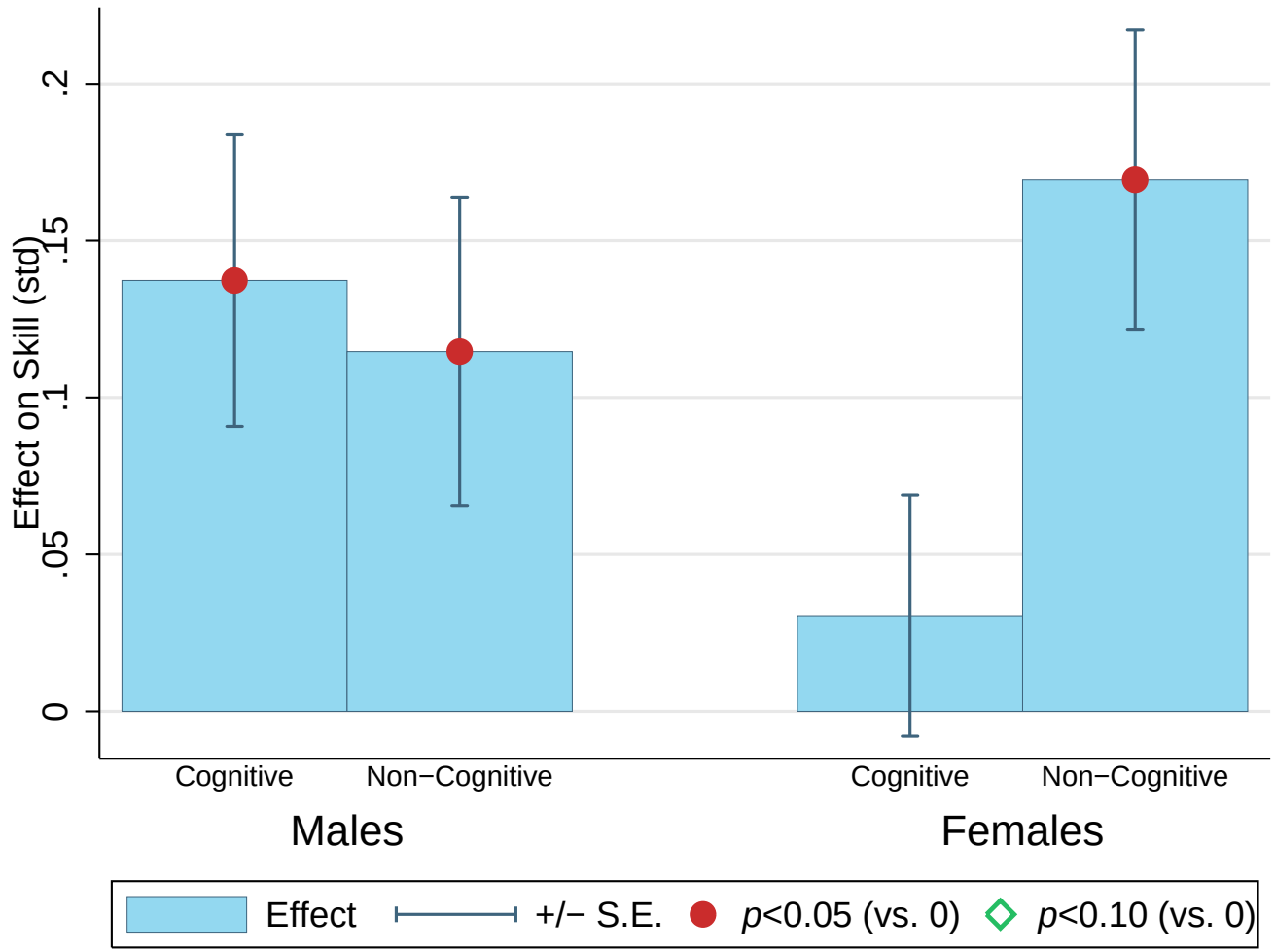


Figure 17: Decomposition of the Treatment Effect

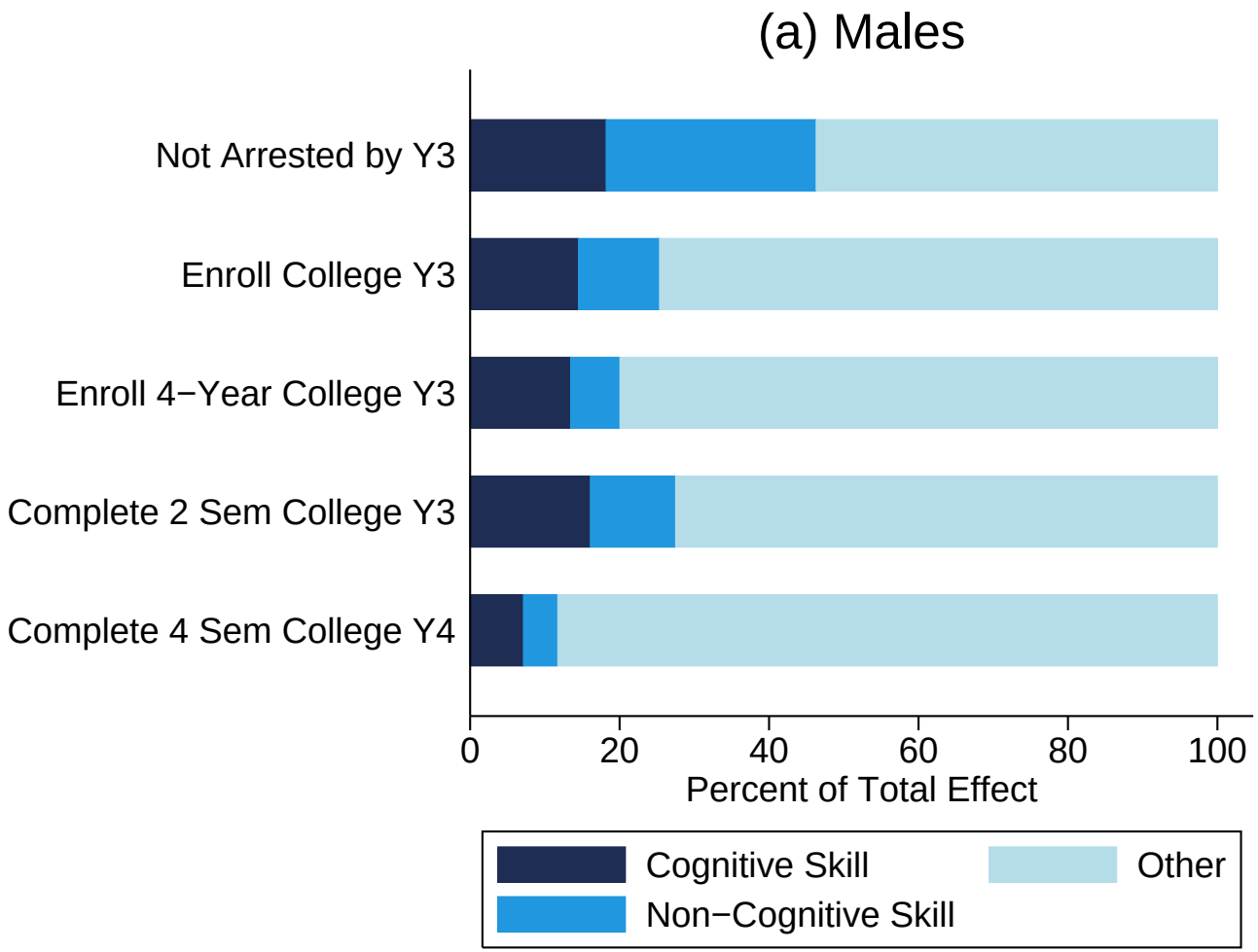
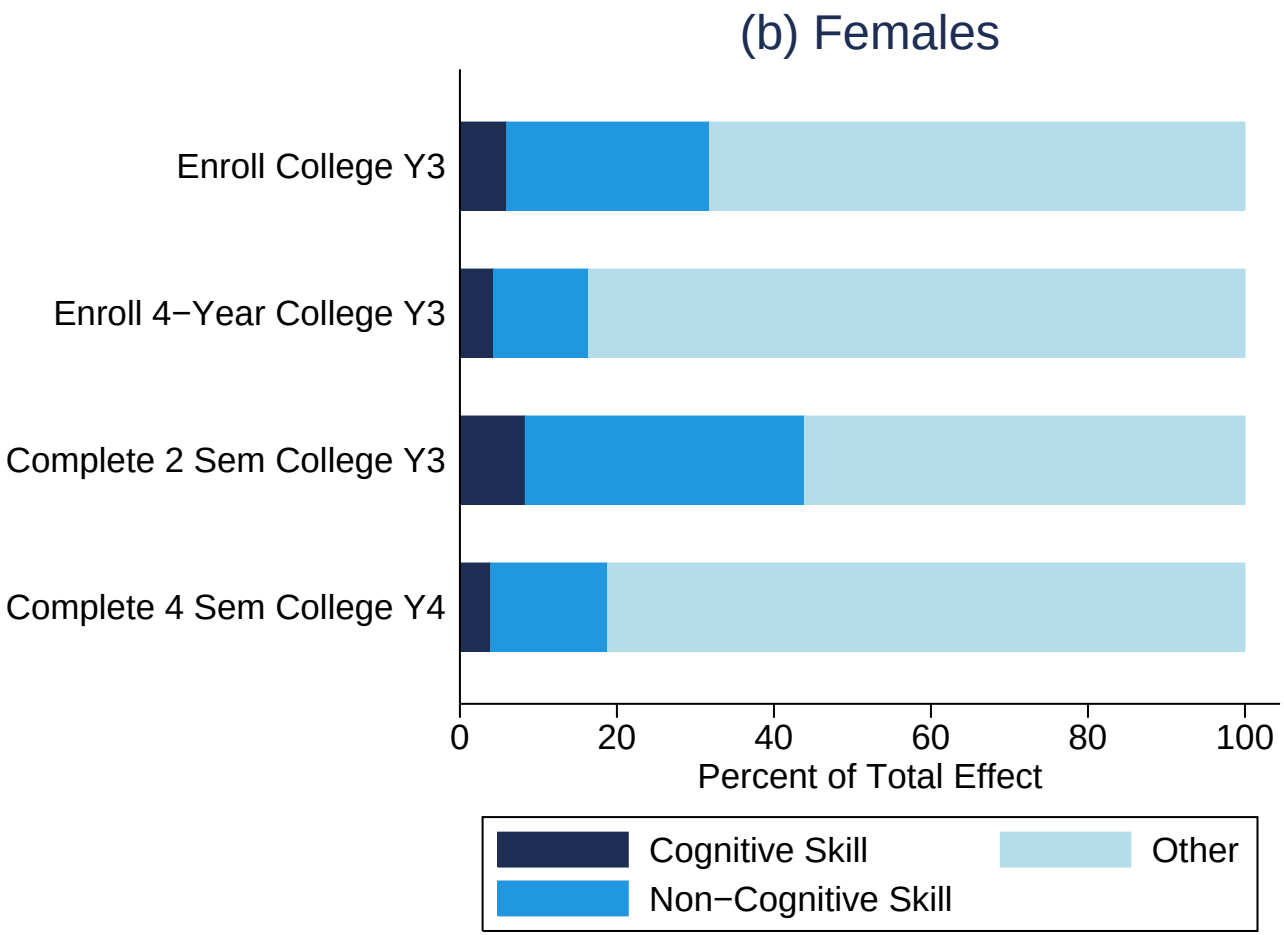


Figure 18: Decomposition of the Treatment Effect



Summary of Additional Analyses

- Estimate a similar structure using analogous measures in the NLSY79
- Adding teacher ratings at time of selection does not change the results
- Students with low cognitive skill benefit the most

Outline

Conclusions

- Validate measures that are not correlated with test scores but are predictive of outcomes
- The measures improve the accuracy of early evaluations
- The measures are useful controls for selection

Do These Measures Capture Non-Cognitive Skills?

- Standardize for incentives and cognitive skills
- In other data sets, they are correlated with traditional non-cognitive measures
- Are they long lasting?
- Is it a problem that they are defined as a residual?

Questions for Future Work

- Do these academic indicators reflect all of the important skills? What else is missing?
- What other incentives or aspects of the situation matter in measurement?
- Are these measures useful if schools are given incentives based on them?
- Should we measure more or measure less?

Outline

Who Benefits the Most?

- Do applicants with different pre-program skills reap different benefits?
- Estimate the main model, but with skill interactions:

$$Y_{ki} = \beta_{Yk} X_i + \alpha_{Yk} \hat{\theta}_i + \delta_k A_i + \gamma_k \hat{\theta}_i A_i + U_{Yki}.$$

Figure 19: Treatment Effect on Non-Arrested by Incoming Cognitive and Non-Cognitive Skill (Males)

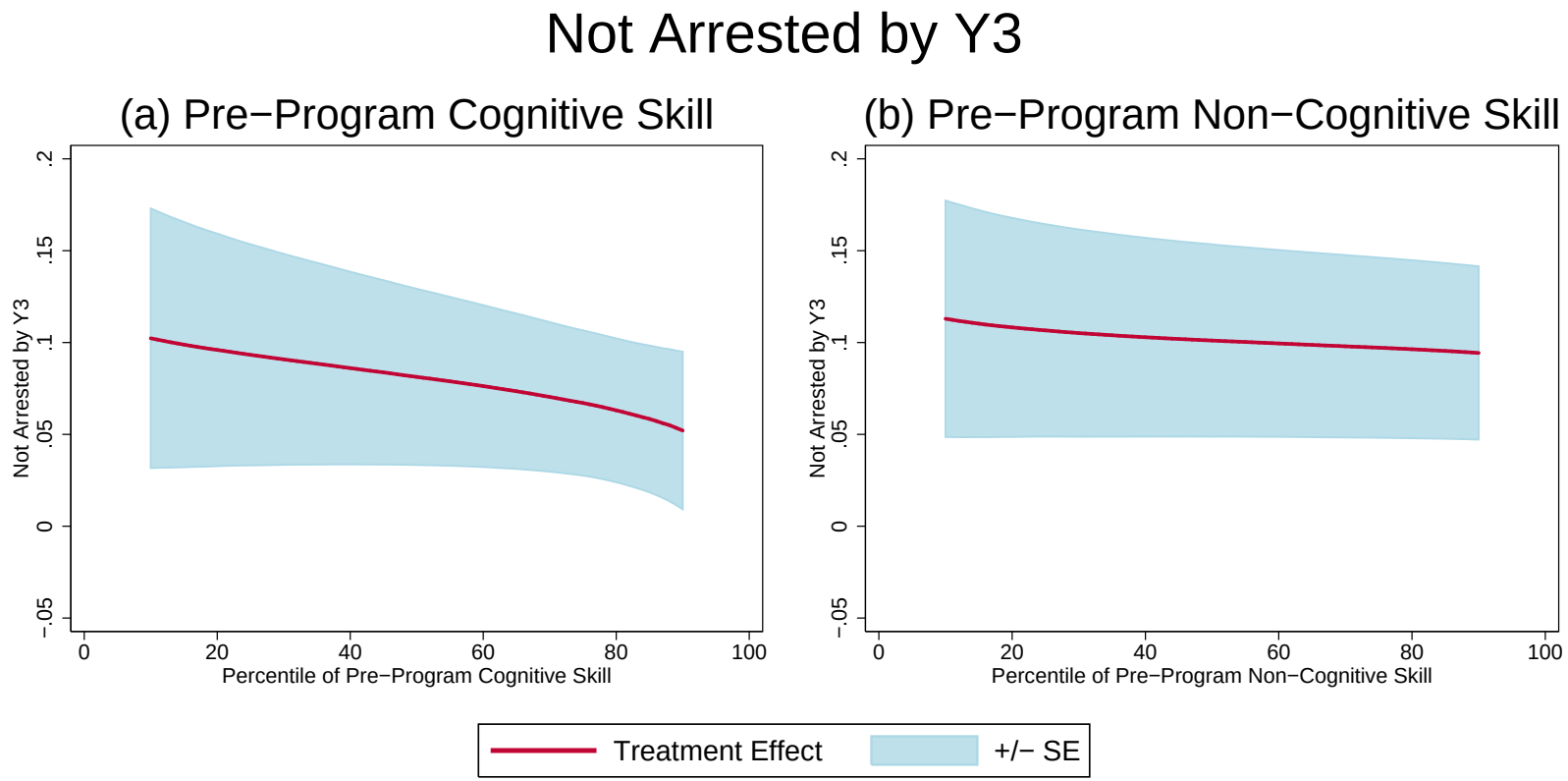


Figure 20: Treatment Effect on Non-Arrested by Incoming Cognitive and Non-Cognitive Skill (Females)

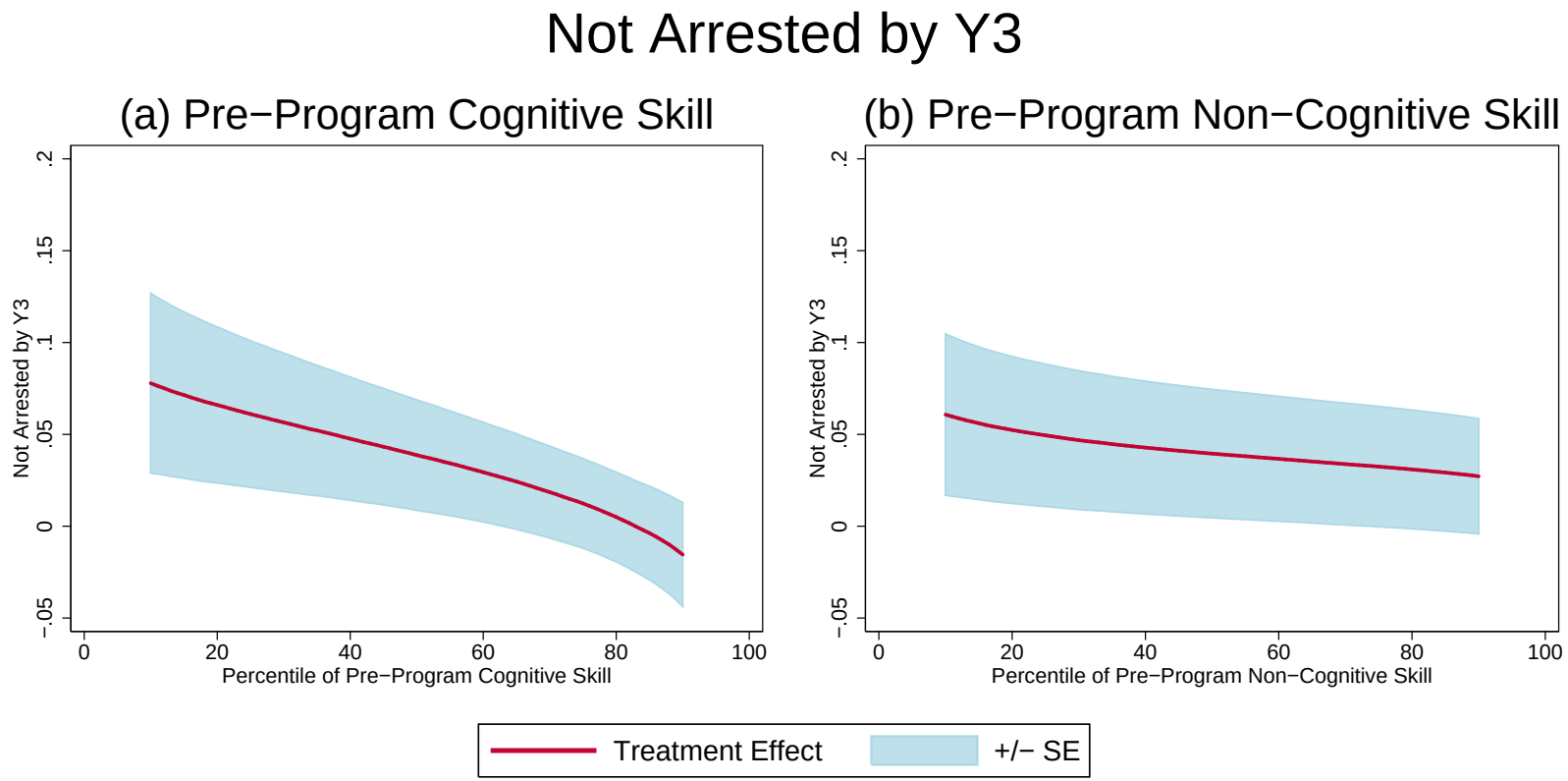


Figure 21: Treatment Effect on College Enrollment by Incoming Cognitive and Non-Cognitive Skill (Males)

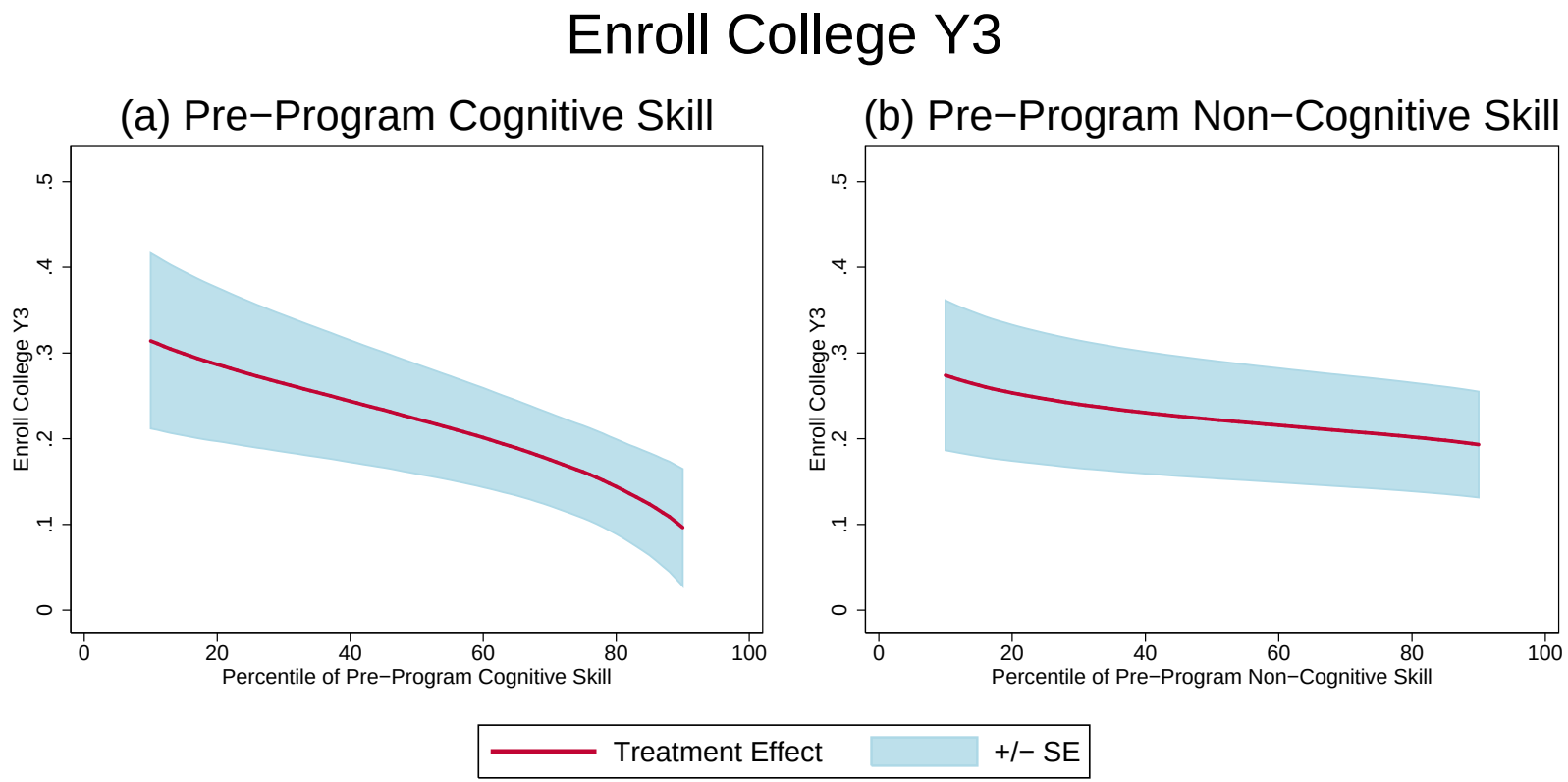
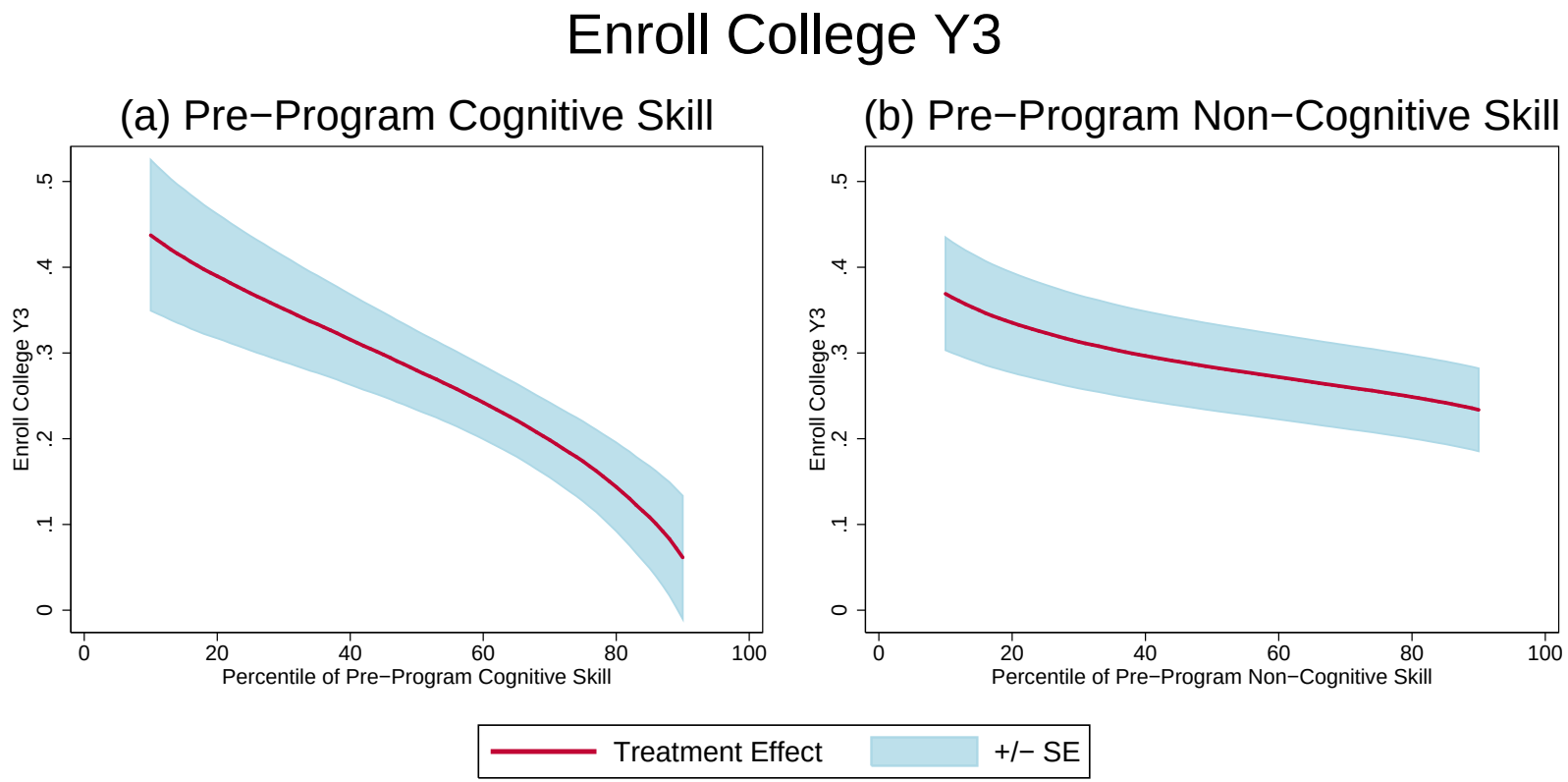


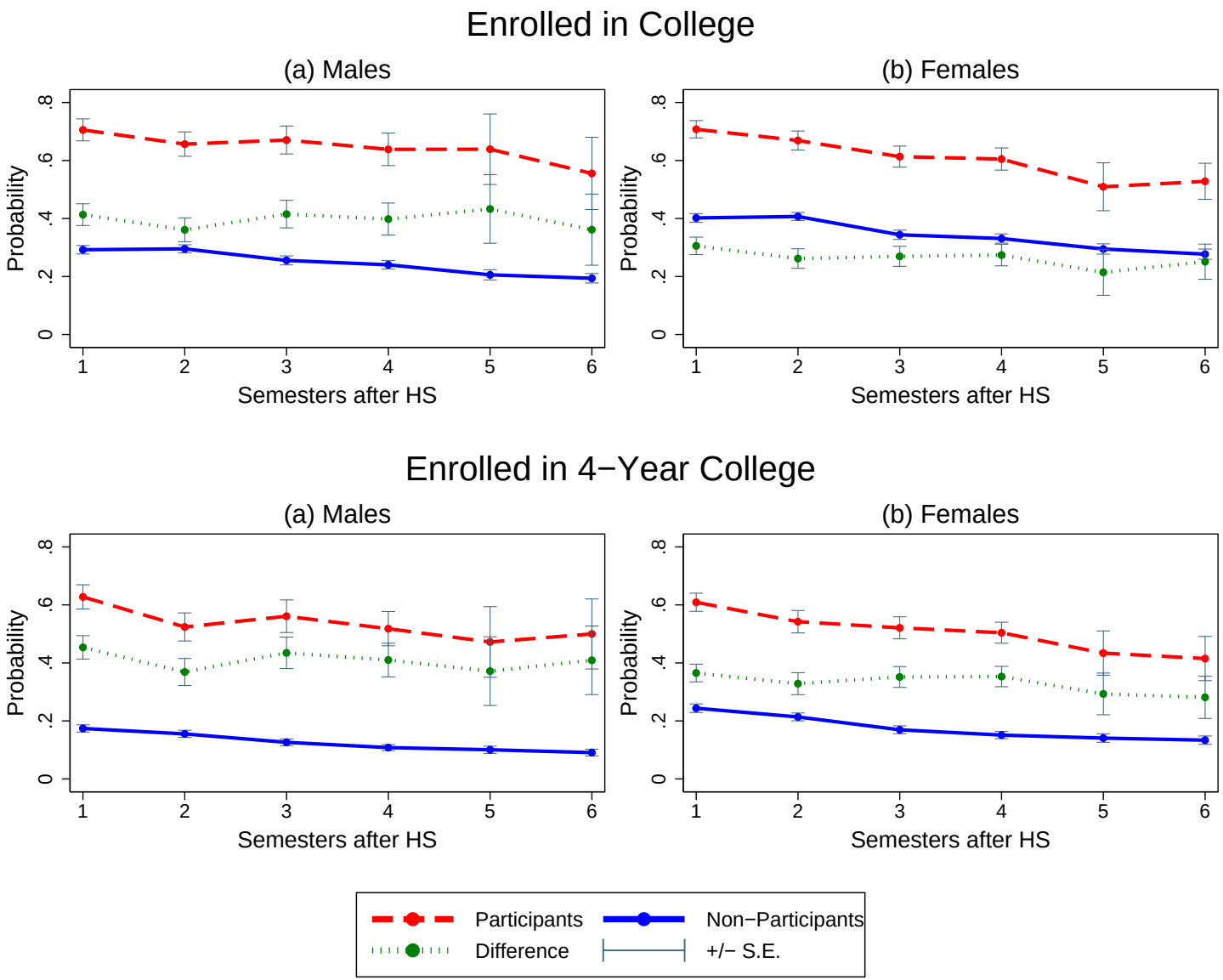
Figure 22: Treatment Effect on College Enrollment by Incoming Cognitive and Non-Cognitive Skill (Females)



Fade Out?

- Previous analysis limited to two years into college due to small sample sizes with all control variables
- Consider unadjusted outcomes to get a sense of whether effects persist until year three of college

Figure 23: Unadjusted College Enrollment



Validating Controls Using Interview Assessments Scores

- For five cohorts, we have interview assessments for both denied applicants ($N = 75$) and accepted applicants ($N = 100$)
- Rated on "five leadership principles" (ambition, integrity, professionalism, resilience, and resourcefulness)
- Add these assessments to main matching variables to see if story changes

Table 2: Estimated Effects When Controlling for Interview Assessments and CPS Measures

Outcome	(0)	(1)
GPA Year 1	-0.12	-0.12
	(0.10)	(0.12)
Absences %tile Year 1	0.04	0.09**
	(0.04)	(0.05)
ACT Score	-0.15	-0.12
	(0.36)	(0.41)
Credits Year 1	3.09*	4.69***
	(1.34)	(1.51)
Discipline Year 1	-0.01	0.05
	(0.14)	(0.16)
Number of Arrests Year 1	0.10***	0.10***
	(0.03)	(0.03)
Rubric Scores	○	●
CPS Measures	●	●

Sources: OneGoal, CPS, and CPD administrative data. **Notes:** The table shows the effects of OneGoal for each outcome listed in the left column. The filled circles at the bottom of the table indicate the controls used in the model. "Rubric Scores" is the sum of the Ambition, Integrity, Professionalism, Resilience, and Resourcefulness teacher ratings of leadership. "CPS Measures" include race, gender, a predicted cognitive factor score, and a predicted non-cognitive factor score. The cognitive factor score is based on the subscores from the reading, English rhetoric, English usage, science, algebra, and geometry subtests of the Plan test. The non-cognitive factor score is based on the fall and spring GPAs from tenth grade, percentile rank of absences in tenth grade, credits accumulated in the fall and spring of tenth grade, and total Group 3–6 disciplinary infractions in tenth grade. The non-cognitive measures are also allowed to depend on the cognitive measures. * 10% significance; ** 5% significance; *** 1% significance.

Two Promising Adolescent Models

1. Provide mentorship and teach non-cognitive skills where they are applied (e.g., workplace) (Kemple and Snipes, 2000; Kemple and Willner, 2008; Roder and Elliot, 2011, 2014)
2. Give targeted help in applying to college (e.g., help with financial aid forms and applications) (Bettinger et al., 2012; Carrell and Sacerdote, 2013)

LINK BACK TO PRESENTATION.

Other Interventions

- Early childhood programs generally appear more promising than adolescent programs (Heckman and Kautz, 2014)
- Several adolescent programs had short-term effects because they gave only short-term incentives or focused only on academics (Heckman and Kautz, 2014)

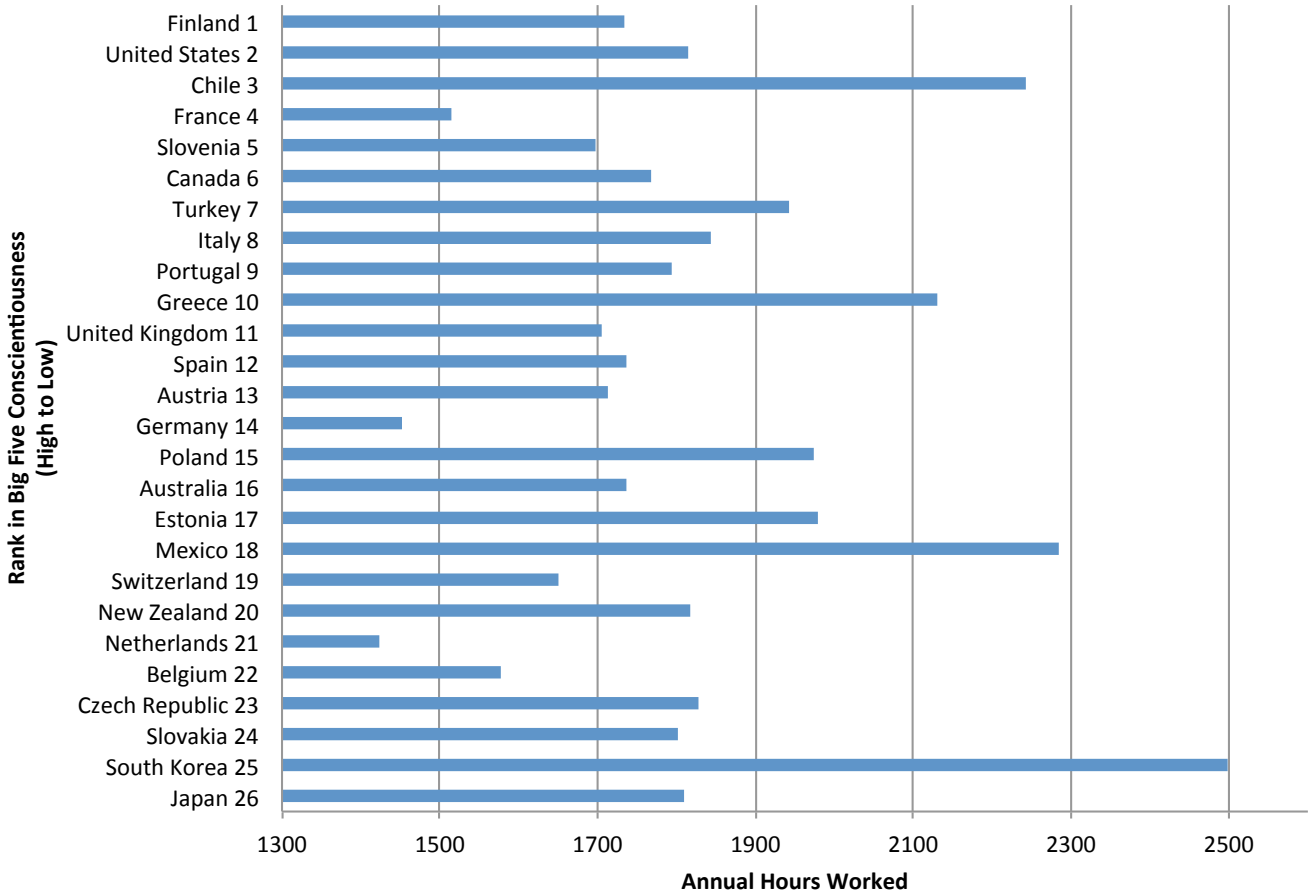
Reference bias

- Most personality assessments do not anchor their measurements in any objective outcome and use a Likert scale (**?**)
- German Socio-Economic Panel (GSOEP) survey asks respondents to rate themselves on the following statement: *"I see myself as someone who tends to be lazy"* (Lang et al., 2011)
- People must interpret the definition of *"lazy,"* which likely involves comparing themselves to other people
- Laziness may mean different things to different groups of people
- Within countries, Conscientiousness is positively associated with labor supply

LINK BACK TO PRESENTATION.

Reference bias

Figure 24: National Rank in Big Five Conscientiousness and Average Annual Hours Worked



Source: The Conscientiousness ranks come from Schmitt et al. (2007). These measures were taken in 2001 (**?**). The hours worked estimates come from **?**. Notes: Several countries are omitted due to lack of data.

LINK BACK TO PRESENTATION

Reference bias

Figure 25: The Effect of KIPP on Attitudes and School Effort

Outcome	Mean, Lottery Winners	Mean, Non-Winners	Impact of Admission Offer (ITT)	Adjusted Impact of Attendance (TOT)
Count of Extracurricular Activities (Mean)	2.95	2.84	0.11 (0.16)	0.18 (0.25)
Homework				
Student reports having homework on a typical night (proportion)	0.96	0.96	0.00 (0.02)	-0.01 (0.03)
Minutes spent on homework on typical night, student report (mean)	117.63	95.70	21.95** (8.5)	35.01** (12.8)
Minutes spent on homework on typical night, parent report (mean)	118.31	86.17	32.14** (4.6)	53.71** (7.0)
Parent says student typically completes homework (proportion)	0.94	0.93	0.01 (0.02)	0.02 (0.03)
Index of School Engagement (Mean)	3.64	3.64	0.00 (0.03)	0.01 (0.05)
Index of Self Control (Mean)	4.43	4.47	-0.04 (0.05)	-0.07 (0.09)
Index of Academic Self-Concept (Mean)	3.25	3.20	0.05 (0.03)	0.08 (0.05)
Index of Effort and Persistence in School (Mean)	3.46	3.51	-0.05 (0.03)	-0.07 (0.05)

Source: Tuttle et al. (2013). Notes: All impacts in this table are based on regression models that pool all lottery schools and that control for baseline covariates. The means for non-winners are regression adjusted, controlling for the full set of baseline covariates; means for lottery winners are computed by adding the impact estimate to the mean for non-winners. Standard errors are shown in parentheses.

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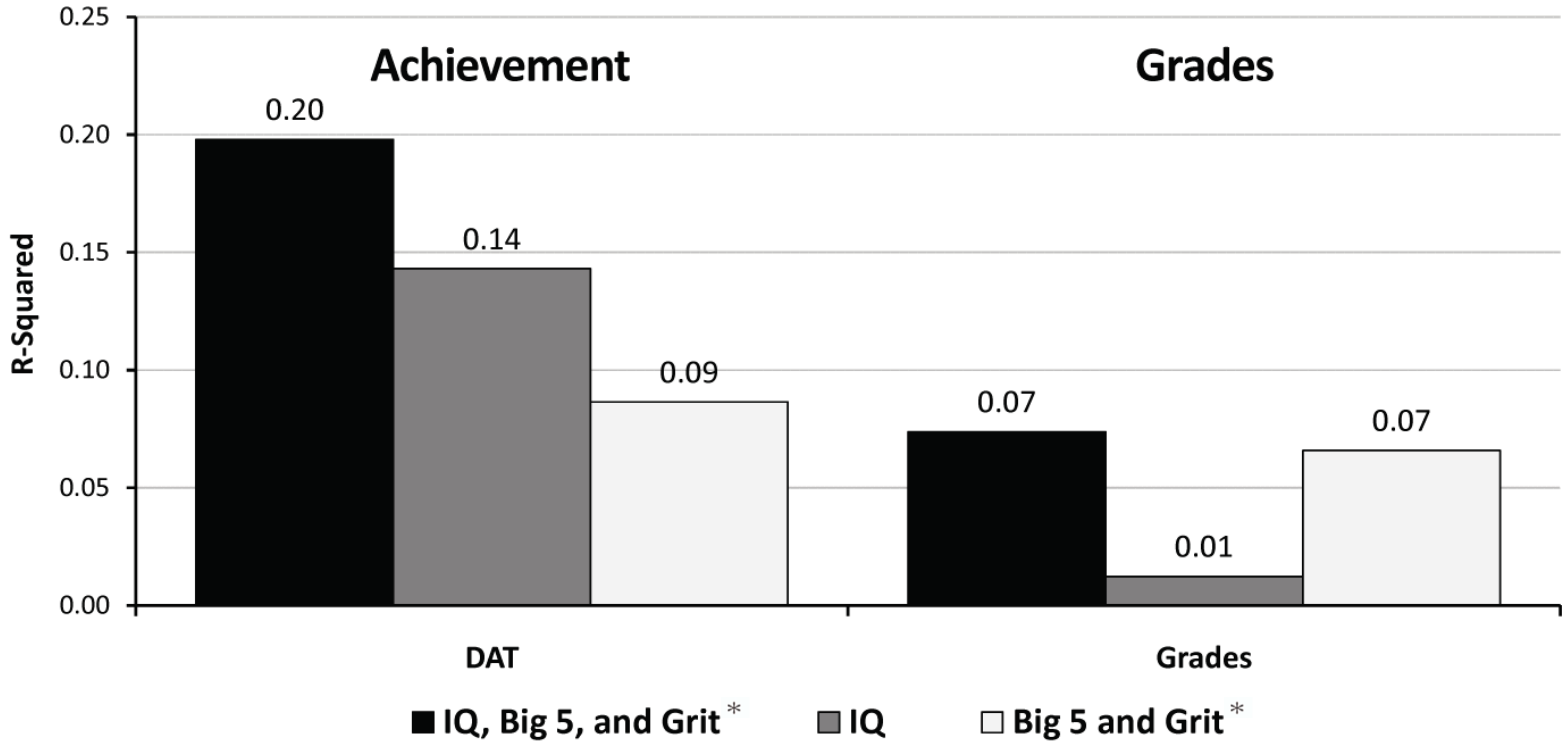
Grades depend on non-cognitive skills

Figure 26: Decomposing Variance Explained for Achievement Tests and Grades into IQ and Non-Cognitive Skills



Source: Borghans et al. (2011). *Notes*: Grit is a measure of persistence on tasks (**?**).

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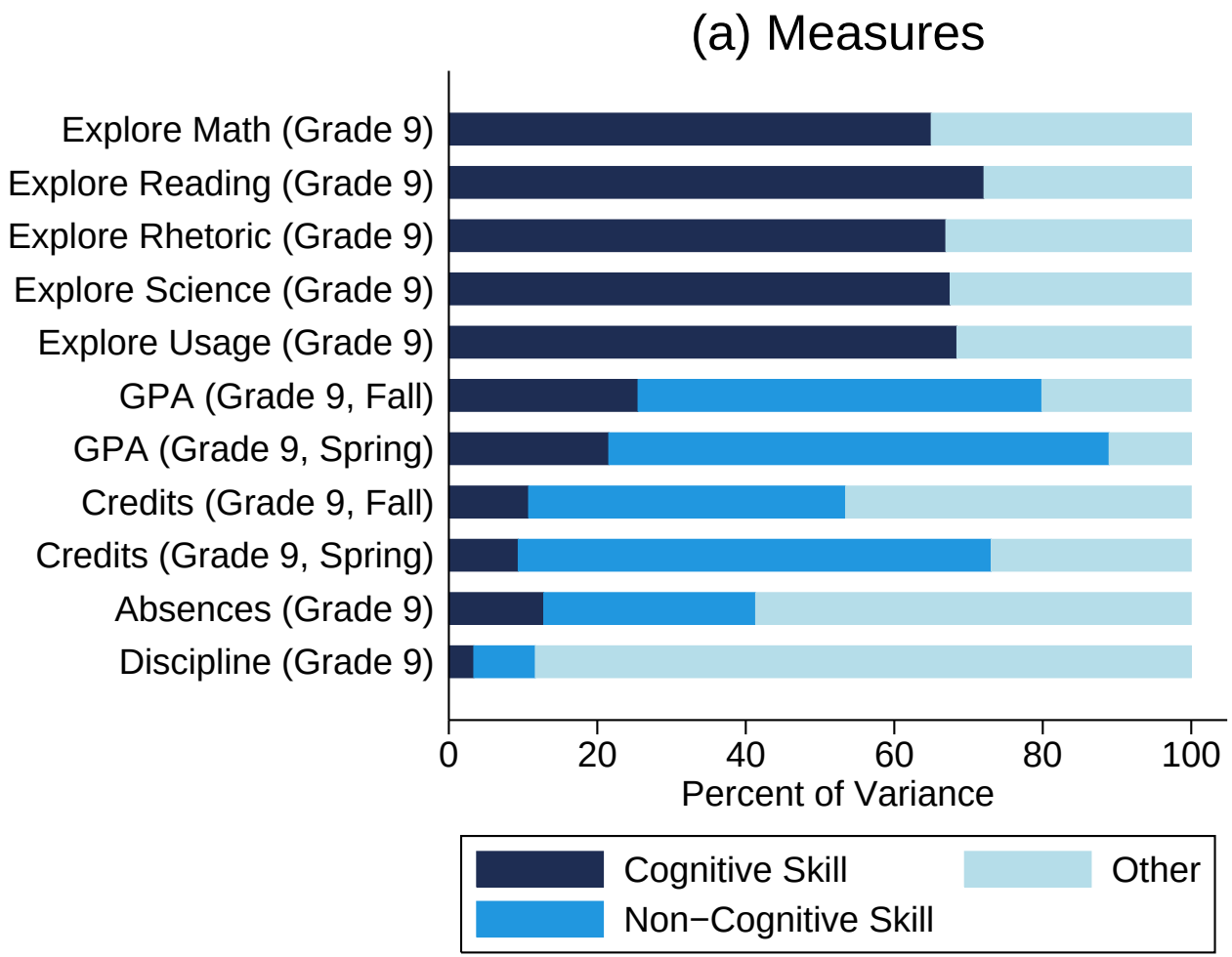
Figure 27: Variance Decomposition of the Measurement System



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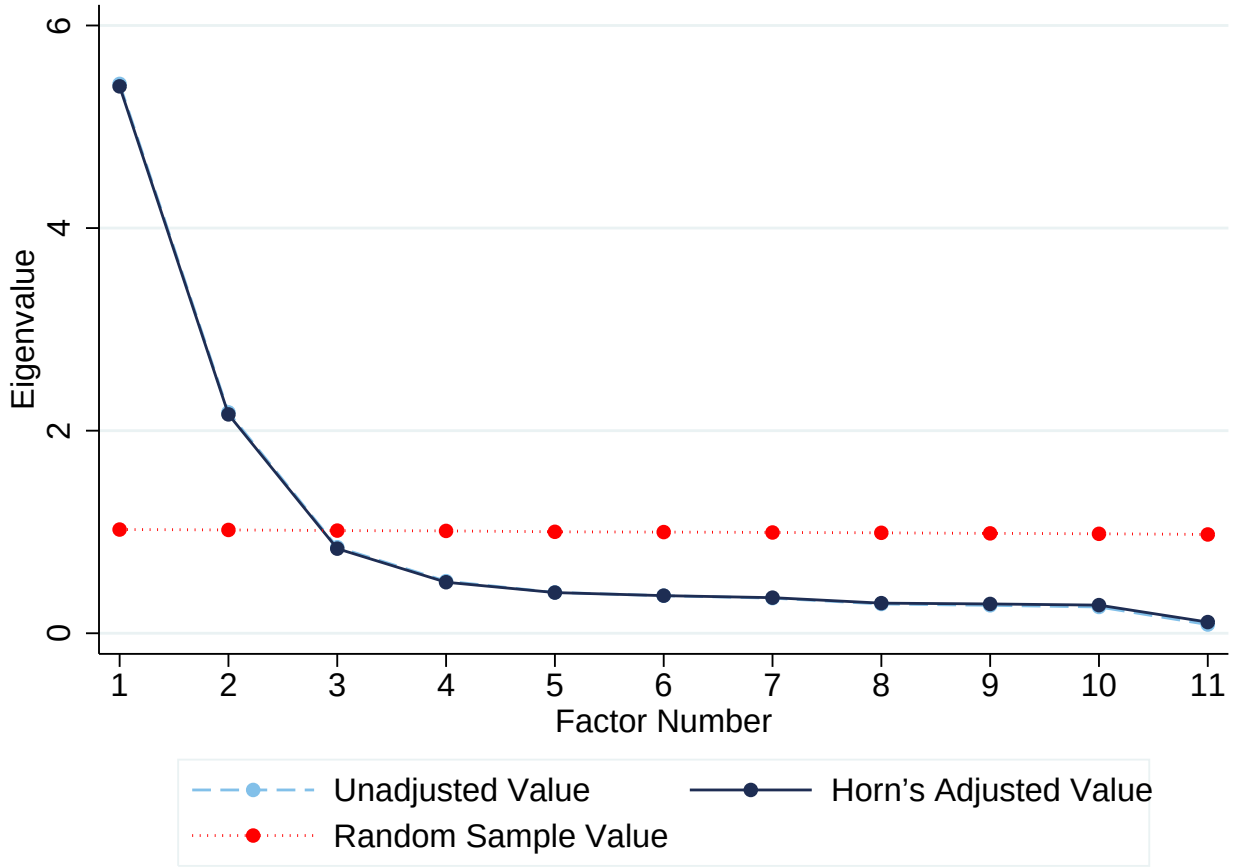
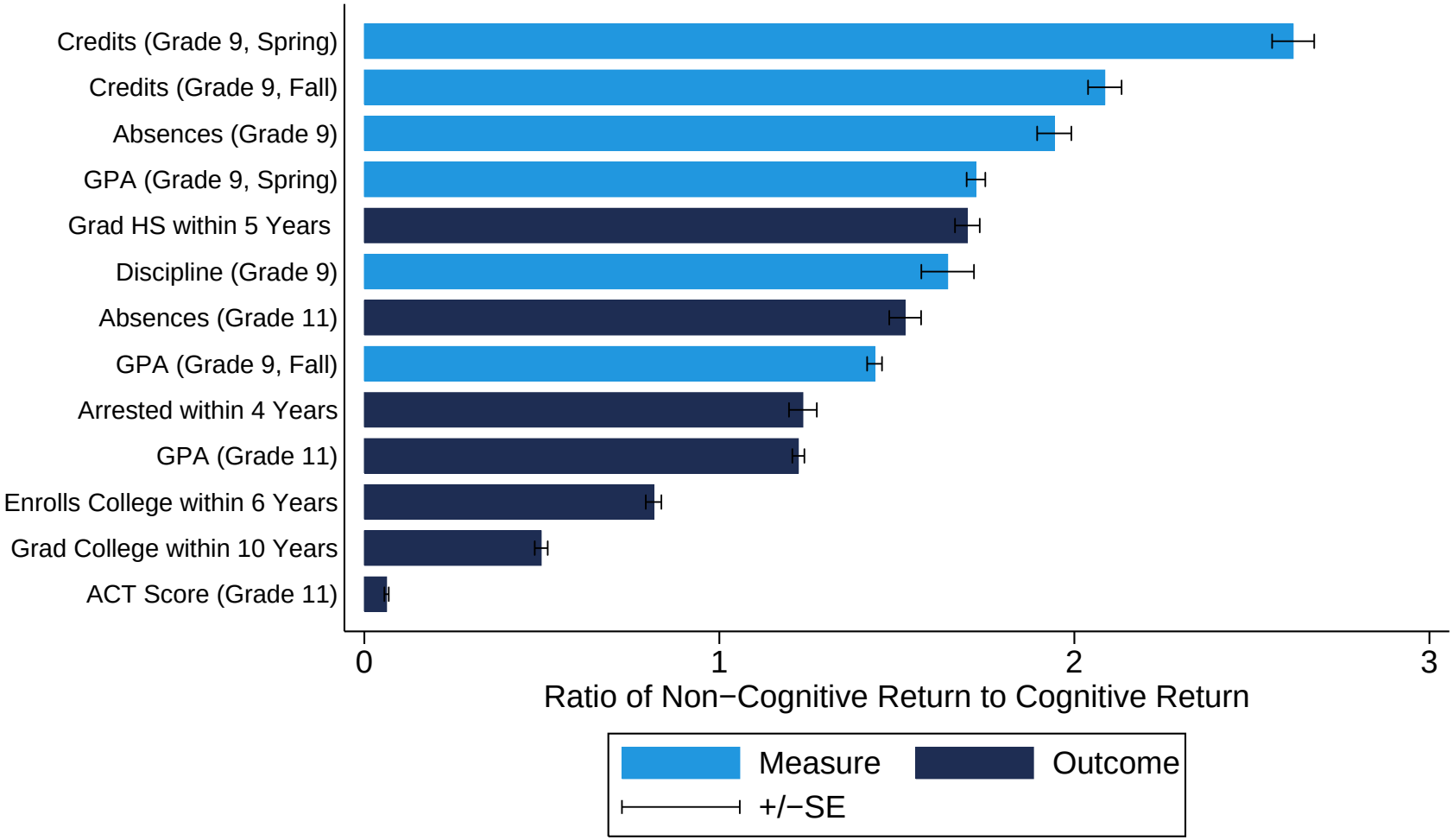
Scree Plot

Figure 28: Scree Plot for Full Measurement System



LINK BACK TO PRESENTATION.

Figure 29: Ratio of Non-Cognitive Return to Cognitive Return



LINK BACK TO PRESENTATION.

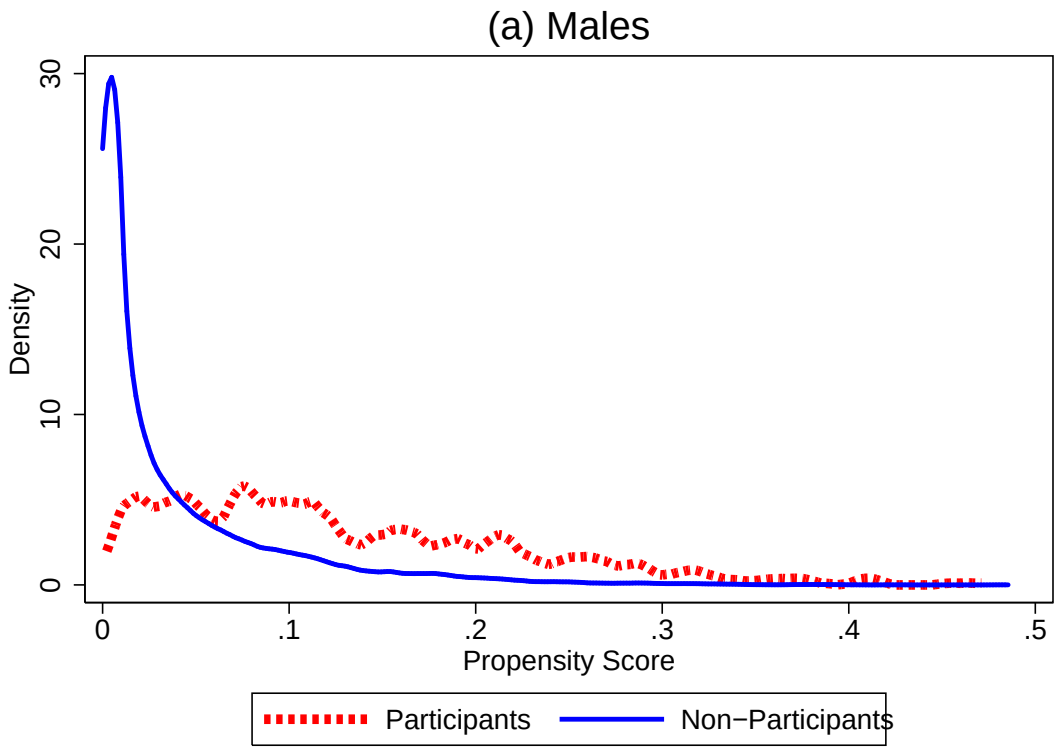
Matching Details

- Estimate propensity scores for participation
- Match treated population to non-participants with similar propensity scores
- Calculate standard errors using methodology proposed by Abadie and Imbens (2012)

LINK BACK TO PRESENTATION.

Overlapping Support

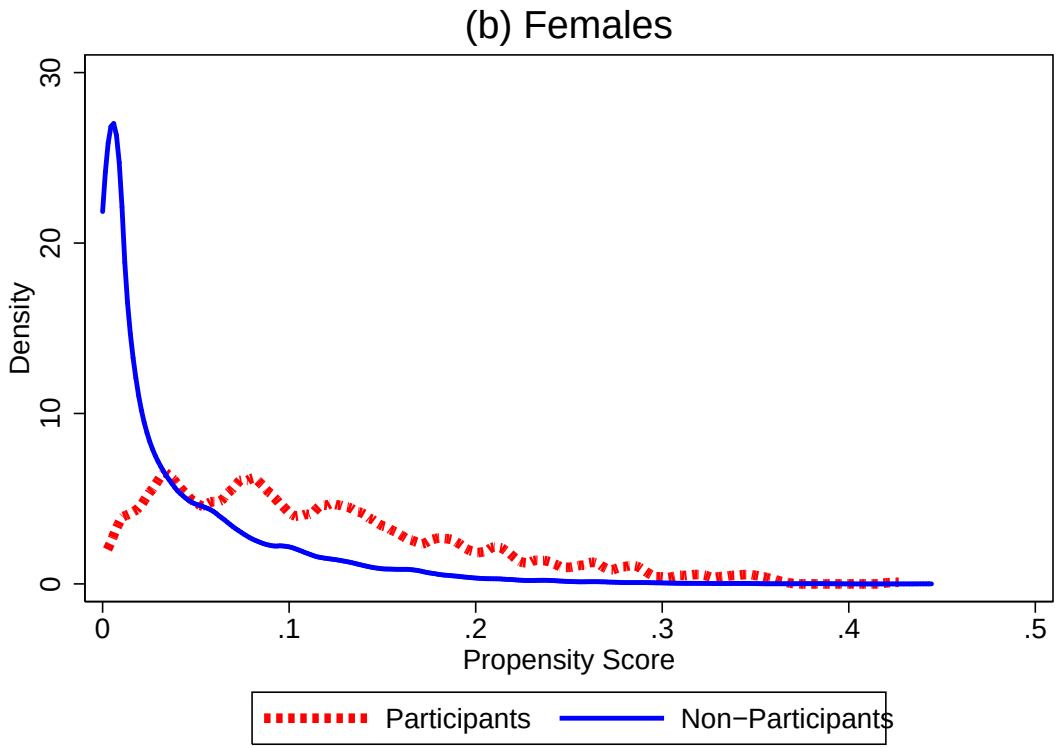
Figure 30: Distribution of Propensity Scores for Participants and Non-Participants (Males)



LINK BACK TO PRESENTATION.

Overlapping Support

Figure 31: Distribution of Propensity Scores for Participants and Non-Participants (Females)



LINK BACK TO PRESENTATION.

Selection into OneGoal

D is an indicator variable for if someone participates in OneGoal

$$
\begin{aligned}
D_i^* &= \gamma_1 X_i + \gamma_2 \theta_i + \varepsilon_{D^*} \\
\varepsilon_{D^*} &\sim N(0,1) \\
\varepsilon_{D^*} &\perp\!\!\!\perp \varepsilon_k \\
\varepsilon_{D^*} &\perp\!\!\!\perp \nu_k \\
\varepsilon_{D^*} &\perp\!\!\!\perp \theta_k \\
D_i &= \mathbf{1}[D^* \geq 0]
\end{aligned}
$$

LINK BACK TO PRESENTATION.

Outcomes

$$Y_{ki} = \beta_{Yk} X_i + \alpha_{Yk} \theta_i + \delta_k D_i + U_{Yki}.$$

D_i: whether person i was accepted into OneGoal

X_i: basic demographic characteristics

$\hat{\theta}_i$: predicted factor score

δ: effect of OneGoal

- Y_k – outcome k, θ_c – cognitive skill, θ_n non-cognitive skill, ν_k error for outcome k, β_{jk} – factor loading.
- The factors are distributed normally and $\theta \perp\!\!\!\perp \nu_k$, $\nu_j \perp\!\!\!\perp \varepsilon_k$,$\nu_j \perp\!\!\!\perp \nu_k$, and $\theta_c \perp\!\!\!\perp \theta_n$.

LINK BACK TO PRESENTATION.

Likelihood

$$\begin{aligned}\mathcal{L} &= \prod_i f\left(\mathbf{Y_i}, \mathbf{M_i}\right) \\ &= \prod_i \int f_1\left(\mathbf{Y_i}|\theta\right) f_2\left(\mathbf{M_i}|\,\theta\right) g(\theta) d\theta\end{aligned}$$

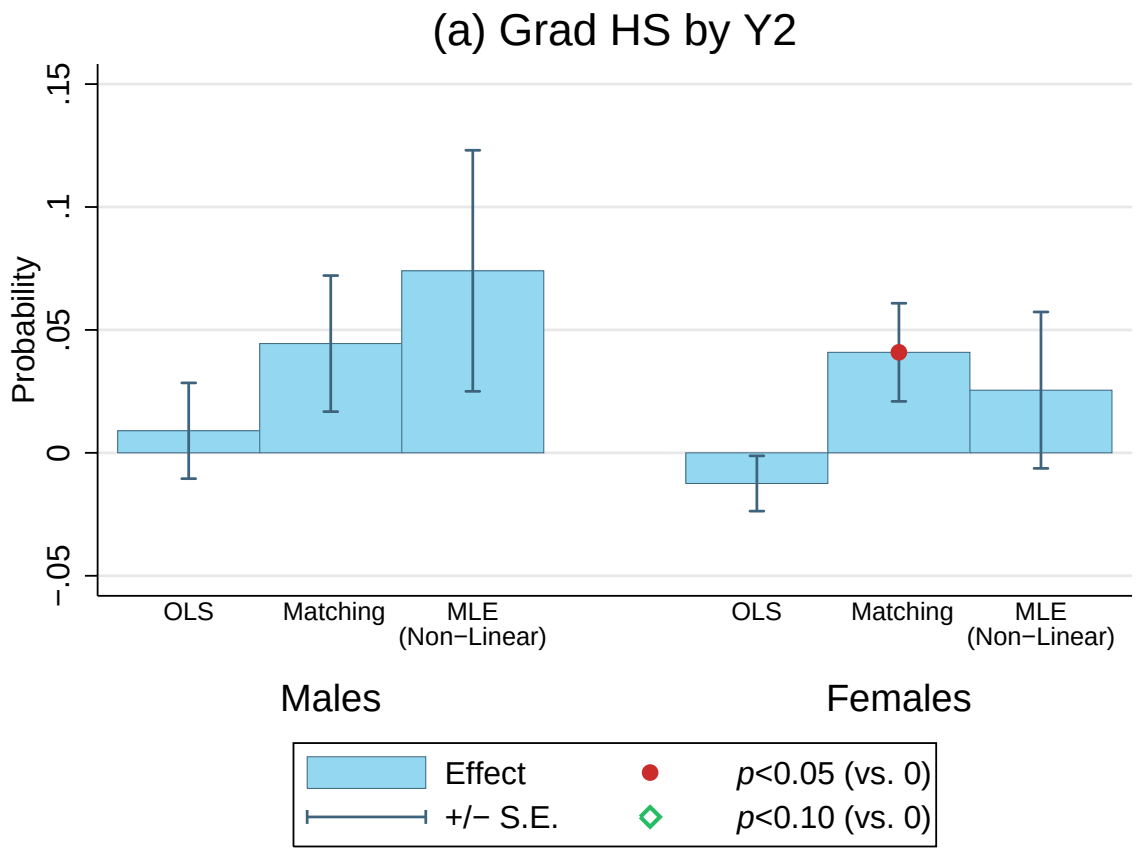
LINK BACK TO PRESENTATION.

Estimation Procedure

- Step 1: Estimate the distribution of the skill factors (**?**)
- Step 2: Estimate the effects on outcomes conditional on the skill factor distribution
- Step 3: Bootstrap to calculate standard errors

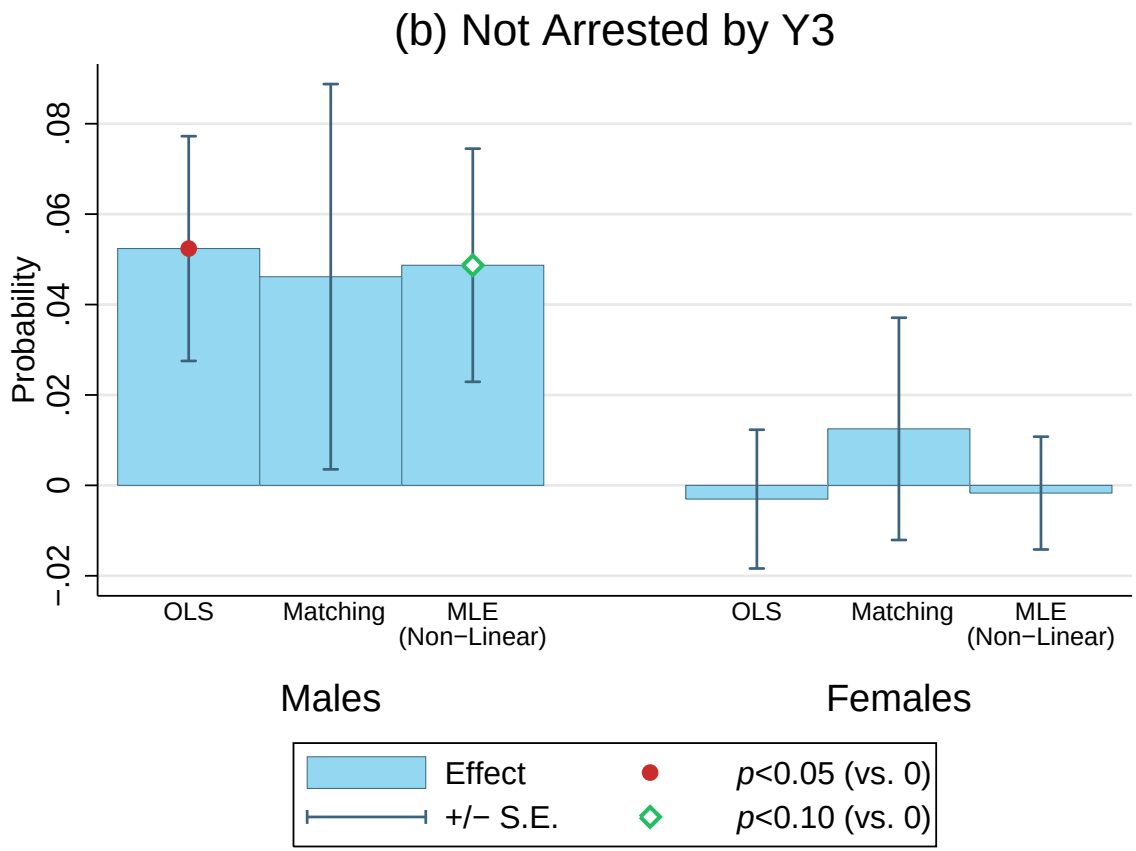
LINK BACK TO PRESENTATION.

Figure 32: Sensitvity Check – Effect of OneGoal on High School Graduation



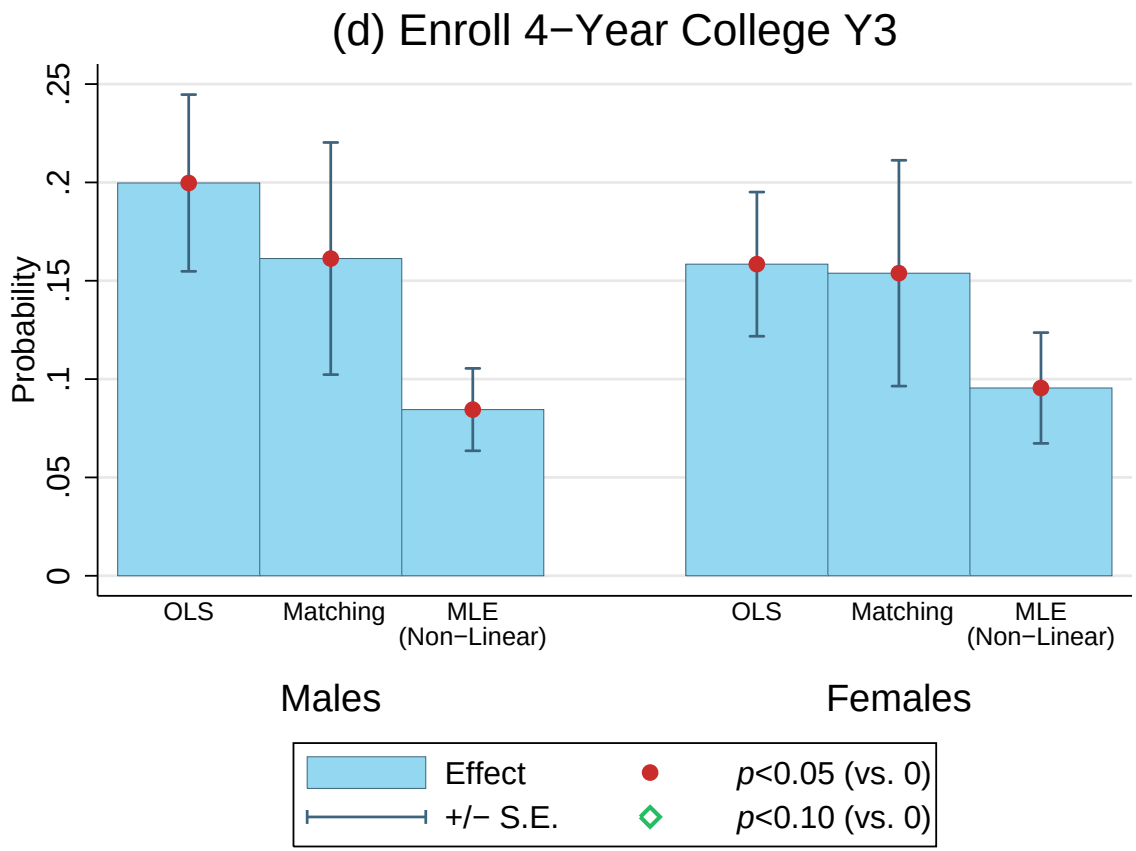
LINK BACK TO PRESENTATION.

Figure 33: Sensitivity Check – Effect of OneGoal on Not Arrested by Tenth Grade



LINK BACK TO PRESENTATION.

Figure 34: Sensitivity Check – Effect of OneGoal on 4-Year College Enrollment by Year 3



LINK BACK TO PRESENTATION.

Potential Outcomes Framework

Adopt the standard potential outcomes framework:
Y_1: Outcome if individual participates in OneGoal
Y_0: Outcome if individual does not participate in OneGoal
D: Indicator for whether and individual would participate if given the option LINK BACK TO PRESENTATION.

Potential Outcomes Framework

$$A = \begin{cases} 1 & \text{if } D = 1 \text{ and } Z = 1, \\ 0 & \text{if } D = 0 \text{ or } Z = 0. \end{cases}$$

D: Indicator for whether an individual would participate if eligible
Z: Indicator for whether an individual is eligible for OneGoal
A: Indicator for whether an individual is observed to participate

LINK BACK TO PRESENTATION.

Using Eligibility as an Instrument

- Use eligibility for OneGoal (Z) as an instrument for participation (A); i.e., whether their school offers OneGoal
- Like a randomized experiment where the treatment group can opt for treatment but the control group has no access
- $TT(X, \theta)$ is identified

Approach 2: Using Eligibility as an Instrument

(E-1)

$$Z \perp\!\!\!\perp (Y_1, Y_0, D) \,|X, \theta$$

(E-2)

$$\Pr(D = 1|X, \theta, Z = 1) = \Pr(D = 1|X, \theta, Z = 0).$$

Under (E-1) and (E-2), Heckman and Vytlacil (2007) show the IV estimator converges to the treatment on the treated:

$$\frac{E[Y|X, \theta, Z = 1] - E[Y|X, \theta, Z = 0]}{E[A|X, \theta, Z = 1] - E[A|X, \theta, Z = 0]} = E[Y_1 - Y_0|X, \theta, D = 1].$$

LINK BACK TO PRESENTATION.

Summary of Past Interventions

- Interventions can shape non-cognitive skills at a variety of ages
- Compared to cognitive skills, non-cognitive skills are malleable through later ages
- There have been fewer high-quality studies of adolescent interventions

Summary of Measurement

- Non-cognitive skills are typically measured using self-reports
- Measurement of any skill can be viewed as performance on a task
- Task performance can depend on multiple skills, incentives, and effort
- Any outcome or behavior that depends on a skill can be used as a measure of that skill

Non-Cognitive Skills can be Measured using School Administrative Data

- Evidence from psychology shows that grades, credits, absences, and disciplinary infractions depend on non-cognitive skills
- After accounting for cognitive ability, these can be viewed as measures of non-cognitive skill
- Collapse these measures into a cognitive component based on achievement test scores and a non-cognitive component
- Non-cognitive skill is three times as predictive of who finishes high school

Evaluation of OneGoal

- OneGoal aims to help disadvantaged high school students complete college by teaching non-cognitive skills
- Recruits students with high non-cognitive skills
- Show that it increases college enrollment by 10–20 percentage points
- About 15–30 percent of the effect is due to improvements in non-cognitive skills

Review of Interventions

- Early childhood programs generally appear more promising than adolescent programs (Heckman and Kautz, 2014)
- Several adolescent programs had short-term effects because they gave only short-term incentives or focused only on academics (Heckman and Kautz, 2014)

	Participant/Evaluation Characteristics						Components					Effects on Outcomes							Return/Benefits	
Program	*Age*	*Duration*	*Target*	*Selection*	*Follow-Up*	*Sample*	*Home*	*Health*	*Parental*	*On Site*	*Group*	*IQ*	*School*	*Personality*	*Education*	*Health*	*Crime*	*Earnings*	*Return*	*Benefit/Cost*
Early																				
NFP	0	2Y	SES	Prgrm	19Y	640	☒	☒	☒	☐	☐	●	◐	●	○	◍	◐	.		2.9
ABC	0	3Y	SES	Refer	30Y	90	☐	☒	☒	☒	☒	●	●	◐	◐	◍	◐	◐		3.8
IHDP	0	3Y	Health	Prgrm	18Y	640	☒	☐	☒	☒	☒	◐	◐	◐	○	○	○	.		
FDRP	0	5Y	SES	Prgrm	15Y	110	☒	☒	☒	☒	☒	○	◐	◍	.	.	●	.		
PCDC	1	2Y	SES	Prgrm	15Y	170	☒	☐	☒	☒	☒	◍	◍	●	.	.	.	.		
JSS	1-2	2Y	Health	Prgrm	22Y	160	☒	☒	☒	☐	☐	●	●	●	◍	●	.	●		
Perry	3	2Y	SES, IQ	Prgrm	37Y	120	☒	☐	☒	☒	☒	◍	●	●	◐	○	●	◐	8.1-9.2	7.1-12.2
Head Start	3	2Y	SES	Prnt	23Y	4,170	☒	☒	☒	☒	☒	◍	◍	○	●	●	◐	●		
CPC	3-4	2Y	SES	Prnt	25Y	1,290	☐	☒	☒	☒	☒	.	●	●	●	●	●	●	18	10.8
TEEP	3,5	2Y	SES	Prgrm	22Y	260	☒	☒	☒	☒	☐	◍	●	●	●	.	.	.		
STAR	5-6	4Y	SES	Prgrm	22Y	11,000	☐	☐	☐	☒	☒	.	◍	●	●	.	.	●	6.2	
Elementary																				
LA's Best	5-6	6Y	SES	Schl	12Y	19,320	☐	☒	☒	☒	☒	.	◍	.	●	.	○	.		0.9
CSP	5-13	5Y	Behav	Refer	35Y	510	☒	☒	☒	☒	☒	.	.	○	.	⊗	○	.		
SSDP	6-7	6Y	Crime	Prgrm	21Y	610	☐	☒	☒	☒	☒	.	●	●	●	●	◍	○		3.1
Adolescence																				
BBBS	10-16	1Y	SES	Self	1Y	960	☐	☐	☐	☐	☐	.	◐	○	.	◐	○	.		1.0
IHAD	11-12	7Y	SES	Prgrm	8Y	180	☐	☒	☒	☒	☒	.	.	.	●	.	.	.		
EPIS	13-15	3Y	Schl	Schl	2Y	45,070	☐	☐	☐	☒	☒	.	●	.	.	.	.	.		0.9-3.0
xl club	14	2Y	Schl	Schl	2Y	261,420	☐	☐	☐	☒	☒	.	○	.	.	.	.	.		
SAS	14-15	5Y	Schl, SES	Schl	6Y	430	☐	☐	☐	☐	☐	.	◍	○	●	.	.	.		
STEP	14-15	2Y	Schl, SES	Self	4Y	4,800	☐	☒	☐	☒	☒	.	○	.	○	.	.	○		
QOP	14-15	5Y	Schl	Prgrm	10Y	1,070	☐	☒	☐	☒	☒	.	○	.	◍	○	⊗	○		0.42
Academies	13-16	4Y	Schl, SES	Self	12Y	1,460	☐	☐	☐	☒	☒	.	◍	○	○	○	◍	◐		
ChalleNGe	16-18	1Y	Dropout	Self	3Y	1,200	☐	☒	☐	☒	☒	.	.	◍	●	◐	◍	●	6.4	2.66
Job Corps	16-24	1Y	SES	Self	9Y	15,300	☐	☒	☐	☒	☒	.	.	.	○	◍	◍	◍		0.22
Year-Up	18-24	1Y	SES	Self	2Y	200	☐	☐	☐	☒	☒	.	.	.	.	.	.	●		

	Participant/Evaluation Characteristics						Components					Effects on Outcomes							Return/Benefits	
Program	*Age*	*Duration*	*Target*	*Selection*	*Follow-Up*	*Sample*	*Home*	*Health*	*Parental*	*On Site*	*Group*	*IQ*	*School*	*Personality*	*Education*	*Health*	*Crime*	*Earnings*	*Return*	*Benefit/Cost*
Early																				
NFP	0	2Y	SES	Prgrm	19Y	640	☒	☒	☒	☐	☐	●	◐	●	○	◍	◐	.		2.9
ABC	0	3Y	SES	Refer	30Y	90	☐	☒	☒	☒	☒	●	●	◐	◐	◍	◐	◐		3.8
IHDP	0	3Y	Health	Prgrm	18Y	640	☒	☐	☒	☒	☒	◐	◐	◐	○	○	○	.		
FDRP	0	5Y	SES	Prgrm	15Y	110	☒	☒	☒	☒	☒	○	◐	◍	.	.	●	.		
PCDC	1	2Y	SES	Prgrm	15Y	170	☒	☐	☒	☒	☒	◍	◍	●	.	.	.	.		
JSS	1-2	2Y	Health	Prgrm	22Y	160	☒	☒	☒	☐	☐	●	●	●	◍	●	.	●		
Perry	3	2Y	SES, IQ	Prgrm	37Y	120	☒	☐	☒	☒	☒	◍	●	●	◐	○	●	◐	8.1-9.2	7.1-12.2
Head Start	3	2Y	SES	Prnt	23Y	4,170	☒	☒	☒	☒	☒	◍	◍	○	●	●	◐	●		
CPC	3-4	2Y	SES	Prnt	25Y	1,290	☐	☒	☒	☒	☒	.	●	●	●	●	●	●	18	10.8
TEEP	3,5	2Y	SES	Prgrm	22Y	260	☒	☒	☒	☒	☐	◍	●	●	●	.	.	.		
STAR	5-6	4Y	SES	Prgrm	22Y	11,000	☐	☐	☐	☒	☒	.	◍	●	●	.	.	●	6.2	
Elementary																				
LA's Best	5-6	6Y	SES	Schl	12Y	19,320	☐	☒	☒	☒	☒	.	◍	.	●	.	○	.		0.9
CSP	5-13	5Y	Behav	Refer	35Y	510	☒	☒	☒	☒	☒	.	.	○	.	⊗	○	.		
SSDP	6-7	6Y	Crime	Prgrm	21Y	610	☐	☒	☒	☒	☒	.	●	●	●	●	◍	○		3.1
Adolescence																				
BBBS	10-16	1Y	SES	Self	1Y	960	☐	☐	☐	☐	☐	.	◐	○	.	◐	○	.		1.0
IHAD	11-12	7Y	SES	Prgrm	8Y	180	☐	☒	☒	☒	☒	.	.	.	●	.	.	.		
EPIS	13-15	3Y	Schl	Schl	2Y	45,070	☐	☐	☐	☒	☒	.	●	.	.	.	.	.		0.9-3.0
xl club	14	2Y	Schl	Schl	2Y	261,420	☐	☐	☐	☒	☒	.	○	.	.	.	.	.		
SAS	14-15	5Y	Schl, SES	Schl	6Y	430	☐	☐	☐	☐	☐	.	◍	○	●	.	.	.		
STEP	14-15	2Y	Schl, SES	Self	4Y	4,800	☐	☒	☐	☒	☒	.	○	.	○	.	.	○		
QOP	14-15	5Y	Schl	Prgrm	10Y	1,070	☐	☒	☐	☒	☒	.	○	.	◍	○	⊗	○		0.42
Academies	13-16	4Y	Schl, SES	Self	12Y	1,460	☐	☐	☐	☒	☒	.	◍	○	○	○	◍	◐		
ChalleNGe	16-18	1Y	Dropout	Self	3Y	1,200	☐	☒	☐	☒	☒	.	.	◍	●	◐	◍	●	6.4	2.66
Job Corps	16-24	1Y	SES	Self	9Y	15,300	☐	☒	☐	☒	☒	.	.	.	○	◍	◍	◍		0.22
Year-Up	18-24	1Y	SES	Self	2Y	200	☐	☐	☐	☒	☒	.	.	.	.	.	.	●		

	Participant/Evaluation Characteristics						Components					Effects on Outcomes							Return/Benefits	
Program	*Age*	*Duration*	*Target*	*Selection*	*Follow-Up*	*Sample*	*Home*	*Health*	*Parental*	*On Site*	*Group*	*IQ*	*School*	*Personality*	*Education*	*Health*	*Crime*	*Earnings*	*Return*	*Benefit/Cost*
Early																				
NFP	0	2Y	SES	Prgrm	19Y	640	☒	☒	☒	☐	☐	●	◐	●	○	◍	◐	.		2.9
ABC	0	3Y	SES	Refer	30Y	90	☐	☒	☒	☒	☒	●	●	◐	◐	◍	◐	◐		3.8
IHDP	0	3Y	Health	Prgrm	18Y	640	☒	☐	☒	☒	☒	◐	◐	◐	○	○	○	.		
FDRP	0	5Y	SES	Prgrm	15Y	110	☒	☒	☒	☒	☒	○	◐	◍	.	.	●	.		
PCDC	1	2Y	SES	Prgrm	15Y	170	☒	☐	☒	☒	☒	◍	◍	●	.	.	.	.		
JSS	1-2	2Y	Health	Prgrm	22Y	160	☒	☒	☒	☐	☐	●	●	●	◍	●	.	●		
Perry	3	2Y	SES, IQ	Prgrm	37Y	120	☒	☐	☒	☒	☒	◍	●	●	◐	○	●	◐	8.1-9.2	7.1-12.2
Head Start	3	2Y	SES	Prnt	23Y	4,170	☒	☒	☒	☒	☒	◍	◍	○	●	●	◐	●		
CPC	3-4	2Y	SES	Prnt	25Y	1,290	☐	☒	☒	☒	☒	.	●	●	●	●	●	●	18	10.8
TEEP	3,5	2Y	SES	Prgrm	22Y	260	☒	☒	☒	☒	☐	◍	●	●	●	.	.	.		
STAR	5-6	4Y	SES	Prgrm	22Y	11,000	☐	☐	☐	☒	☒	.	◍	●	●	.	.	●	6.2	
Elementary																				
LA's Best	5-6	6Y	SES	Schl	12Y	19,320	☐	☒	☒	☒	☒	.	◍	.	●	.	○	.		0.9
CSP	5-13	5Y	Behav	Refer	35Y	510	☒	☒	☒	☒	☒	.	.	○	.	⊗	○	.		
SSDP	6-7	6Y	Crime	Prgrm	21Y	610	☐	☒	☒	☒	☒	.	●	●	●	●	◍	○		3.1
Adolescence																				
BBBS	10-16	1Y	SES	Self	1Y	960	☐	☐	☐	☐	☐	.	◐	○	.	◐	○	.		1.0
IHAD	11-12	7Y	SES	Prgrm	8Y	180	☐	☒	☒	☒	☒	.	.	.	●	.	.	.		
EPIS	13-15	3Y	Schl	Schl	2Y	45,070	☐	☐	☐	☒	☒	.	●	.	.	.	.	.		0.9-3.0
xl club	14	2Y	Schl	Schl	2Y	261,420	☐	☐	☐	☒	☒	.	○	.	.	.	.	.		
SAS	14-15	5Y	Schl, SES	Schl	6Y	430	☐	☐	☐	☐	☐	.	◍	○	●	.	.	.		
STEP	14-15	2Y	Schl, SES	Self	4Y	4,800	☐	☒	☐	☒	☒	.	○	.	○	.	.	○		
QOP	14-15	5Y	Schl	Prgrm	10Y	1,070	☐	☒	☐	☒	☒	.	○	.	◍	○	⊗	○		0.42
Academies	13-16	4Y	Schl, SES	Self	12Y	1,460	☐	☐	☐	☒	☒	.	◍	○	○	○	◍	◐		
ChalleNGe	16-18	1Y	Dropout	Self	3Y	1,200	☐	☒	☐	☒	☒	.	.	◍	●	◐	◍	●	6.4	2.66
Job Corps	16-24	1Y	SES	Self	9Y	15,300	☐	☒	☐	☒	☒	.	.	.	○	◍	◍	◍		0.22
Year-Up	18-24	1Y	SES	Self	2Y	200	☐	☐	☐	☒	☒	.	.	.	.	.	.	●		

	Participant/Evaluation Characteristics						Components					Effects on Outcomes							Return/Benefits	
Program	*Age*	*Duration*	*Target*	*Selection*	*Follow-Up*	*Sample*	*Home*	*Health*	*Parental*	*On Site*	*Group*	*IQ*	*School*	*Personality*	*Education*	*Health*	*Crime*	*Earnings*	*Return*	*Benefit/Cost*
Early																				
NFP	0	2Y	SES	Prgrm	19Y	640	☒	☒	☒	☐	☐	●	◐	●	○	◍	◐	.		2.9
ABC	0	3Y	SES	Refer	30Y	90	☐	☒	☒	☒	☒	●	●	◐	◐	◍	◐	◐		3.8
IHDP	0	3Y	Health	Prgrm	18Y	640	☒	☐	☒	☒	☒	◐	◐	◐	○	○	○	.		
FDRP	0	5Y	SES	Prgrm	15Y	110	☒	☒	☒	☒	☒	○	◐	◍	.	.	●	.		
PCDC	1	2Y	SES	Prgrm	15Y	170	☒	☐	☒	☒	☒	◍	◍	●	.	.	.	.		
JSS	1-2	2Y	Health	Prgrm	22Y	160	☒	☒	☒	☐	☐	●	●	●	◍	●	.	●		
Perry	3	2Y	SES, IQ	Prgrm	37Y	120	☒	☐	☒	☒	☒	◍	●	●	◐	○	●	◐	8.1-9.2	7.1-12.2
Head Start	3	2Y	SES	Prnt	23Y	4,170	☒	☒	☒	☒	☒	◍	◍	○	●	●	◐	●		
CPC	3-4	2Y	SES	Prnt	25Y	1,290	☐	☒	☒	☒	☒	.	●	●	●	●	●	●	18	10.8
TEEP	3,5	2Y	SES	Prgrm	22Y	260	☒	☒	☒	☒	☐	◍	●	●	●	.	.	.		
STAR	5-6	4Y	SES	Prgrm	22Y	11,000	☐	☐	☐	☒	☒	.	◍	●	●	.	.	●	6.2	
Elementary																				
LA's Best	5-6	6Y	SES	Schl	12Y	19,320	☐	☒	☒	☒	☒	.	◍	.	●	.	○	.		0.9
CSP	5-13	5Y	Behav	Refer	35Y	510	☒	☒	☒	☒	☒	.	.	○	.	⊗	○	.		
SSDP	6-7	6Y	Crime	Prgrm	21Y	610	☐	☒	☒	☒	☒	.	●	●	●	●	◍	○		3.1
Adolescence																				
BBBS	10-16	1Y	SES	Self	1Y	960	☐	☐	☐	☐	☐	.	◐	○	.	◐	○	.		1.0
IHAD	11-12	7Y	SES	Prgrm	8Y	180	☐	☒	☒	☒	☒	.	.	.	●	.	.	.		
EPIS	13-15	3Y	Schl	Schl	2Y	45,070	☐	☐	☐	☒	☒	.	●	.	.	.	.	.		0.9-3.0
xl club	14	2Y	Schl	Schl	2Y	261,420	☐	☐	☐	☒	☒	.	○	.	.	.	.	.		
SAS	14-15	5Y	Schl, SES	Schl	6Y	430	☐	☐	☐	☐	☐	.	◍	○	●	.	.	.		
STEP	14-15	2Y	Schl, SES	Self	4Y	4,800	☐	☒	☐	☒	☒	.	○	.	○	.	.	○		
QOP	14-15	5Y	Schl	Prgrm	10Y	1,070	☐	☒	☐	☒	☒	.	○	.	◍	○	⊗	○		0.42
Academies	13-16	4Y	Schl, SES	Self	12Y	1,460	☐	☐	☐	☒	☒	.	◍	○	○	○	◍	◐		
ChalleNGe	16-18	1Y	Dropout	Self	3Y	1,200	☐	☒	☐	☒	☒	.	.	◍	●	◐	◍	●	6.4	2.66
Job Corps	16-24	1Y	SES	Self	9Y	15,300	☐	☒	☐	☒	☒	.	.	.	○	◍	◍	◍		0.22
Year-Up	18-24	1Y	SES	Self	2Y	200	☐	☐	☐	☒	☒	.	.	.	.	.	.	●		

	Participant/Evaluation Characteristics						Components					Effects on Outcomes							Return/Benefits	
Program	*Age*	*Duration*	*Target*	*Selection*	*Follow-Up*	*Sample*	*Home*	*Health*	*Parental*	*On Site*	*Group*	*IQ*	*School*	*Personality*	*Education*	*Health*	*Crime*	*Earnings*	*Return*	*Benefit/Cost*
Early																				
NFP	0	2Y	SES	Prgrm	19Y	640	☒	☒	☒	☐	☐	●	◐	●	○	◍	◐	.		2.9
ABC	0	3Y	SES	Refer	30Y	90	☐	☒	☒	☒	☒	●	●	◐	◐	◍	◐	◐		3.8
IHDP	0	3Y	Health	Prgrm	18Y	640	☒	☐	☒	☒	☒	◐	◐	◐	○	○	○	.		
FDRP	0	5Y	SES	Prgrm	15Y	110	☒	☒	☒	☒	☒	○	◐	◍	.	.	●	.		
PCDC	1	2Y	SES	Prgrm	15Y	170	☒	☐	☒	☒	☒	◍	◍	●	.	.	.	.		
JSS	1-2	2Y	Health	Prgrm	22Y	160	☒	☒	☒	☐	☐	●	●	●	◍	●	.	●		
Perry	3	2Y	SES, IQ	Prgrm	37Y	120	☒	☐	☒	☒	☒	◍	●	●	◐	○	●	◐	8.1-9.2	7.1-12.2
Head Start	3	2Y	SES	Prnt	23Y	4,170	☒	☒	☒	☒	☒	◍	◍	○	●	●	◐	●		
CPC	3-4	2Y	SES	Prnt	25Y	1,290	☐	☒	☒	☒	☒	.	●	●	●	●	●	●	18	10.8
TEEP	3,5	2Y	SES	Prgrm	22Y	260	☒	☒	☒	☒	☐	◍	●	●	●	.	.	.		
STAR	5-6	4Y	SES	Prgrm	22Y	11,000	☐	☐	☐	☒	☒	.	◍	●	●	.	.	●	6.2	
Elementary																				
LA's Best	5-6	6Y	SES	Schl	12Y	19,320	☐	☒	☒	☒	☒	.	◍	.	●	.	○	.		0.9
CSP	5-13	5Y	Behav	Refer	35Y	510	☒	☒	☒	☒	☒	.	.	○	.	⊗	○	.		
SSDP	6-7	6Y	Crime	Prgrm	21Y	610	☐	☒	☒	☒	☒	.	●	●	●	●	◍	○		3.1
Adolescence																				
BBBS	10-16	1Y	SES	Self	1Y	960	☐	☐	☐	☐	☐	.	◐	○	.	◐	○	.		1.0
IHAD	11-12	7Y	SES	Prgrm	8Y	180	☐	☒	☒	☒	☒	.	.	.	●	.	.	.		
EPIS	13-15	3Y	Schl	Schl	2Y	45,070	☐	☐	☐	☒	☒	.	●	.	.	.	.	.		0.9-3.0
xl club	14	2Y	Schl	Schl	2Y	261,420	☐	☐	☐	☒	☒	.	○	.	.	.	.	.		
SAS	14-15	5Y	Schl, SES	Schl	6Y	430	☐	☐	☐	☐	☐	.	◍	○	●	.	.	.		
STEP	14-15	2Y	Schl, SES	Self	4Y	4,800	☐	☒	☐	☒	☒	.	○	.	○	.	.	○		
QOP	14-15	5Y	Schl	Prgrm	10Y	1,070	☐	☒	☐	☒	☒	.	○	.	◍	○	⊗	○		0.42
Academies	13-16	4Y	Schl, SES	Self	12Y	1,460	☐	☐	☐	☒	☒	.	◍	○	○	○	◍	◐		
ChalleNGe	16-18	1Y	Dropout	Self	3Y	1,200	☐	☒	☐	☒	☒	.	.	◍	●	◐	◍	●	6.4	2.66
Job Corps	16-24	1Y	SES	Self	9Y	15,300	☐	☒	☐	☒	☒	.	.	.	○	◍	◍	◍		0.22
Year-Up	18-24	1Y	SES	Self	2Y	200	☐	☐	☐	☒	☒	.	.	.	.	.	.	●		

	Participant/Evaluation Characteristics						Components					Effects on Outcomes							Return/Benefits	
Program	*Age*	*Duration*	*Target*	*Selection*	*Follow-Up*	*Sample*	*Home*	*Health*	*Parental*	*On Site*	*Group*	*IQ*	*School*	*Personality*	*Education*	*Health*	*Crime*	*Earnings*	*Return*	*Benefit/Cost*
Early																				
NFP	0	2Y	SES	Prgrm	19Y	640	☒	☒	☒	☐	☐	●								2.9
ABC	0	3Y	SES	Refer	30Y	90	☐	☒	☒	☒	☒	●								3.8
IHDP	0	3Y	Health	Prgrm	18Y	640	☒	☐	☒	☒	☒	◐								
FDRP	0	5Y	SES	Prgrm	15Y	110	☒	☒	☒	☒	☒	○								
PCDC	1	2Y	SES	Prgrm	15Y	170	☒	☐	☒	☒	☒	◍								
JSS	1-2	2Y	Health	Prgrm	22Y	160	☒	☒	☒	☐	☐	●								
Perry	3	2Y	SES, IQ	Prgrm	37Y	120	☒	☐	☒	☒	☒	◍							8.1-9.2	7.1-12.2
Head Start	3	2Y	SES	Prnt	23Y	4,170	☒	☒	☒	☒	☒	◍								
CPC	3-4	2Y	SES	Prnt	25Y	1,290	☐	☒	☒	☒	☒	.							18	10.8
TEEP	3,5	2Y	SES	Prgrm	22Y	260	☒	☒	☒	☒	☐	◍								
STAR	5-6	4Y	SES	Prgrm	22Y	11,000	☐	☐	☐	☒	☒	.							6.2	
Elementary																				
LA's Best	5-6	6Y	SES	Schl	12Y	19,320	☐	☒	☒	☒	☒	.								0.9
CSP	5-13	5Y	Behav	Refer	35Y	510	☒	☒	☒	☒	☒	.								
SSDP	6-7	6Y	Crime	Prgrm	21Y	610	☐	☒	☒	☒	☒	.								3.1
Adolescence																				
BBBS	10-16	1Y	SES	Self	1Y	960	☐	☐	☐	☐	☐	.								1.0
IHAD	11-12	7Y	SES	Prgrm	8Y	180	☐	☒	☒	☒	☒	.								
EPIS	13-15	3Y	Schl	Schl	2Y	45,070	☐	☐	☐	☒	☒	.								0.9-3.0
xl club	14	2Y	Schl	Schl	2Y	261,420	☐	☐	☐	☒	☒	.								
SAS	14-15	5Y	Schl, SES	Schl	6Y	430	☐	☐	☐	☐	☐	.								
STEP	14-15	2Y	Schl, SES	Self	4Y	4,800	☐	☒	☐	☒	☒	.								
QOP	14-15	5Y	Schl	Prgrm	10Y	1,070	☐	☒	☐	☒	☒	.								0.42
Academies	13-16	4Y	Schl, SES	Self	12Y	1,460	☐	☐	☐	☒	☒	.								
ChalleNGe	16-18	1Y	Dropout	Self	3Y	1,200	☐	☒	☐	☒	☒	.							6.4	2.66
Job Corps	16-24	1Y	SES	Self	9Y	15,300	☐	☒	☐	☒	☒	.								0.22
Year-Up	18-24	1Y	SES	Self	2Y	200	☐	☐	☐	☒	☒	.								

	Participant/Evaluation Characteristics						Components					Effects on Outcomes							Return/Benefits	
Program	*Age*	*Duration*	*Target*	*Selection*	*Follow-Up*	*Sample*	*Home*	*Health*	*Parental*	*On Site*	*Group*	*IQ*	*School*	*Personality*	*Education*	*Health*	*Crime*	*Earnings*	*Return*	*Benefit/Cost*
Early																				
NFP	0	2Y	SES	Prgrm	19Y	640	☒	☒	☒	☐	☐	●	◐	●	○	◍	◐	.		2.9
ABC	0	3Y	SES	Refer	30Y	90	☐	☒	☒	☒	☒	●	●	◐	◐	◍	◐	◐		3.8
IHDP	0	3Y	Health	Prgrm	18Y	640	☒	☐	☒	☒	☒	◐	◐	◐	○	○	○	.		
FDRP	0	5Y	SES	Prgrm	15Y	110	☒	☒	☒	☒	☒	○	◐	◍	.	.	●	.		
PCDC	1	2Y	SES	Prgrm	15Y	170	☒	☐	☒	☒	☒	◍	◍	●	.	.	.	.		
JSS	1-2	2Y	Health	Prgrm	22Y	160	☒	☒	☒	☐	☐	●	●	●	◍	●	.	●		
Perry	3	2Y	SES, IQ	Prgrm	37Y	120	☒	☐	☒	☒	☒	◍	●	●	◐	○	●	◐	8.1-9.2	7.1-12.2
Head Start	3	2Y	SES	Prnt	23Y	4,170	☒	☒	☒	☒	☒	◍	◍	○	●	●	◐	●		
CPC	3-4	2Y	SES	Prnt	25Y	1,290	☐	☒	☒	☒	☒	.	●	●	●	●	●	●	18	10.8
TEEP	3,5	2Y	SES	Prgrm	22Y	260	☒	☒	☒	☒	☐	◍	●	●	●	.	.	.		
STAR	5-6	4Y	SES	Prgrm	22Y	11,000	☐	☐	☐	☒	☒	.	◍	●	●	.	.	●	6.2	
Elementary																				
LA's Best	5-6	6Y	SES	Schl	12Y	19,320	☐	☒	☒	☒	☒	.	◍	.	●	.	○	.		0.9
CSP	5-13	5Y	Behav	Refer	35Y	510	☒	☒	☒	☒	☒	.	.	○	.	⊗	○	.		
SSDP	6-7	6Y	Crime	Prgrm	21Y	610	☐	☒	☒	☒	☒	.	●	●	●	●	◍	○		3.1
Adolescence																				
BBBS	10-16	1Y	SES	Self	1Y	960	☐	☐	☐	☐	☐	.	◐	○	.	◐	○	.		1.0
IHAD	11-12	7Y	SES	Prgrm	8Y	180	☐	☒	☒	☒	☒	.	.	.	●	.	.	.		
EPIS	13-15	3Y	Schl	Schl	2Y	45,070	☐	☐	☐	☒	☒	.	●	.	.	.	.	.		0.9-3.0
xl club	14	2Y	Schl	Schl	2Y	261,420	☐	☐	☐	☒	☒	.	○	.	.	.	.	.		
SAS	14-15	5Y	Schl, SES	Schl	6Y	430	☐	☐	☐	☐	☐	.	◍	○	●	.	.	.		
STEP	14-15	2Y	Schl, SES	Self	4Y	4,800	☐	☒	☐	☒	☒	.	○	.	○	.	.	○		
QOP	14-15	5Y	Schl	Prgrm	10Y	1,070	☐	☒	☐	☒	☒	.	○	.	◍	○	⊗	○		0.42
Academies	13-16	4Y	Schl, SES	Self	12Y	1,460	☐	☐	☐	☒	☒	.	◍	○	○	○	◍	◐		
ChalleNGe	16-18	1Y	Dropout	Self	3Y	1,200	☐	☒	☐	☒	☒	.	.	◍	●	◐	◍	●	6.4	2.66
Job Corps	16-24	1Y	SES	Self	9Y	15,300	☐	☒	☐	☒	☒	.	.	.	○	◍	◍	◍		0.22
Year-Up	18-24	1Y	SES	Self	2Y	200	☐	☐	☐	☒	☒	.	.	.	.	.	.	●		

	Participant/Evaluation Characteristics						Components					Effects on Outcomes							Return/Benefits	
Program	*Age*	*Duration*	*Target*	*Selection*	*Follow-Up*	*Sample*	*Home*	*Health*	*Parental*	*On Site*	*Group*	*IQ*	*School*	*Personality*	*Education*	*Health*	*Crime*	*Earnings*	*Return*	*Benefit/Cost*
Early																				
NFP	0	2Y	SES	Prgrm	19Y	640	☒	☒	☒	☐	☐	●	◐	●	○	◍	◐	.		2.9
ABC	0	3Y	SES	Refer	30Y	90	☐	☒	☒	☒	☒	●	●	◐	◐	◍	◐	◐		3.8
IHDP	0	3Y	Health	Prgrm	18Y	640	☒	☐	☒	☒	☒	◐	◐	◐	○	○	○	.		
FDRP	0	5Y	SES	Prgrm	15Y	110	☒	☒	☒	☒	☒	○	◐	◍	.	.	●	.		
PCDC	1	2Y	SES	Prgrm	15Y	170	☒	☐	☒	☒	☒	◍	◍	●	.	.	.	.		
JSS	1-2	2Y	Health	Prgrm	22Y	160	☒	☒	☒	☐	☐	●	●	●	◍	●	.	●		
Perry	3	2Y	SES, IQ	Prgrm	37Y	120	☒	☐	☒	☒	☒	◍	●	●	◐	○	●	◐	8.1-9.2	7.1-12.2
Head Start	3	2Y	SES	Prnt	23Y	4,170	☒	☒	☒	☒	☒	◍	◍	○	●	●	◐	●		
CPC	3-4	2Y	SES	Prnt	25Y	1,290	☐	☒	☒	☒	☒	.	●	●	●	●	●	●	18	10.8
TEEP	3,5	2Y	SES	Prgrm	22Y	260	☒	☒	☒	☒	☐	◍	●	●	●	.	.	.		
STAR	5-6	4Y	SES	Prgrm	22Y	11,000	☐	☐	☐	☒	☒	.	◍	●	●	.	.	●	6.2	
Elementary																				
LA's Best	5-6	6Y	SES	Schl	12Y	19,320	☐	☒	☒	☒	☒	.	◍	.	●	.	○	.		0.9
CSP	5-13	5Y	Behav	Refer	35Y	510	☒	☒	☒	☒	☒	.	.	○	.	⊗	○	.		
SSDP	6-7	6Y	Crime	Prgrm	21Y	610	☐	☒	☒	☒	☒	.	●	●	●	●	◍	○		3.1
Adolescence																				
BBBS	10-16	1Y	SES	Self	1Y	960	☐	☐	☐	☐	☐	.	◐	○	.	◐	○	.		1.0
IHAD	11-12	7Y	SES	Prgrm	8Y	180	☐	☒	☒	☒	☒	.	.	.	●	.	.	.		
EPIS	13-15	3Y	Schl	Schl	2Y	45,070	☐	☐	☐	☒	☒	.	●	.	.	.	.	.		0.9-3.0
xl club	14	2Y	Schl	Schl	2Y	261,420	☐	☐	☐	☒	☒	.	○	.	.	.	.	.		
SAS	14-15	5Y	Schl, SES	Schl	6Y	430	☐	☐	☐	☐	☐	.	◍	○	●	.	.	.		
STEP	14-15	2Y	Schl, SES	Self	4Y	4,800	☐	☒	☐	☒	☒	.	○	.	○	.	.	○		
QOP	14-15	5Y	Schl	Prgrm	10Y	1,070	☐	☒	☐	☒	☒	.	○	.	◍	○	⊗	○		0.42
Academies	13-16	4Y	Schl, SES	Self	12Y	1,460	☐	☐	☐	☒	☒	.	◍	○	○	○	◍	◐		
ChalleNGe	16-18	1Y	Dropout	Self	3Y	1,200	☐	☒	☐	☒	☒	.	.	◍	●	◐	◍	●	6.4	2.66
Job Corps	16-24	1Y	SES	Self	9Y	15,300	☐	☒	☐	☒	☒	.	.	.	○	◍	◍	◍		0.22
Year-Up	18-24	1Y	SES	Self	2Y	200	☐	☐	☐	☒	☒	.	.	.	.	.	.	●		

Notes: ☐ – Does not include intervention component. ☒ – Includes intervention component. ○ – No effects. ● – Positive effects. ◍ – Weakly positive effects. ◐ – Mixed effects (either different studies find different results or only particular sub-populations benefited). ⊗ – Negative effects. "." – Not measured. "Age" – The age at which participants entered the program. For programs that targeted grades, rather than ages, it was assumed that children entered kindergarten at ages 5-6 and each the age range advanced one year for each subsequent grade. "Duration" – Length of the treatment. In cases where the treatment length varied for participants, the longest duration was presented. "Target" – Population that was targeted by the program. SES – socioeconomic status or disadvantage. Behav – Behavior. Schl – School Performance. Crime – local crime rates. IQ – low IQ. "Selection" – The party that acted first in the joining the sample. Prgrm – Evaluation program contacted participants. Refer – Other party referred participants to program. Par – Parent applied to program. Self – Participant applied to program. Schl – School selected participants. Hosp – Hospital referred participants. "Follow-Up" duration of longest follow-up evaluation in years. "Sample" – Largest sample size from the studies examined (rounded to nearest 10). "Home" – Included home visits. "Health" – Included a nutritional component. "Parental" – Involved parents. "On Site" – Took place at an on site location. "Group" – Whether the intervention combined participants in groups. "IQ" – IQ score. "School" – school performance. "Character" – measured character skills. "Education" – educational attainment. "Health" – health (including drug use). "Crime" – crime. "Earnings" – earnings or related outcomes. "Return" – Annual rate of return. "Benefit/Cost" – Estimated benefits divided by costs.

Summary Table Sources: **NFP** – Olds et al. (2004,?); Olds (2006); Eckenrode et al. (2010); Olds et al. (2007); Kitzman et al. (2010); Olds et al. (2010). **ABC** – **?**Breitmayer and Ramey (1986); Temple and Reynolds (2007). **IHDP** – McCormick et al. (2006). **FDRP** – Lally et al. (1987). **PCDC** – Johnson and Walker (1991); Bridgeman et al. (1981); Besharov et al. (2011). **JSS** – Walker et al. (2007); Grantham-McGregor et al. (1991); Gertler et al. (2013); Walker et al. (2005). **Perry** – Heckman et al. (2010a,b); **?**. **Head Start** – Ludwig and Miller (2007); Garces et al. (2002); Deming (2009); Westat (2010); Carneiro and Ginja (2012); Currie and Thomas (1995). **CPC** – Reynolds (1994); Niles et al. (2006); Reynolds et al. (2002, 2011). **TEEP** – Kagitcibasi et al. (2001, 2009). **STAR** – Chetty et al. (2011); Krueger (2003). **LAs BEST** – Huang et al. (2005); Goldschmidt et al. (2007); Huang et al. (2000). **CSP** – McCord (1978). **SSDP** – Hawkins et al. (1999, 2005, 2008). **BBBS** – Tierney et al. (1995). **IHAD** – Kahne and Bailey (1999). **EPIS** – Martins (2010). **XL Club** – Holmlund and Silva (2009). **SAS** – Johnson (1999). **STEP** – Walker and Vilella-Velez (1992). **QOP** – Rodríguez-Planas (2012, 2010). **Academies** – Kemple and Willner (2008); Kemple and Snipes (2000). **ChalleNGe** – Bloom et al. (2009); Millenky et al. (2010, 2011). **Job Corps** – Schochet et al. (2001, 2008). **Year Up** – Roder and Elliot (2011)

Two Promising Adolescent Models

1. Provide mentorship and teach non-cognitive skills where they are applied (e.g., workplace) (Kemple and Snipes, 2000; Kemple and Willner, 2008; Roder and Elliot, 2011, 2014)
2. Give targeted help in applying to college (e.g., help with financial aid forms and applications) (Bettinger et al., 2012; Carrell and Sacerdote, 2013)

Figure 35: Correlations between Ninth Grade Measures

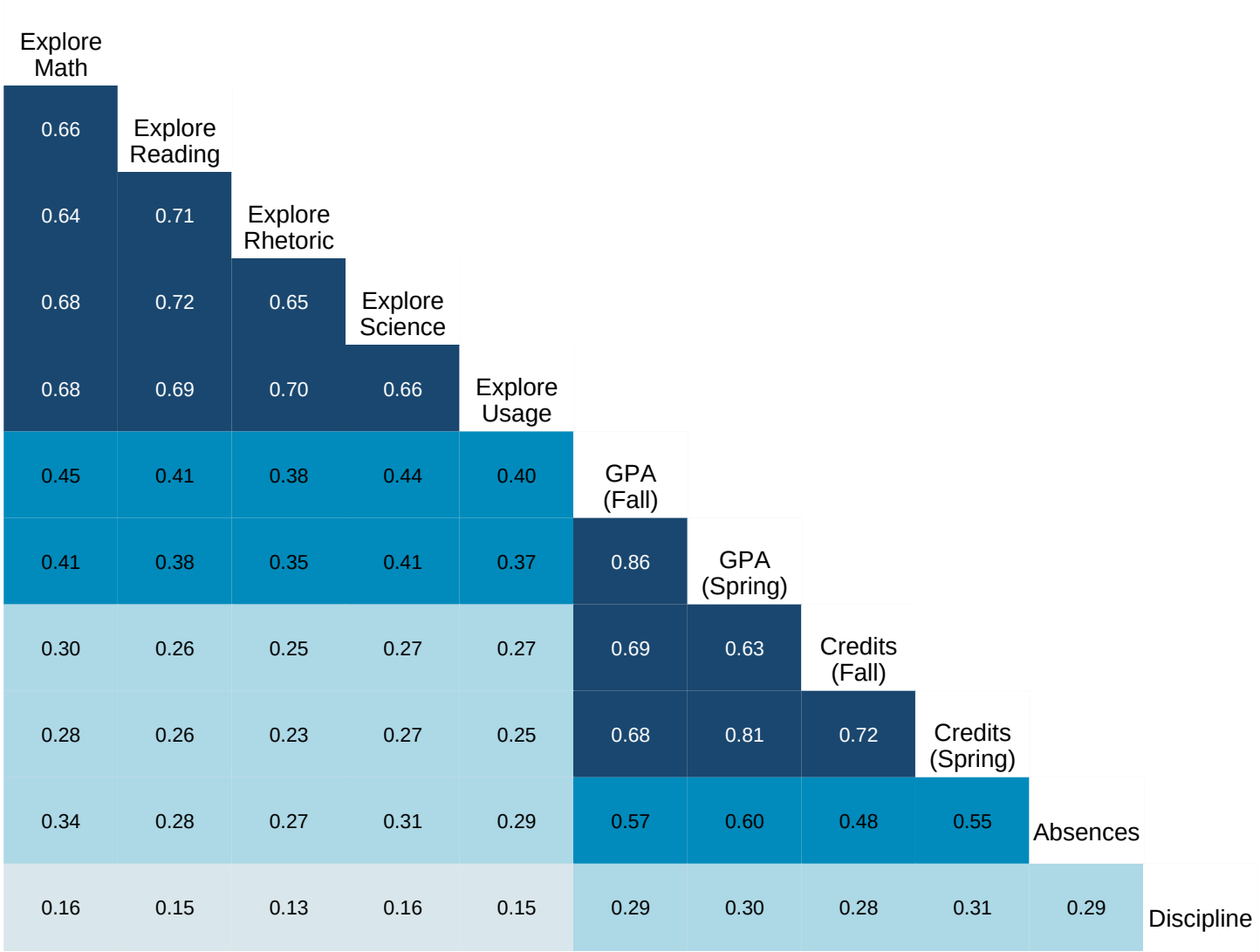
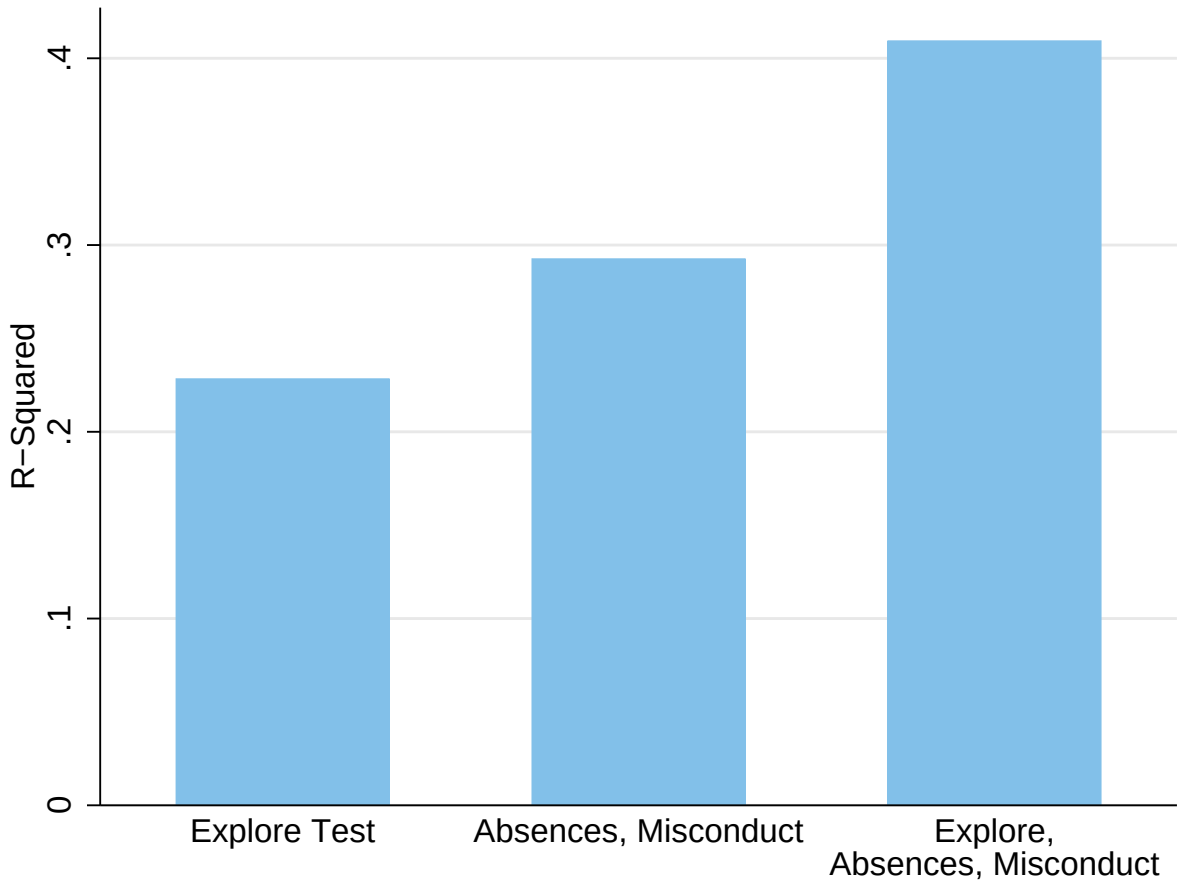
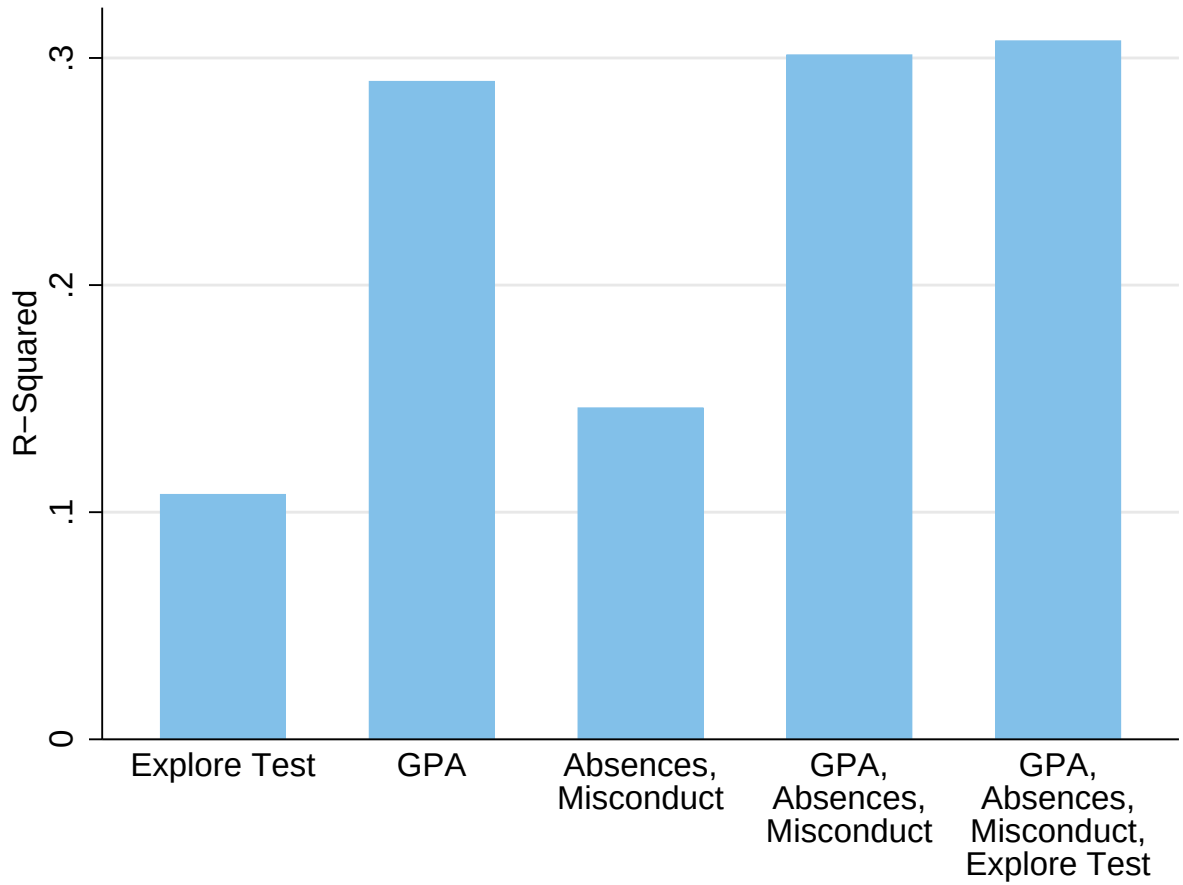


Figure 36: Decomposing GPA into Cognitive and Character Skill



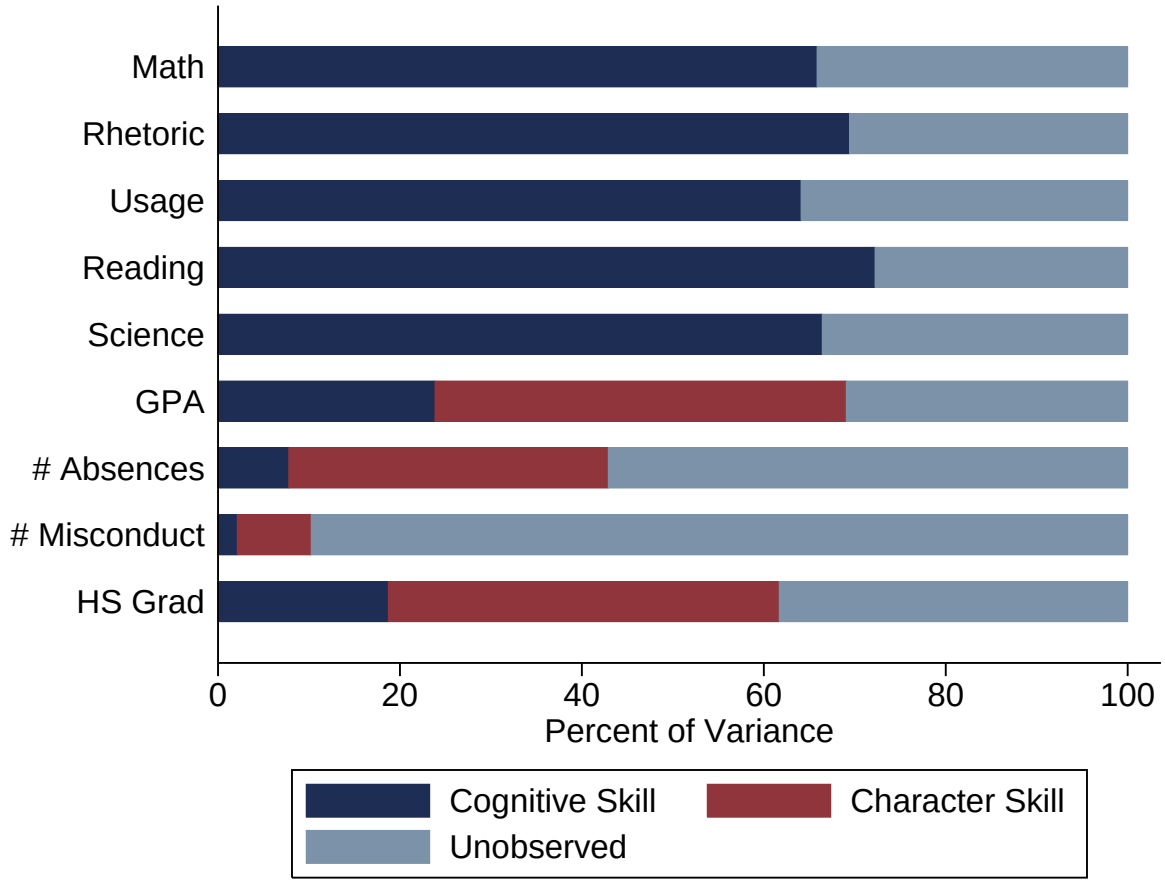
*Notes:*Absences, tardies, GPA, and number of Level III-LevelVI misconduct reports are measured during the first semester of 9th grade. The Explore test score is the sum of the scores on the math, science, reading, English usage, and English rhetoric portions of the Explore achievement test. The sample is restricted to students who are active during the first and second semester of 9th grade.

Figure 37: Predictive Validity of Measures for High School Graduation



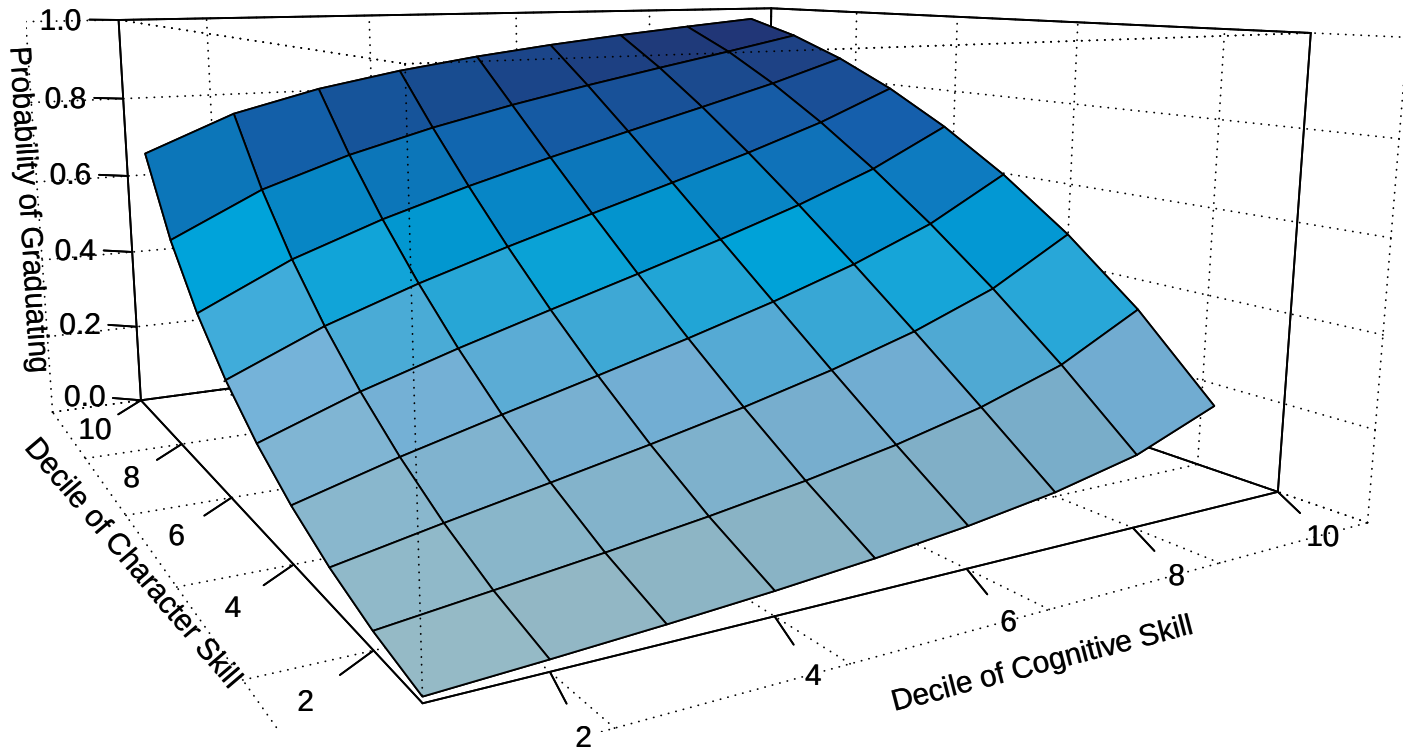
*Notes:*Absences, tardies, GPA, and number of Level III-LevelVI misconduct reports are measured during the first semester of 9th grade. The Explore test score is the sum of the scores on the math, science, reading, English usage, and English rhetoric portions of the Explore achievement test. The sample is restricted to students who are active during the first and second semester of 9th grade. High school graduation is measured within 5 years of entering 9th grade.

Figure 38: Explained Variance in Measurement System



*Notes:*Absences, tardies, GPA, and number of Level III-LevelVI misconduct reports are measured during the first semester of 9th grade. The Explore test score is the sum of the scores on the math, science, reading, English usage, and English rhetoric portions of the Explore achievement test. The sample is restricted to students who are active during the first and second semester of 9th grade. High school graduation is measured within 5 years of entering 9th grade.

Figure 39: (a) The Probability of High School Graduation by Cognitive and Character Skills

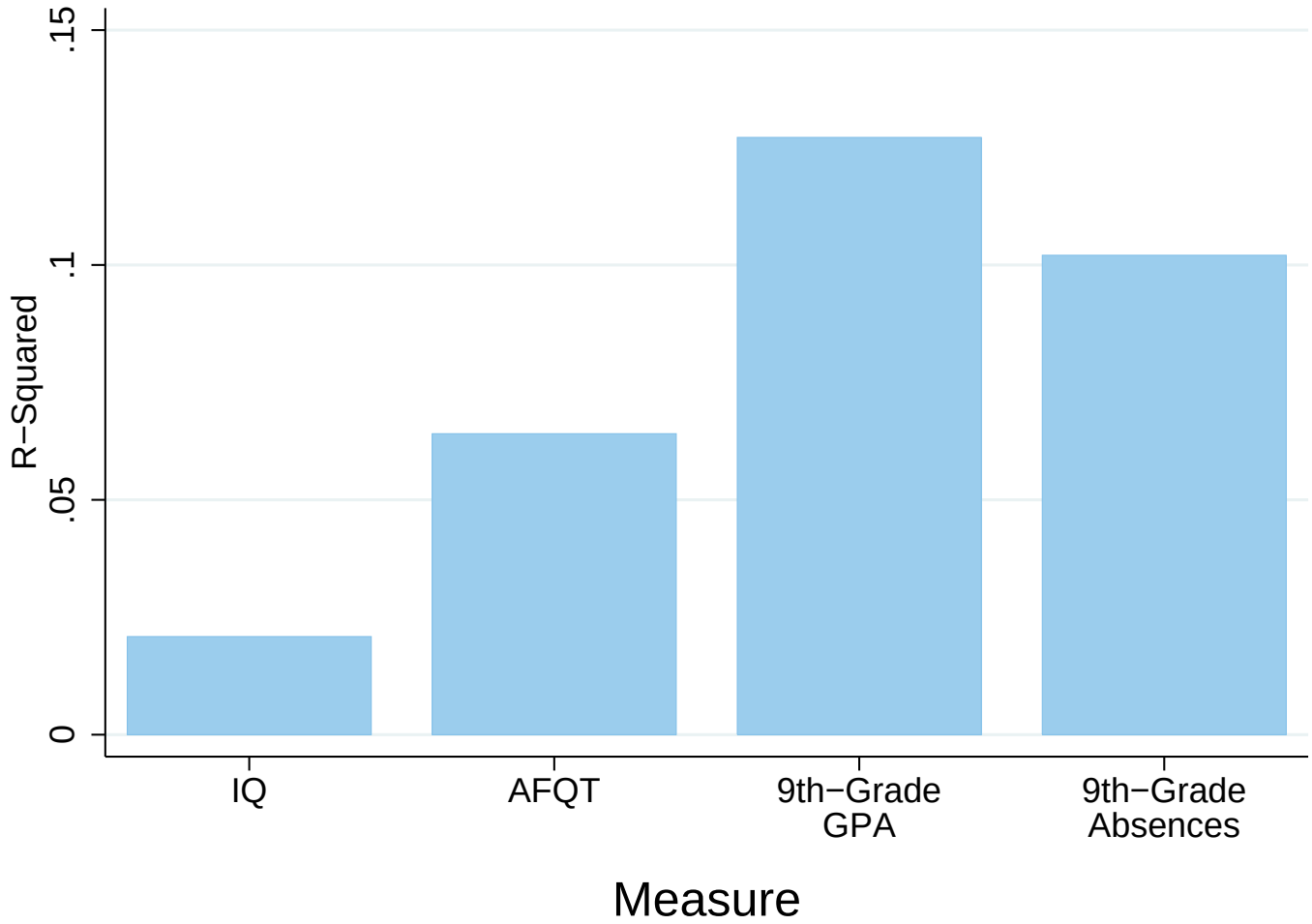


Notes: Panel (a) shows the probability of high school graduation as a function of cognitive skill and character skill. Panels (b) and (c) show the probability of high school graduation as a function of each skill, holding the other skill fixed at the median. The dashed lines display the 95% confidence intervals. The confidence intervals are estimated using the delta method. High school graduation is defined as graduating high school within 5 years of first entering 9th grade. The sample is restricted to students who are active during the first and second semester of 9th grade. The final sample size is 10,000 students drawn at random. The distribution of skills is estimated from a measurement system that includes first semester absences, tardies, GPA, number of Level III-LevelVI misconduct reports, and scores on the math, science, reading, English usage, and English rhetoric portions of the Explore achievement test. The model is normalized so that the components of the Explore test only depend on cognitive skill, implicitly defining cognitive skill as the ability to perform on achievement tests. All other measurements depend on both cognitive and character skills.

Unpacking the bundles

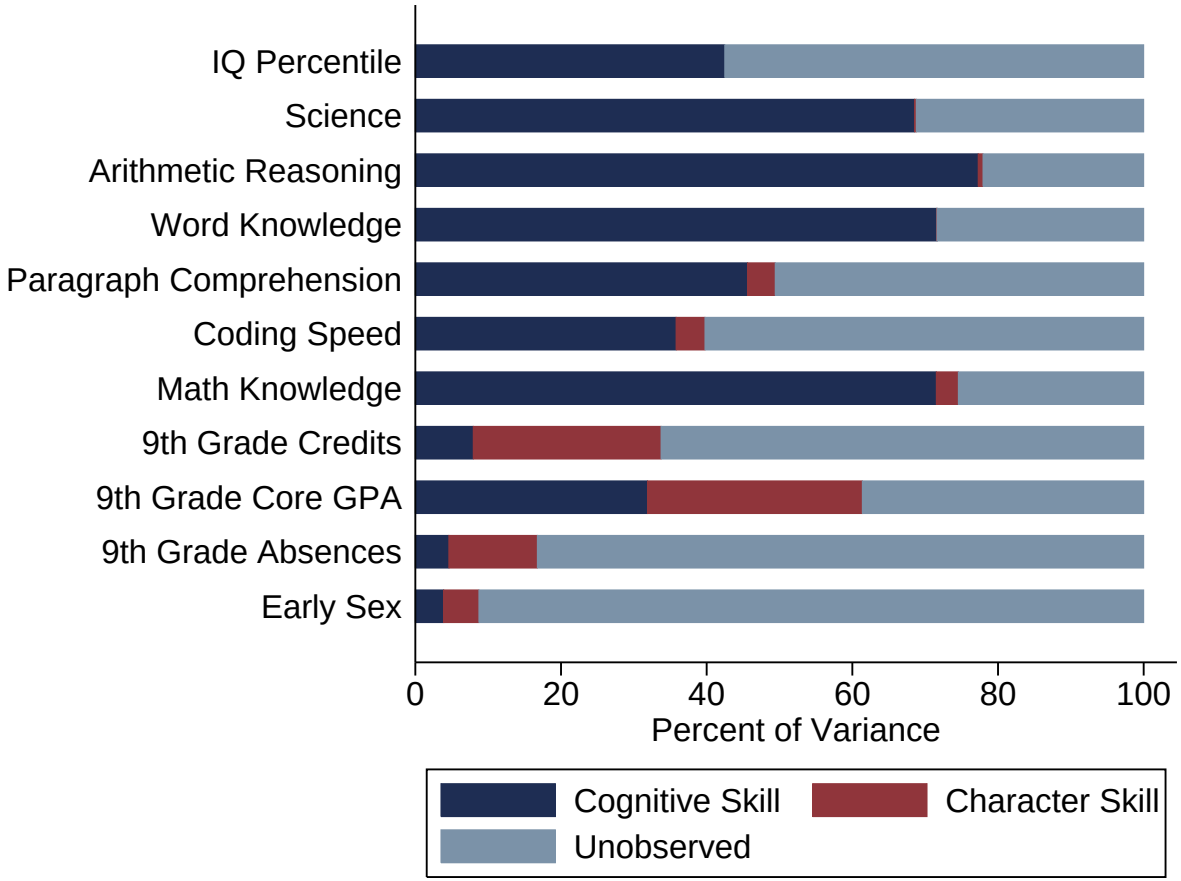
- Use the NLSY79 to form measures of cognitive and character skills
- Study how different measures and outcomes bundle skills
- Using a single measure to capture multiple outcomes can reduce predictive power

Figure 40: Predictive Validities of Measures of Cognition and Character in High School Graduation (Explained Variance)



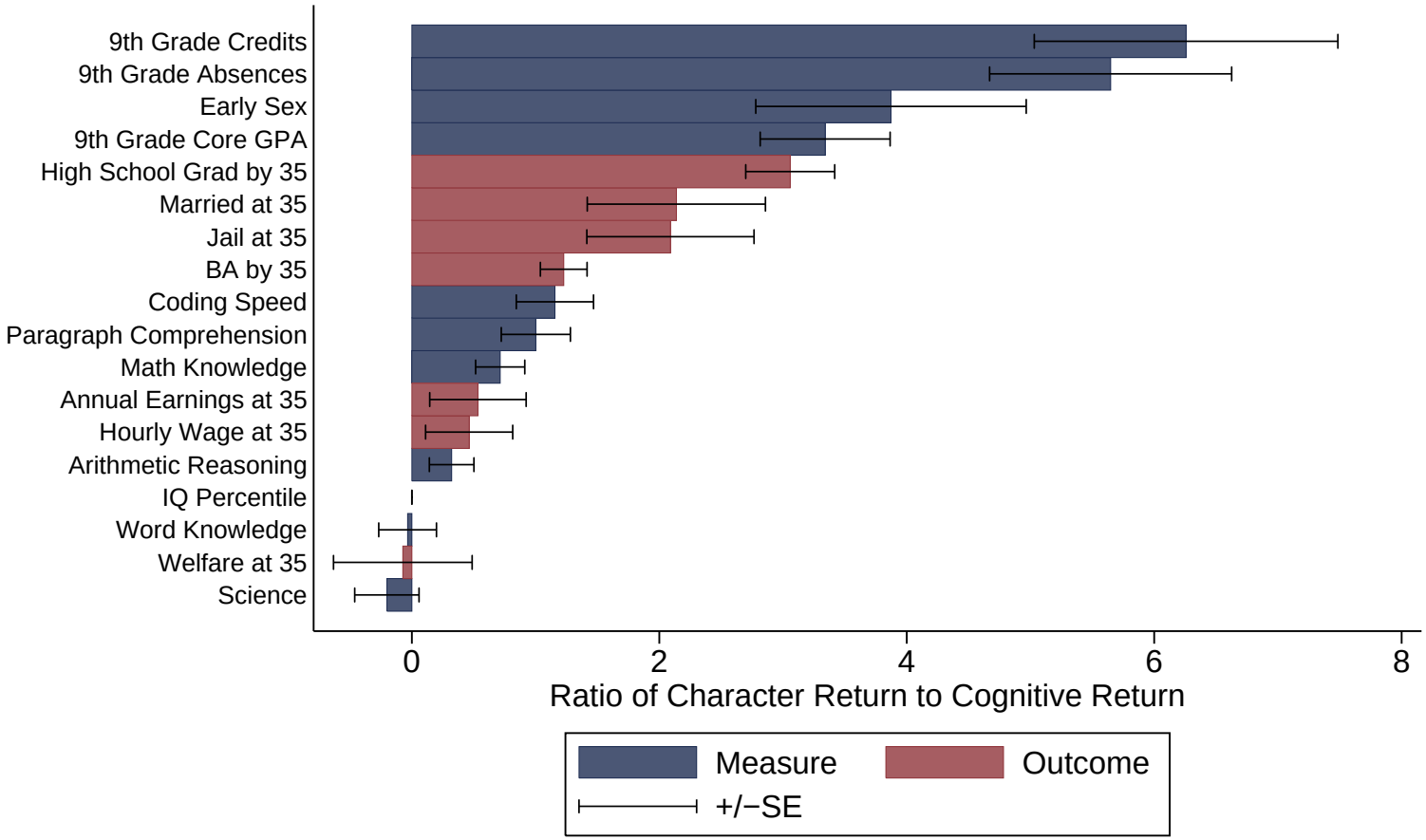
*Source:*National Longitudinal Survey of Youth 1979. *Notes:* Each bar represents the explained variance (R^2) from a regression of high school graduation on the variable listed on the x-axis. IQ is pooled across several IQ tests using IQ percentiles. AFQT is adjusted for schooling at the time of the test. GPA is the individual's core-subject GPA from ninth grade. The sample excludes the military over sample.

Figure 41: Explained Variance in Measurement System



*Notes:*National Longitudinal Survey of Youth 1979.

Figure 42: Ratio of Character to Cognitive Skill Return



*Notes:*National Longitudinal Survey of Youth 1979. Due to the biennial nature of the survey after 1994, some respondents are not interviewed at age 35, for these individuals age 36 is used. Earnings includes zero-earners and excludes observations over $200,000 (2005 dollars). Hourly wage excludes observations less than $3 or over $200 (2005 dollars). Hours worked excludes observations less than 80 or more than 4000. Jail by age 35 indicates whether the respondent had listed residing in a jail or prison at some point before age 35. Welfare at age 35 indicates whether the respondent received any positive amount of welfare at age 35. Married at age 35 indicates whether the responded was currently married. B.A. degree by age 35 indicates whether the respondent received a B.A. degree (or higher) by age 35.

What does it mean that measures of character and cognition are correlated?

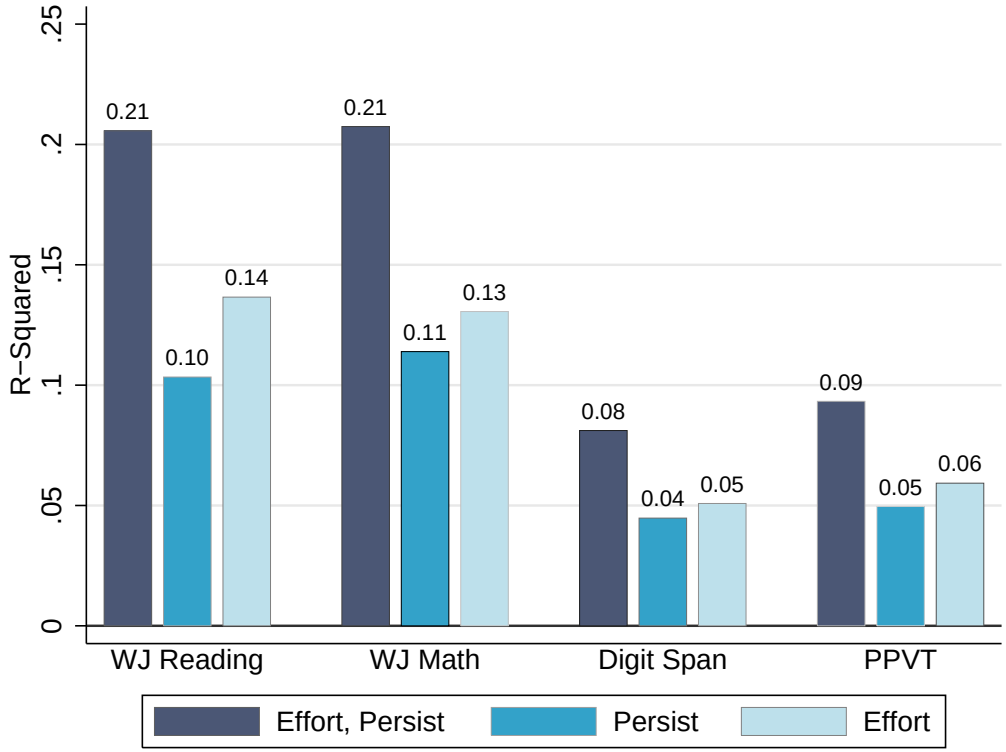
- Story 1: Taking a test requires some amount of effort and achievement tests require more at the moment
- Story 2: Achievement tests partly capture acquired knowledge, which is accumulated as a function of general persistence

What does it mean that measures of character and cognition are correlated?

- Attempt to address this question by studying the Fragile Families data set
- Use teacher's rating of student persistence as a measure of general persistence
- Standardize the scores on the test using a measure of effort as observed by the interviewer during the test

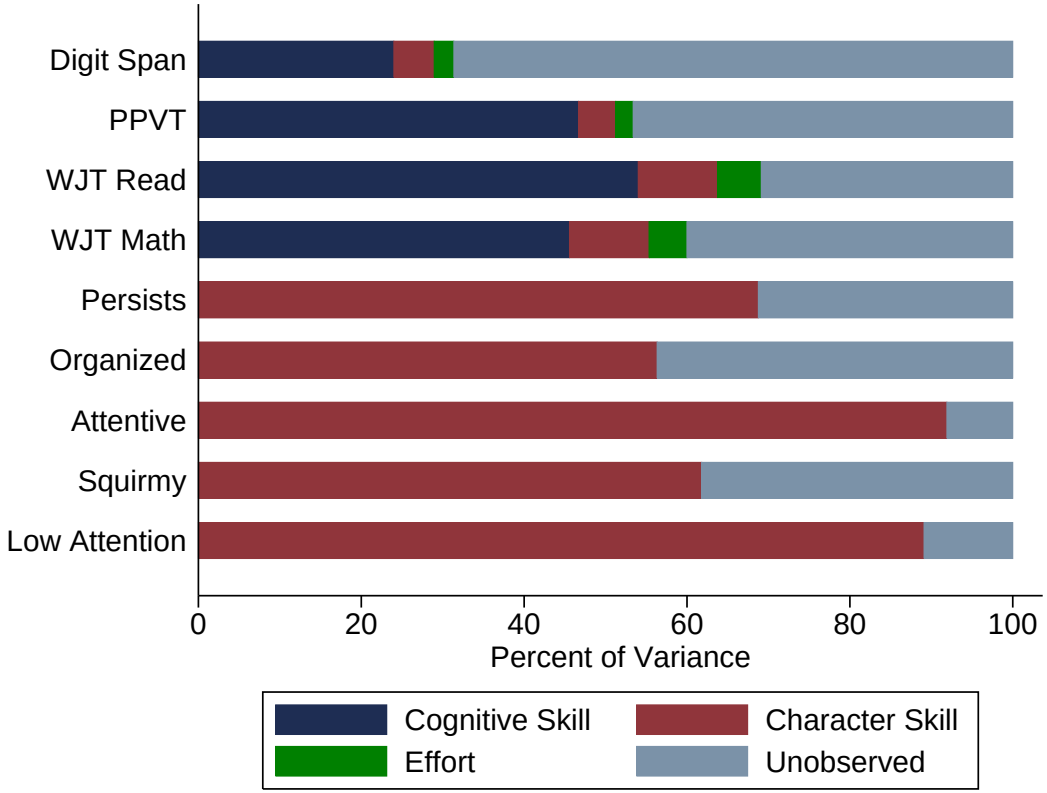
Effort and Persistence Predict Different Test Scores to Different Degrees

Figure 43: Predictive Validity of Effort and Teacher's Rating of Persistence by Type of Test



The data come from the nine-year interview in the Fragile Families and Child Wellbeing Study. The graph shows the variance explained (R-squared) in the Woodcock Johnson Reading Test, The Woodcock Johnson Math Test, Peabody Picture Vocabulary Test-IIIA (PPVT-IIIA), the Woodcock Johnson III tests for reading and math skills, and the Wechsler Intelligence Scale for Children-IV (WISC-IV) Digit Span test. "Effort" is measured by the interviewers report of persistence during the test. "Persistence" is measured by the teacher's report of the child's tendency to complete tasks in school.

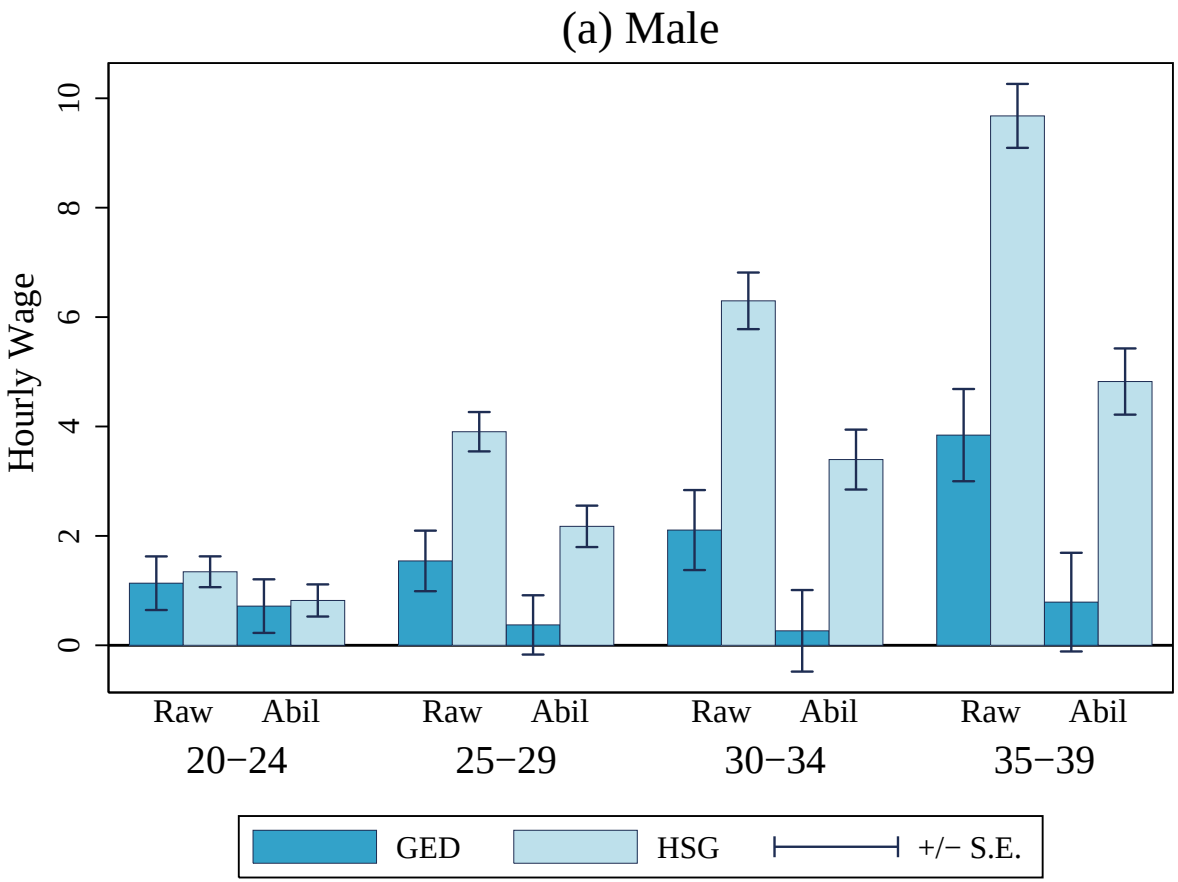
Figure 44: Explained Variance in Fragile Families Measurement System



The data come from the nine-year interview in the Fragile Families and Child Wellbeing Study. The graph shows the variance explained (R-squared) in the Woodcock Johnson Reading Test, The Woodcock Johnson Math Test, Peabody Picture Vocabulary Test-IIIA (PPVT-IIIA), the Woodcock Johnson III tests for reading and math skills, and the Wechsler Intelligence Scale for Children-IV (WISC-IV) Digit Span test. "Effort" is measured by the interviewers report of persistence during the test. The dedicated measures of character skills are based on teacher reports.

The GED Does Not Improve Hourly Wages

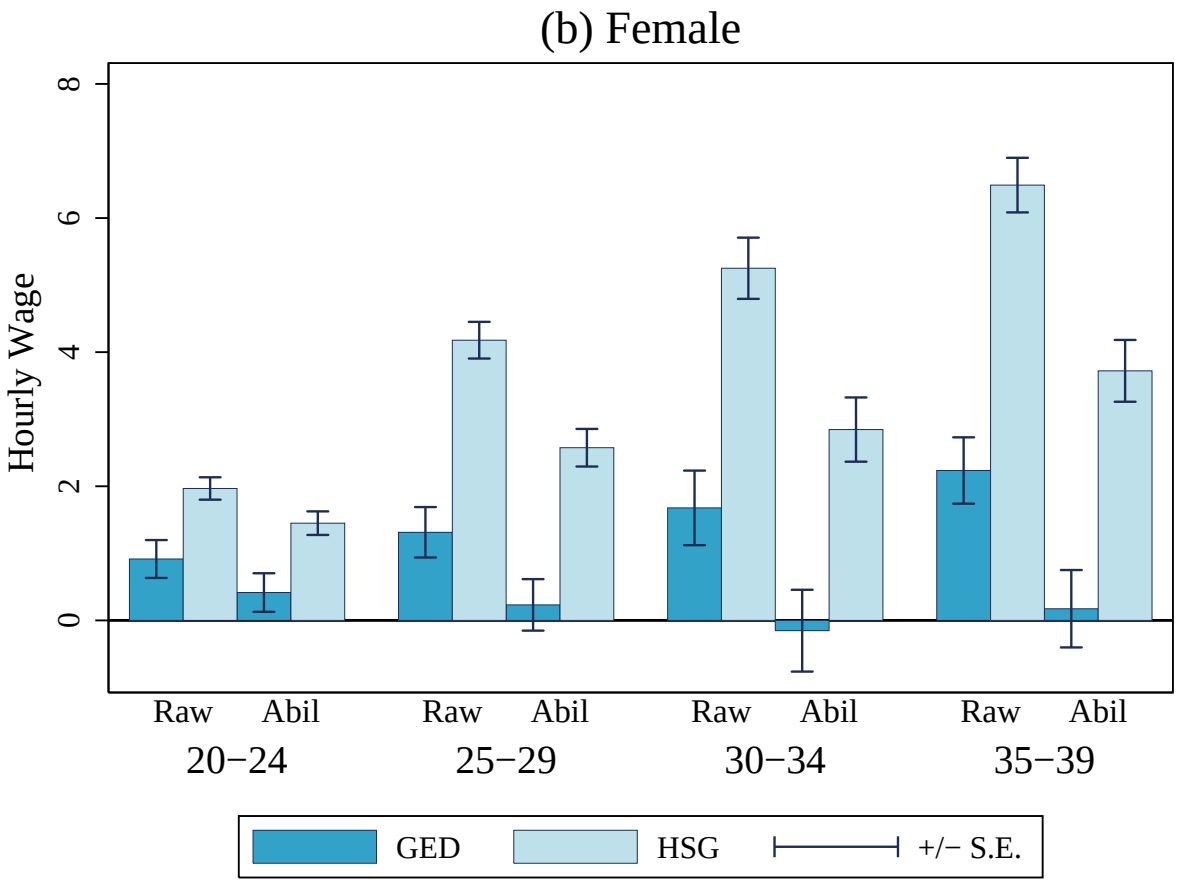
Figure 45: Hourly Wages Relative to Dropouts - Males



Source:?, National Longitudinal Survey of Youth, 1979.
Notes: Controls: "Raw"—age and region or state of residence; "Abil"—AFQT adjusted for schooling at time of test. Regressions exclude those reporting earning more than $300,000 or working more than 4,000 hours. The intervals around each bar are standard errors centered around the mean—a measure of sampling variability. All regressions allow for clustered standard errors at the individual level.

The GED Does Not Improve Hourly Wages

Figure 46: Hourly Wages Relative to Dropouts -Females



Source:?, National Longitudinal Survey of Youth, 1979.
Notes: Controls: "Raw"—age and region or state of residence; "Abil"—AFQT adjusted for schooling at time of test. Regressions exclude those reporting earning more than $300,000 or working more than 4,000 hours. The intervals around each bar are standard errors centered around the mean—a measure of sampling variability. All regressions allow for clustered standard errors at the individual level.

Misconduct Scores

Table 3: 9th Grade Measures from Administrative Data

Level	Examples
Level III	Disruptive Behavior on Bus, Fight without Injury, Cheating, Bullying, Forgery
Level IV	Extortion, Assault, Vandalism, Theft, Fight with Injury
Level V	Aggravated Assault, Gang Act, False Fire Alarm, Gross Disobedience to Authority
Level VI	Arson, Bomb Threat, Attempted Murder, Battery, Drug Use, Sex Violations, Use of Weapon to Harm

Skill Measures from the Fragile Families Data

Table 4: Age 9 Measures of Skills

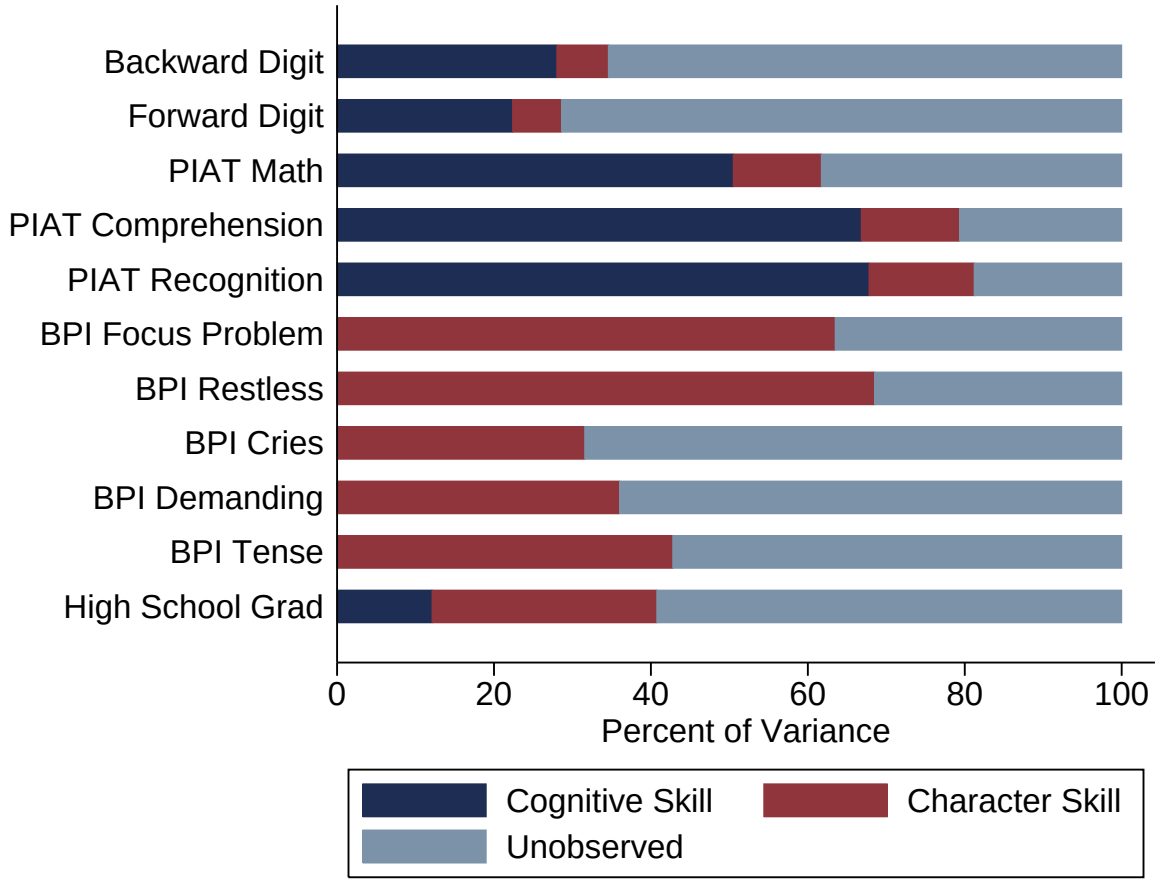
Measure	Cognition	Character
Digit Span (IQ)	X	X
PPVT (IQ)	X	X
WJT Read (Achievement)	X	X
WJT Math (Achievement)	X	X
Teacher Rating of Persistence		X
Teacher Rating of Organization		X
Teacher Rating of Attentiveness		X
Teacher Rating of Squirminess		X
Teacher Rating of Low Attention		X

Skill Measures from the CNLSY Data

Table 5: Age 8-11 Measures of Skills

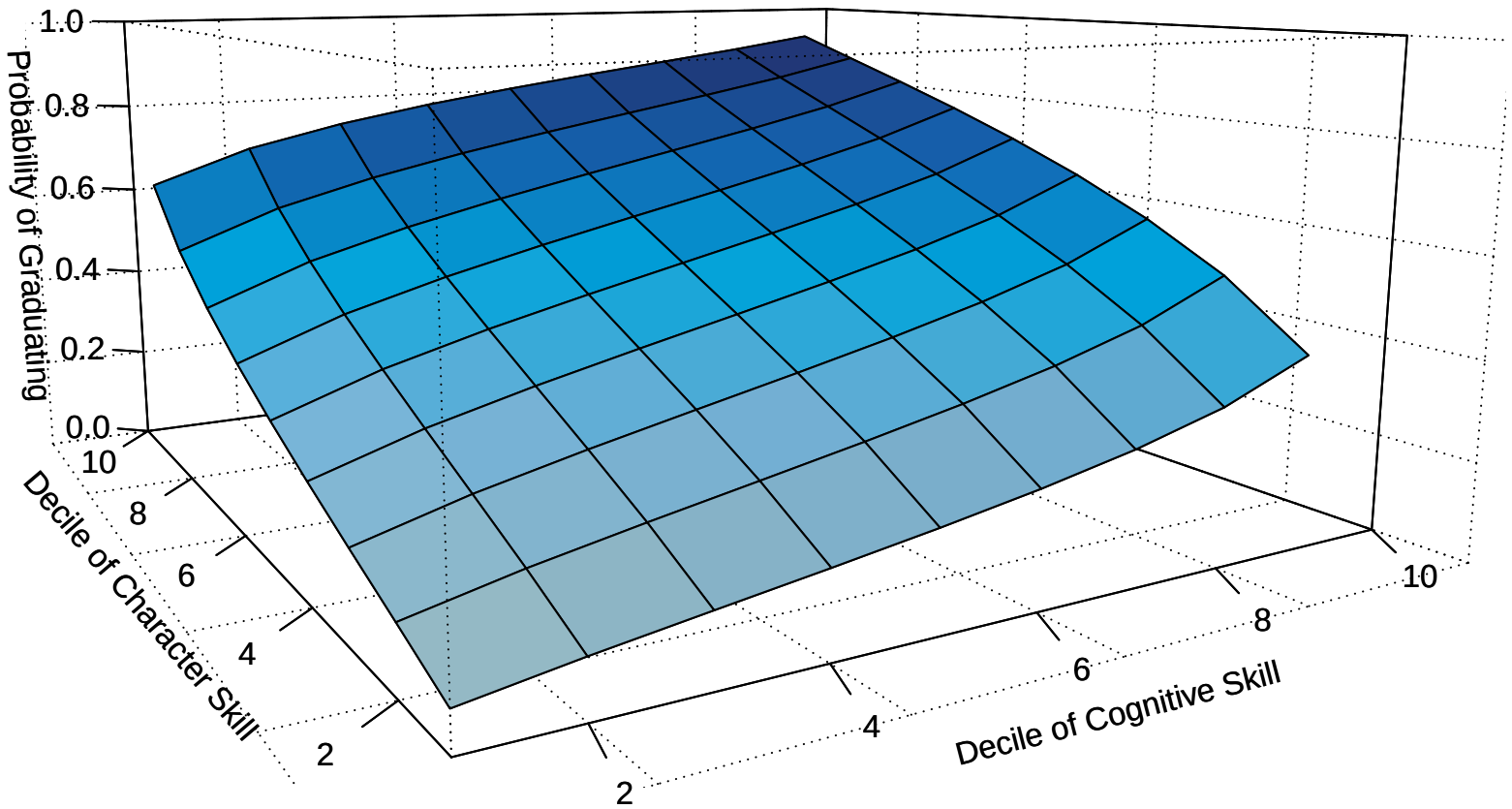
Measure	Cognition	Character
Forward Digit Span (IQ)	X	X
Backward Digit Span (IQ)	X	X
PIAT Math (Achievement)	X	X
PIAT Comprehension (Achievement)	X	X
PIAT Recognition (Achievement)	X	X
BPI Focus Problems		X
BPI Restless		X
BPI Cries		X
BPI Demanding		X
BPI Tense		X
High School Grad	X	X

Figure 47: Explained Variance in CNLSY Measurement System



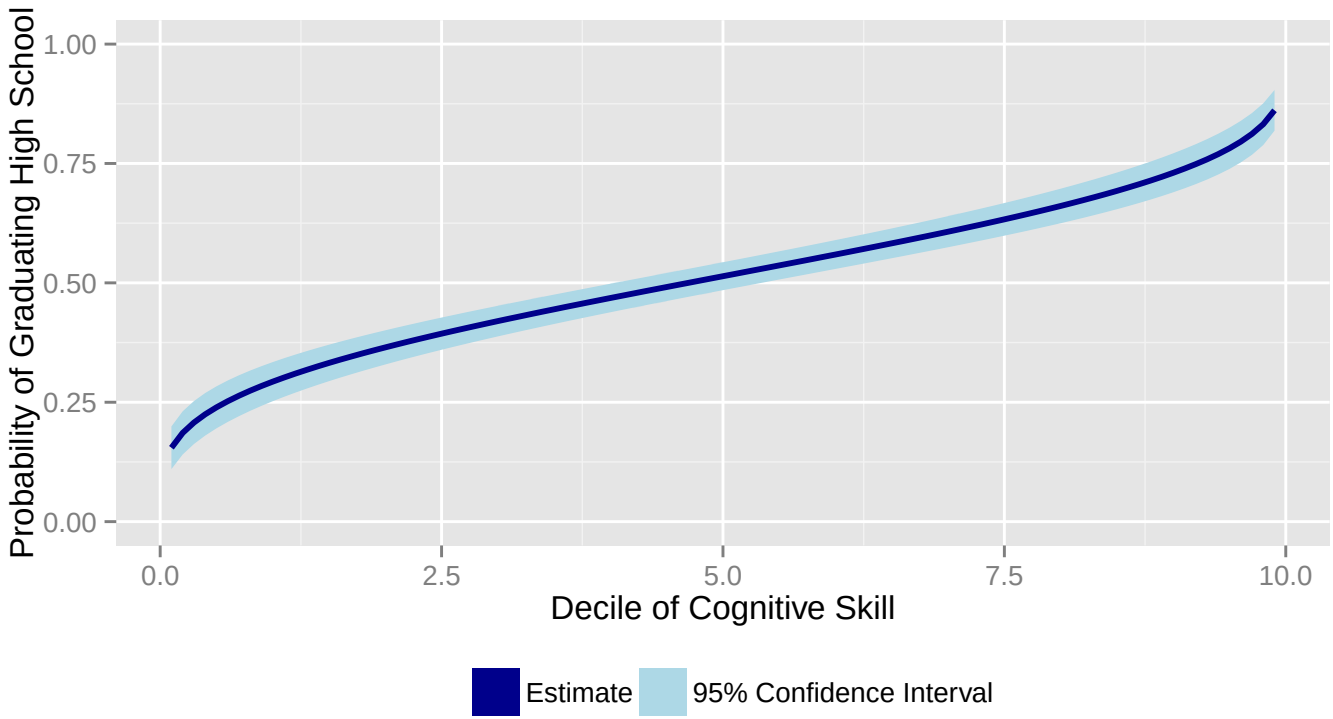
Source: CNLSY. *Notes:* The measures of cognition and character were taken between ages 8 and 11. The Backward and Forward Digit Span tests are tests of working memory. The BPI measures come from the Behavior Problems Index. High school graduation status was measured at age 19.

Figure 48: The Effect of Cognitive and Character Skills on the Probability of Graduating (a)



Source: CNLSY. *Notes:* Panel (a) shows the probability of high school graduation as a function of cognitive skill and non-academic skill. Panels (b) and (c) show the probability of high school graduation as a function of each skill, holding the other skill fixed at the median. The dashed lines display the 95% confidence intervals. The confidence intervals are estimated using the delta method. The measures of cognition and character were taken between ages 8 and 11. The Backward and Forward Digit Span tests are tests of working memory. The BPI measures come from the Behavior Problems Index. High school graduation status was measured at age 19.

Figure 49: The Effect of Cognitive and Character Skills on the Probability of Graduating (b)



Source: CNLSY. *Notes:* Panel (a) shows the probability of high school graduation as a function of cognitive skill and non-academic skill. Panels (b) and (c) show the probability of high school graduation as a function of each skill, holding the other skill fixed at the median. The dashed lines display the 95% confidence intervals. The confidence intervals are estimated using the delta method. The measures of cognition and character were taken between ages 8 and 11. The Backward and Forward Digit Span tests are tests of working memory. The BPI measures come from the Behavior Problems Index. High school graduation status was measured at age 19.

Figure 50: The Effect of Cognitive and Character Skills on the Probability of Graduating (c)

Source: CNLSY. *Notes:* Panel (a) shows the probability of high school graduation as a function of cognitive skill and non-academic skill. Panels (b) and (c) show the probability of high school graduation as a function of each skill, holding the other skill fixed at the median. The dashed lines display the 95% confidence intervals. The confidence intervals are estimated using the delta method. The measures of cognition and character were taken between ages 8 and 11. The Backward and Forward Digit Span tests are tests of working memory. The BPI measures come from the Behavior Problems Index. High school graduation status was measured at age 19.

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