A Muslim School Advantage?

Evidence from a Natural Experiment

Said Hassan

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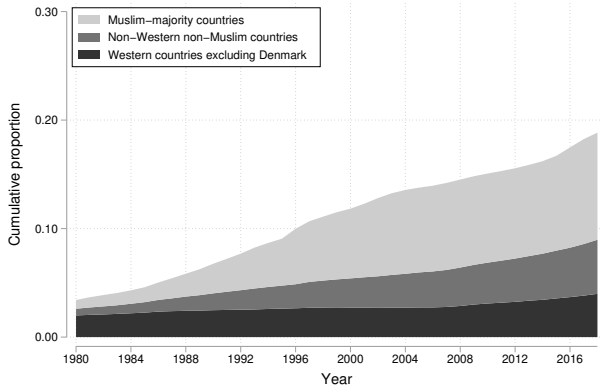
Motivation

Do Muslim schools improve the academic performance of Muslim children?

Motivation

Figure: School-aged children (5–15 yrs) by ethnic background in Denmark.



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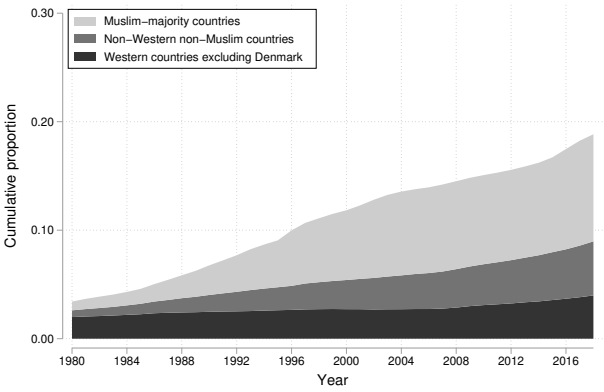

- Fastest growing minority in DK, SE, UK, DE, NL, FR
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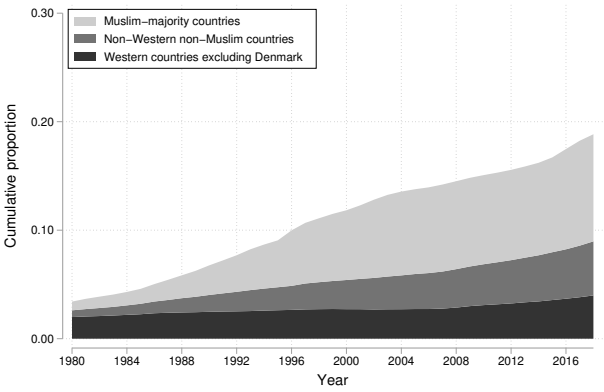

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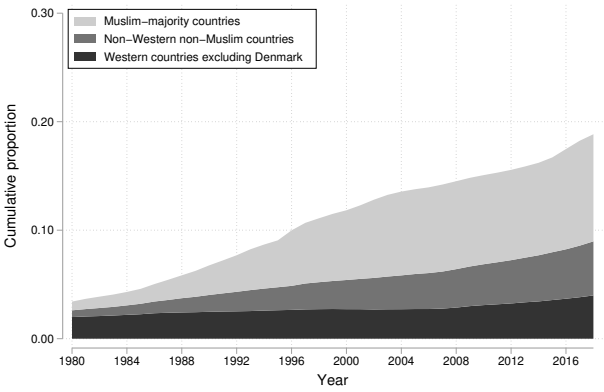

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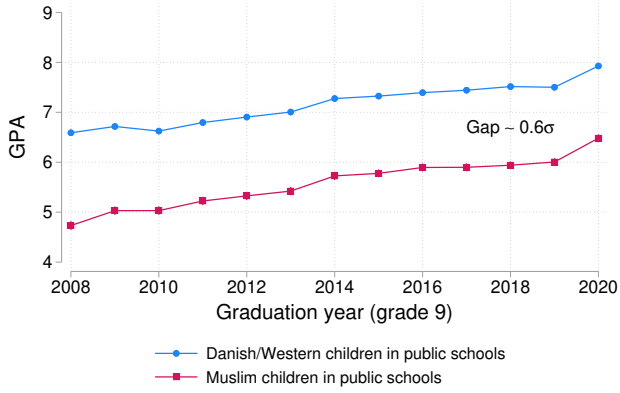
- Socioeconomically disadvantaged (vs natives/Western immigrants)
  (Heath et al., 2008; Alba et al., 2011; Dustmann et al., 2017)
- Concerns regarding "parallel societies" and social integration
  (Heath and Demireva, 2014; Hilbig and Riaz, 2022)

Motivation

Figure: Test score gap: Muslim vs. non-Muslim students in **public schools**



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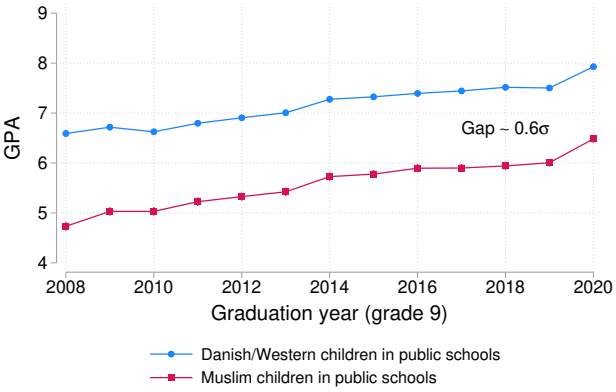

- ≈ Black-White achievement gap in US (Reardon, 2015)

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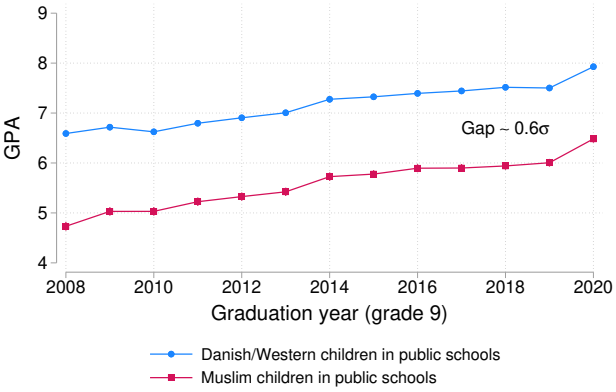
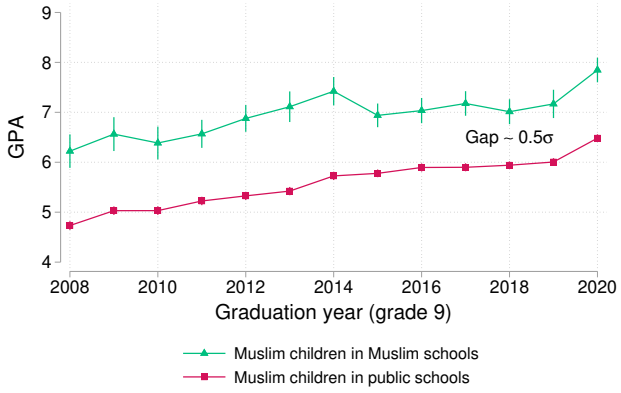


- $\approx$ Black-White achievement gap in US (Reardon, 2015)
- Muslim schools $\Longrightarrow$ negative peer effects? (Sacerdote, 2011)

Motivation

Figure: Performance of **Muslim kids** in public vs Muslim schools



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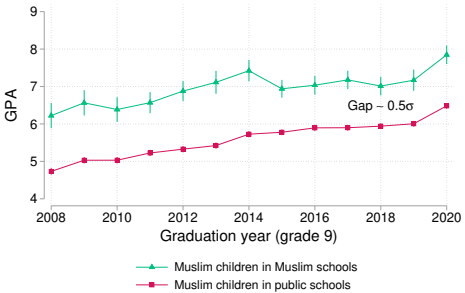

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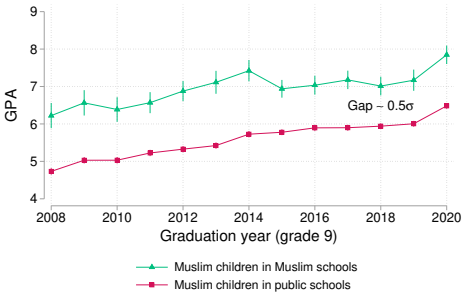

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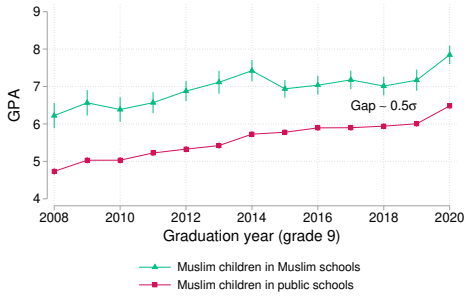

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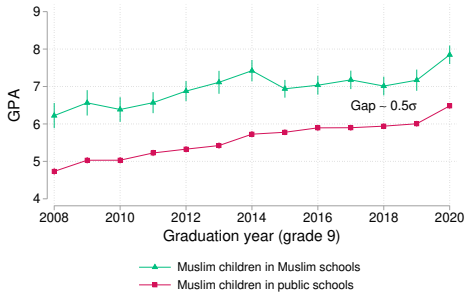

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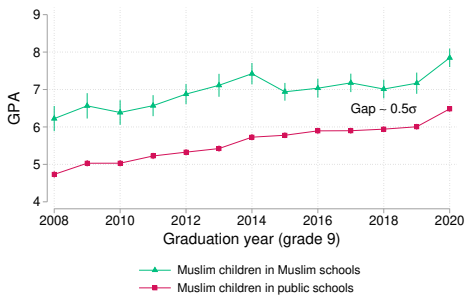

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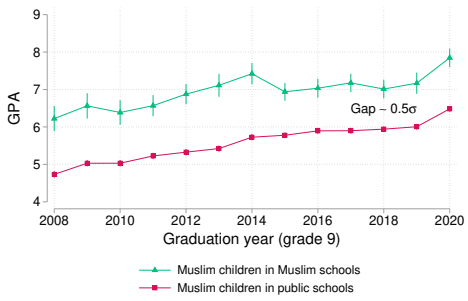

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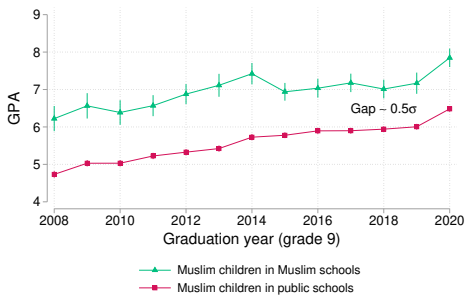

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- Discrimination/teacher bias (Bates et al., 2013)

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5. Long term outcomes and social integration

Empirical setting

Danish context

- 150 year tradition of independent schools
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Full population register data

- Precise educational records/history
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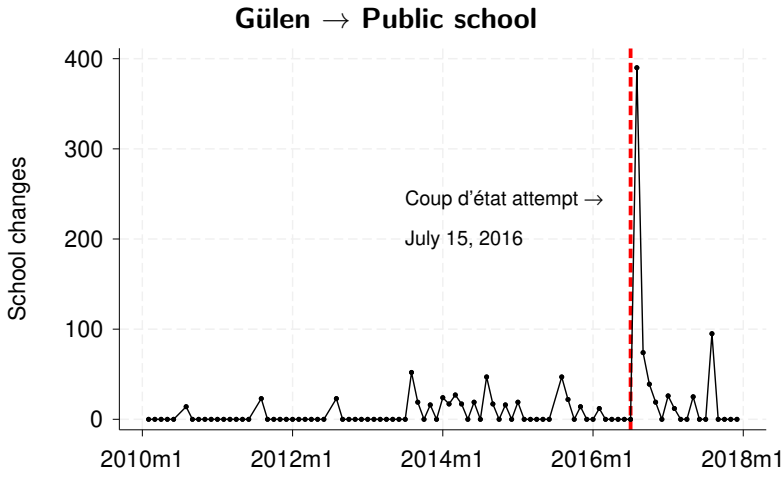
- Test scores in grade 9 (but no panel data!)
- Reading and mathematics
  - Main: written externally evaluated
  - Supplementary: teacher evaluated

Natural experiment



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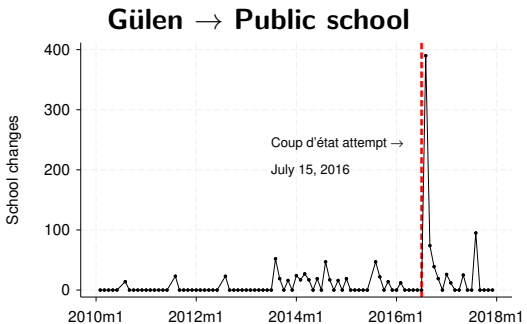

- **TR:** 80,000 arrests; 160,000 layoffs
- **DK:** 3 out of 9 schools closed
- **DK:** $>$ 500 school changes

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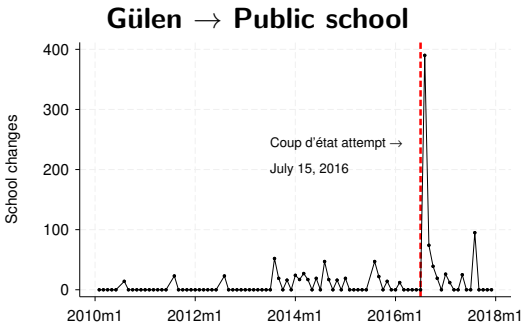

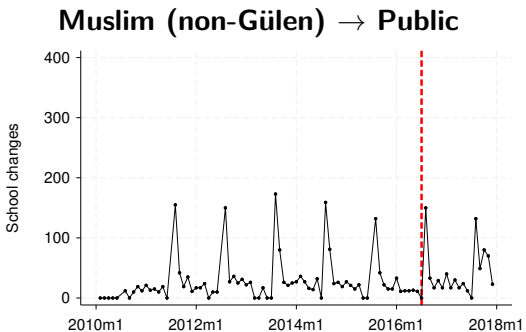

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$$y_{it} = \rho D_i + x_i'\beta + \alpha_t + \varepsilon_{it}$$

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Stricter setups:

- Remove "stayers" ▸ Results without stayers
- Gülen school closures only vs control ▸ Closures
- Gülen → Other Muslim schools ▸ Other Muslim schools

Covariate balance

	Treatment		Control			
	Mean	(SD)	Mean	(SD)	Difference	*p*-value
Female	0.563	(0.496)	0.488	(0.501)	0.075	0.086
Age	16.153	(0.653)	16.226	(0.501)	−0.073	0.182
Both parents born in DK	0.815	(0.388)	0.774	(0.420)	0.041	0.236
Birth weight (kg)	3.412	(0.548)	3.413	(0.645)	−0.001	0.978
Parents divorced	0.080	(0.271)	0.071	(0.258)	0.008	0.726
Parental education (years)	12.823	(2.605)	12.644	(2.549)	0.179	0.436
Parental income	71.059	(30.889)	73.088	(25.237)	−2.028	0.438
Parent unemployed	0.198	(0.399)	0.263	(0.442)	−0.066	0.070
Observations	552		168			

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Main findings

	Reading			Math		
	(1) OLS	(2) OLS	(3) IPTW	(4) OLS	(5) OLS	(6) IPTW
Muslim school	0.345**	0.319**	0.322**	0.319**	0.283**	0.319**
	(0.115)	(0.103)	(0.123)	(0.110)	(0.094)	(0.112)
Constant	−0.250	−0.202	−0.520***	−0.388***	−0.137	−0.694***
	(0.158)	(0.151)	(0.116)	(0.107)	(0.119)	(0.096)
Observations	660	660	660	644	644	644
R^2	0.056	0.175		0.060	0.137	
Covariates	No	Yes	Yes†	No	Yes	Yes†

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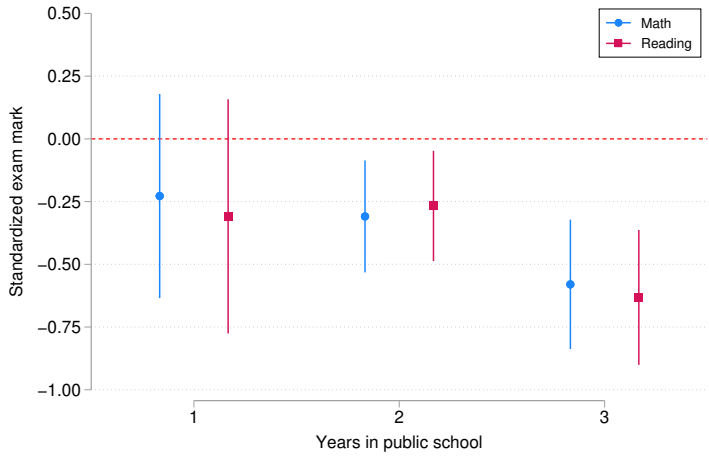

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- 1-year school learning estimates range from $^1/_4$–$^1/_3$ σ (Woessmann, 2016)
- **How much is driven by disruption?**

Dealing with disruption effects

1. Estimate benchmark disruption effects ($\approx 0.08\sigma$) ▸ VA results
2. Transition between school types ▸ Transition analyses
3. Exploit variation in timing
4. School changes to non-Gülen Muslim schools
5. Parental stress following coup (event study)

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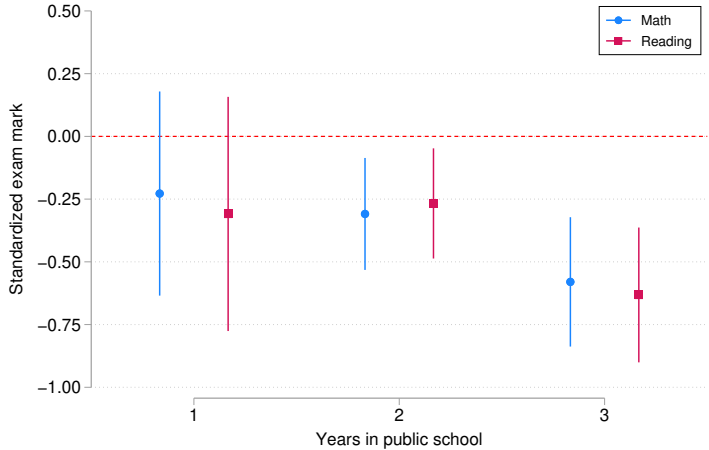
Disruption I



Disruption II: Gülen → other Muslim schools

	Reading		Math	
	(1)	(2)	(3)	(4)
Movers	−0.184	−0.018	−0.088	0.065
	[−0.525,0.156]	[−0.348,0.312]	[−0.469,0.292]	[−0.357,0.488]
	(0.264)	(0.910)	(0.624)	(0.743)
Constant	0.095	0.108	−0.069	0.124
	[−0.211,0.402]	[−0.210,0.427]	[−0.148,0.010]	[−0.009,0.258]
	(0.514)	(0.476)	(0.080)	(0.066)
Observations	663	663	649	649
R^2	0.022	0.144	0.015	0.089
Covariates	No	Yes	No	Yes

Disruption III: Event studies of parental reactions

Figure: Event study: parents with children in Gülen vs non-Gülen Turkish Muslim schools

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Figure: Event study: parents with children in Gülen vs non-Gülen Turkish Muslim schools

(a) Sick leave

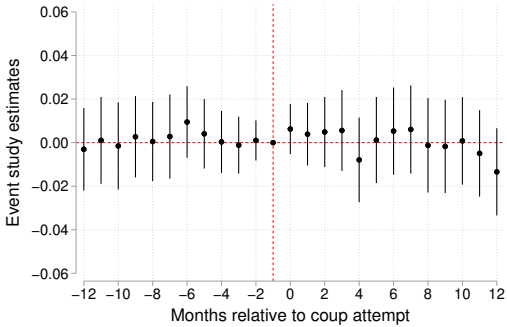

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Figure: Event study: parents with children in Gülen vs non-Gülen Turkish Muslim schools

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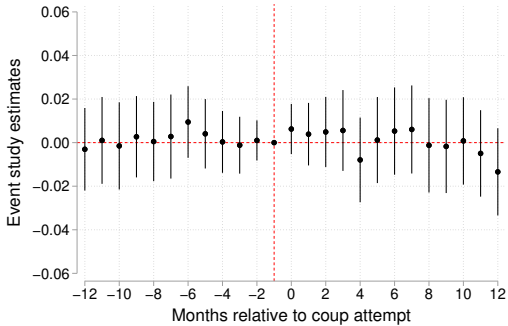
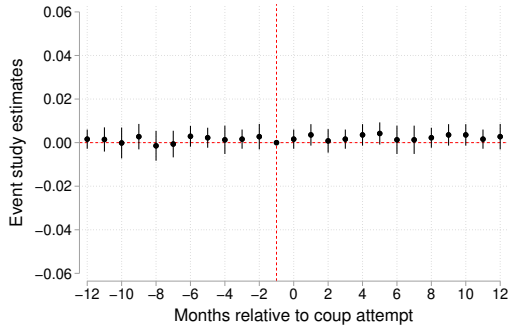
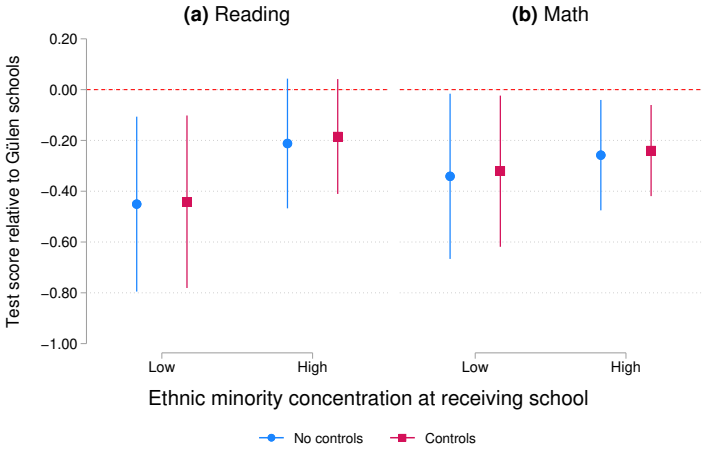


(b) Divorce



Mechanism I: Ethnic similarity



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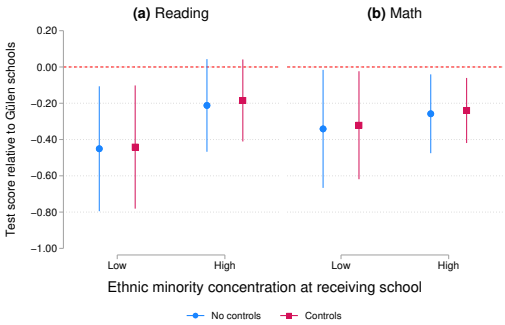

- Robust to alternative specifications
  - ▸ Ethnicity definitions
  - ▸ Percentile cutoffs

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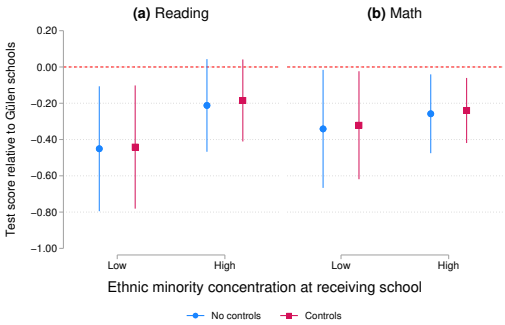

- Robust to alternative specifications
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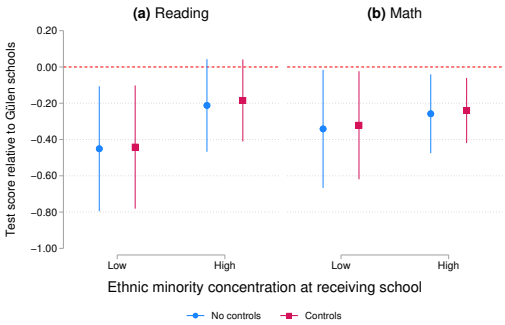

- Robust to alternative specifications
  - ▸ Ethnicity definitions
  - ▸ Percentile cutoffs
- **Not** driven by SES
  - ▸ Control for SES
- Aspirations play a role
  - ▸ Aspiration results

Mechanism I: Ethnic similarity – School and teacher characteristics

	Low Ethnic Concentration		High Ethnic Concentration		t-test	
	Mean	(SD)	Mean	(SD)	Difference	p-value
School and peer characteristics						
Ethnic minority	0.274	(0.094)	0.603	(0.174)	−0.329	0.000
School GPA (std)	−0.130	(0.267)	−0.347	(0.248)	0.217	0.000
School cohort size	188.013	(50.768)	167.988	(56.120)	20.025	0.019
Paternal income	59.919	(9.740)	47.384	(6.937)	12.535	0.000
Maternal income	47.152	(4.703)	38.164	(4.241)	8.988	0.000
Paternal education	13.969	(0.920)	13.020	(0.500)	0.949	0.000
Maternal education	13.793	(1.003)	12.495	(0.910)	1.298	0.000
Teacher characteristics						
Ethnic minority	0.053	(0.050)	0.115	(0.076)	−0.062	0.000
Age	42.541	(2.716)	42.289	(1.702)	0.252	0.481
Certified	0.801	(0.093)	0.795	(0.087)	0.006	0.677
Experience (years)	12.678	(2.350)	12.566	(1.735)	0.111	0.733
Experience $\geq$ 3 years	0.887	(0.064)	0.879	(0.057)	0.008	0.390
Observations	77		83			

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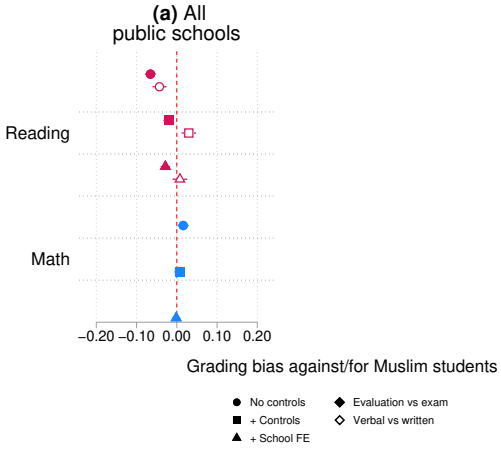
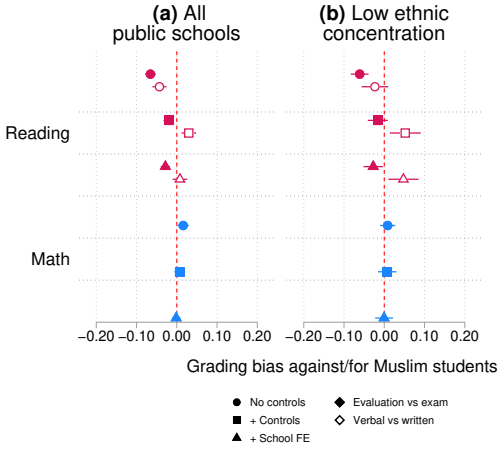
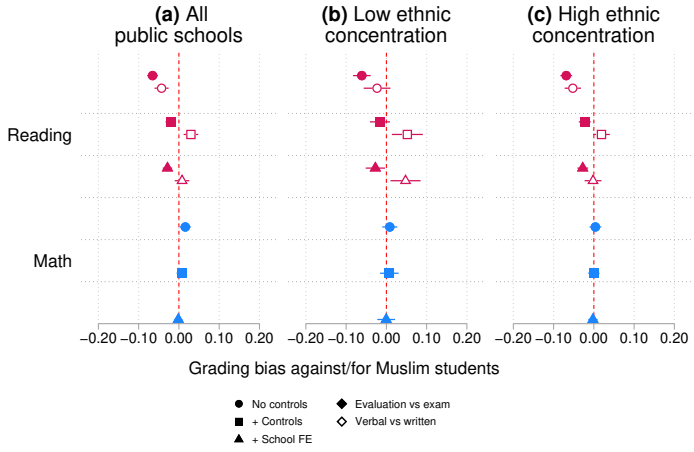
Mechanism II: Grading bias and discrimination



Mechanism II: Grading bias and discrimination



Mechanism II: Grading bias and discrimination



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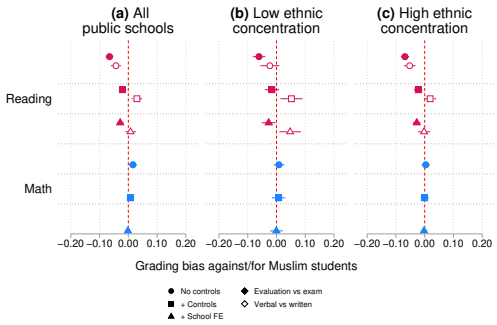

- Robust to different models, samples, measures
  - Conditional vs difference
  - Comparison groups
  - Sample periods

Mechanism II: Grading bias and discrimination

However, what happens if you ask teachers to *evaluate* students?

Mechanism II: Grading bias and discrimination

	Dep. var.: Teacher-evaluated student readiness for high school					
	Academic readiness		Social readiness		Personal readiness	
	(1)	(2)	(3)	(4)	(5)	(6)
Muslim student	−0.154***	−0.030***	−0.133***	−0.041***	−0.181***	−0.057***
	(0.008)	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)
Constant	0.829***	0.784***	0.892***	0.832***	0.831***	0.746***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.005)
Observations	94,992	94,992	73,830	73,830	73,830	73,830
R^2 adj.	0.012	0.240	0.016	0.106	0.020	0.149
Covariates	No	Yes	No	Yes	No	Yes

Long-term outcomes and integration

Long-term outcomes and integration

	High school outcomes			Social benefits recipient	
	Admission (age 18)	Completion (age 20)	Standardized GPA	Ever	Weeks
	(1)	(2)	(3)	(4)	(5)
Muslim school	0.113**	0.122*	0.355*	−0.048	−6.397
	(0.037)	(0.058)	(0.149)	(0.033)	(4.828)
Constant	−0.172***	−0.163	−1.175***	0.029	3.024
	(0.048)	(0.082)	(0.185)	(0.038)	(3.930)
Observations	720	720	514	720	720
R^2 adj.	0.078	0.118	0.125	0.041	0.019
Covariates	Yes	Yes	Yes	Yes	Yes

Conclusion

Muslim schools improve minority students' achievement and integration

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Muslim schools improve minority students' achievement and integration

- Driven by **ethnic homophily** $\Longrightarrow$ alienation in mainstream schools
- Not explained by grading bias
- ... but subtle biases persist

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Muslim schools improve minority students' achievement and integration

- Driven by **ethnic homophily** $\Longrightarrow$ alienation in mainstream schools
- Not explained by grading bias
- ... but subtle biases persist

Policy

- Assimilationist policies come with costs to important outcomes
- Limitation: no data on values, norms, etc.

Thank You!

saidhassan.net

Comparing movers to stayers

	Stayers		Movers			
	Mean	(SD)	Mean	(SD)	Difference	*p*-value
Female	0.562	0.497	0.488	0.501	0.074	0.126
Age	16.121	0.748	16.226	0.501	-0.105	0.105
Both parents born in DK	0.776	0.418	0.774	0.420	0.002	0.958
Birth weight (kg)	3.407	0.553	3.413	0.645	-0.006	0.917
Parents divorced	0.094	0.292	0.071	0.258	0.022	0.411
Parental education (years)	12.962	2.629	12.644	2.549	0.318	0.209
Parental income	73.764	33.797	73.088	25.237	0.676	0.821
Parent unemployed	0.182	0.387	0.263	0.442	-0.081	0.040
Observations	299		168			

Disruption: Benchmark VA estimates

Back to robust

	Full sample			Muslim children		
	(1)	(2)	(3)	(4)	(5)	(6)
Disruption (δ)	−0.104***	−0.096***	−0.080***	−0.080***	−0.068**	−0.063***
	(0.010)	(0.009)	(0.008)	(0.022)	(0.021)	(0.019)
α	0.683***	0.615***	0.601***	0.544***	0.504***	0.493***
	(0.003)	(0.003)	(0.003)	(0.006)	(0.006)	(0.006)
γ			0.381***			0.338***
			(0.008)			(0.018)
Constant	0.001	1.721***	1.791***	−0.183***	2.086***	2.221***
	(0.004)	(0.057)	(0.057)	(0.010)	(0.149)	(0.150)
Observations	373,576	373,575	373,575	35,076	35,076	35,076
R^2	0.431	0.496	0.510	0.365	0.421	0.437
Covariates	No	Yes	Yes	No	Yes	Yes

Disruption: Transition analyses

Back to robust

	From public school			From private school		From Muslim school	
	To public	To private	To Muslim	To private	To public	To Muslim	To public
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Move	−0.166***	0.039	0.163*	−0.189***	−0.368***	0.043	−0.489***
	(0.011)	(0.027)	(0.077)	(0.028)	(0.021)	(0.123)	(0.086)
Constant	−0.166***	−0.182***	−0.180***	0.101***	0.080***	−0.163	−0.153
	(0.007)	(0.006)	(0.006)	(0.016)	(0.016)	(0.124)	(0.112)
Obs. (total)	256,697	265,828	265,828	43,223	47,647	1,566	1,837
Obs. (movers)	33,827	9,072	113	2,132	4,476	45	269
R^2 adj.	0.189	0.185	0.185	0.142	0.158	0.064	0.113
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Ethnic similarity - Alternative definitions

Back

	A. Main results: Any minority		B. Alternative measure: Muslim		C. Alternative measure: Turkish	
	Reading (1)	Math (2)	Reading (3)	Math (4)	Reading (5)	Math (6)
Ethnic concentration						
Low (below median)	−0.441*	−0.321*	−0.397*	−0.278	−0.452***	−0.339***
	(0.171)	(0.150)	(0.165)	(0.144)	(0.118)	(0.099)
High (above median)	−0.185	−0.240**	−0.224	−0.280**	−0.206	−0.236
	(0.114)	(0.090)	(0.117)	(0.088)	(0.146)	(0.123)
Observations	655	639	655	639	655	639
R^2	0.168	0.128	0.166	0.127	0.168	0.128
Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Ethnic similarity - Alternative pctile cutoffs

Back

	Reading			Math		
	(1)	(2)	(3)	(4)	(5)	(6)
Ethnic concentration						
Low ($< P_{25}$)	-0.509^{***}			-0.321		
	(0.128)			(0.163)		
High ($\geq P_{25}$)	-0.269^{*}			-0.271^{**}		
	(0.119)			(0.101)		
Low ($< P_{50}$)		-0.445^{*}			-0.329^{*}	
		(0.175)			(0.153)	
High ($\geq P_{50}$)		-0.187			-0.235^{*}	
		(0.112)			(0.089)	
Low ($< P_{75}$)			-0.334^{**}			-0.296^{**}
			(0.122)			(0.104)
High ($\geq P_{75}$)			-0.221			-0.222
			(0.190)			(0.139)
Observations	655	655	655	639	639	639
R^2	0.166	0.168	0.164	0.127	0.128	0.127
Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Ethnic similarity - Correlation between measures

Back

	A. All Schools			B. Receiving Schools		
Variables	1.	2.	3.	1.	2.	3.
1. % Muslim	1.000			1.000		
2. % Any non-western	0.962	1.000		0.980	1.000	
3. % Turkish	0.631	0.586	1.000	0.645	0.599	1.000

Ethnic similarity - Control for SES

Back

	Reading				Math			
	Main				Main			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ethnic concentration								
Low	−0.441*	−0.444	−0.331	−0.459*	−0.321*	−0.573	−0.288	−0.329*
	(0.171)	(0.250)	(0.389)	(0.179)	(0.150)	(0.298)	(0.379)	(0.163)
High	−0.185	−0.185	−0.117	−0.192	−0.240**	−0.335**	−0.220	−0.193*
	(0.114)	(0.125)	(0.223)	(0.163)	(0.090)	(0.125)	(0.220)	(0.092)
School variables (average in $t-1$)								
Parental income		0.000				0.000		
		(0.000)				(0.000)		
Parental education			−0.049				−0.015	
			(0.126)				(0.129)	
School GPA				0.020				0.143
				(0.323)				(0.203)
Observations	655	655	655	637	639	639	639	621

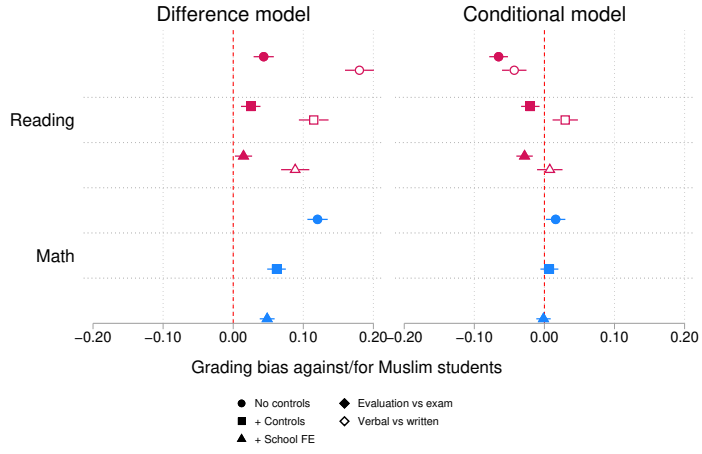
Ethnic similarity - Aspirations

Back

	Dep. var.: Educational aspirations			
	(1)	(2)	(3)	(4)
Minority student	0.006	0.097***	0.108***	0.075***
	(0.012)	(0.018)	(0.022)	(0.020)
% Minority in school			0.000	
			(0.000)	
Minority student × % Minority in school			−0.001	0.000
			(0.001)	(0.000)
Constant	0.794***	0.748***	0.741***	0.749***
	(0.005)	(0.005)	(0.007)	(0.003)
Observations	46,988	44,105	36,212	36,209
R^2 adj.	0.000	0.197	0.198	0.251
Covariates	No	Yes	Yes	Yes
School fixed effects	No	No	No	Yes

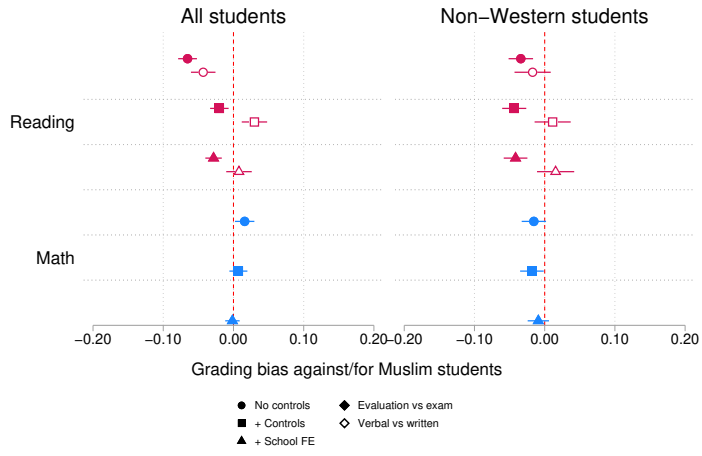
Grading bias: Conditional vs difference models

Back



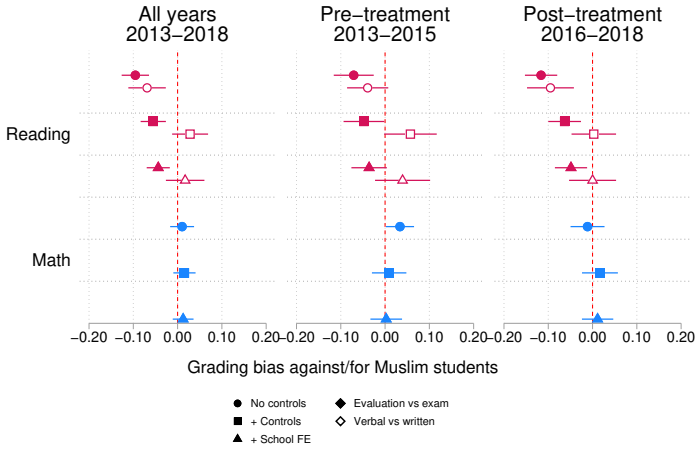
Grading bias: Comparison groups

Back



Grading bias: Sample periods (receiving schools)

Back



Robustness: School closures only

Back to main Back to robust

	Reading			Math		
	(1) OLS	(2) OLS	(3) IPTW	(4) OLS	(5) OLS	(6) IPTW
Muslim school	0.458	0.601*	0.226	0.379	0.657*	0.123
	(0.285)	(0.280)	(0.359)	(0.272)	(0.254)	(0.185)
Constant	−0.226	−0.277	−0.587***	−0.517	−0.529*	−0.671***
	(0.285)	(0.330)	(0.113)	(0.272)	(0.260)	(0.103)
Observations	148	148	148	148	148	148
R^2	0.105	0.259		0.064	0.201	
Covariates	No	Yes	Yes†	No	Yes	Yes†

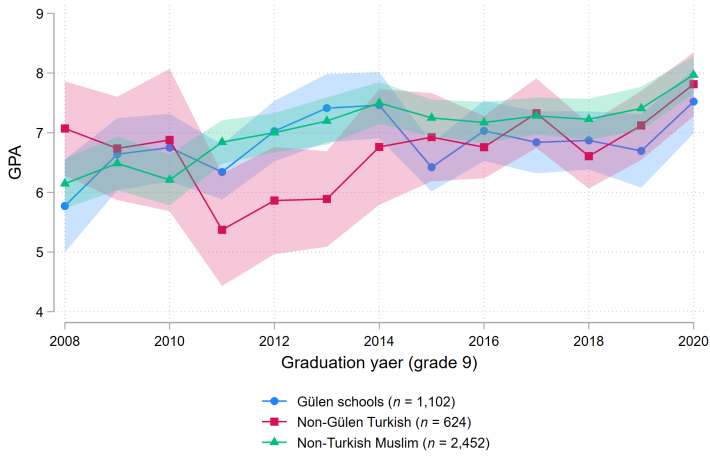
Robustness: Results without stayers

Back to main | Back to robust

	Reading			Math		
	(1) OLS	(2) OLS	(3) IPTW	(4) OLS	(5) OLS	(6) IPTW
Muslim school	0.884***	0.923***	0.469***	0.868***	0.858***	0.465***
	(0.184)	(0.181)	(0.123)	(0.099)	(0.143)	(0.119)
Constant	−0.788***	−0.700***	−0.587***	−0.937***	−0.688***	−0.756***
	(0.122)	(0.185)	(0.086)	(0.093)	(0.179)	(0.073)
Observations	379	379	379	379	379	379
R^2	0.089	0.202		0.090	0.150	
Covariates	No	Yes	Yes†	No	Yes	Yes†

Robustness: Gülen vs other Muslim schools - test scores

Back



SES in low- and high-ethnic concentration schools

	Low Ethnic		High Ethnic			
	Mean	(SD)	Mean	(SD)	Difference	*p*-value
Ethnic minority	0.274	0.094	0.603	0.174	-0.329	0.000
School characteristics (peers)						
School cohort size	188.013	50.768	167.988	56.120	20.025	0.019
Maternal income	47.152	4.703	38.164	4.241	8.988	0.000
Maternal education	13.793	1.003	12.495	0.910	1.298	0.000
Teacher characteristics						
Ethnic minority	0.053	0.050	0.115	0.076	-0.062	0.000
Age	42.541	2.716	42.289	1.702	0.252	0.481
Certified	0.801	0.093	0.795	0.087	0.006	0.677
Experience (years)	12.678	2.350	12.566	1.735	0.111	0.733
Experience $\geq$ 3 years	0.887	0.064	0.879	0.057	0.008	0.390
Specialized (Reading)	0.436	0.075	0.420	0.082	0.016	0.204
Specialized (Mathematics)	0.241	0.064	0.251	0.069	-0.009	0.372
Observations	77		83			

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