Seeing is Believing: Identity, Inequality, and the Impact of Television on the Hispanic Achievement Gap

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Motivation

- Hispanics in the US face large obstacles. Compared to white people, they are:
  - **60%** less likely to complete college,
  - **68%** less likely to found a business,
  - and have **5x** less household wealth ($38k vs. $148k)

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- Americans spend more time watching TV than any other activity but sleep
  - **50%** of Hispanics watch satellite or broadcast Spanish Language TV (SLTV)

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- Americans spend more time watching TV than any other activity but sleep
  - **50%** of Hispanics watch satellite or broadcast Spanish Language TV (SLTV)
- Large literature on how TV affects behavior (**Gentzkow & Shapiro 2008**; DellaVigna & al. 2007; Ferrara & al., 2012)
- Prior efforts to study Hispanic interaction with media focused on politics (Waldfogel & al. 2009; Trujillo & al. 2012)

This project:

Show that SLTV reduces the Hispanic achievement gap in public schools:

- Identification: difference-in-discontinuities design
- Gap vs. whites and Asians in SAT/ACTs taken, calculus courses taken, AP exams passed, etc. **shrinks** with SLTV
- However, the gap vs. whites and Asians **rises** when looking at English proficiency

How to reconcile this?

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How to reconcile this? Propose an **identity** mechanism. Three strands of evidence:

1. More bullying on the basis of ethnicity (but not gender)
2. Hispanics in places where SLTV focuses more Hispanic identity perform better (but not if SLTV focuses more on education)
3. Hispanics with SLTV visit Hispanic branded establishments more (but not Brazilian branded ones)

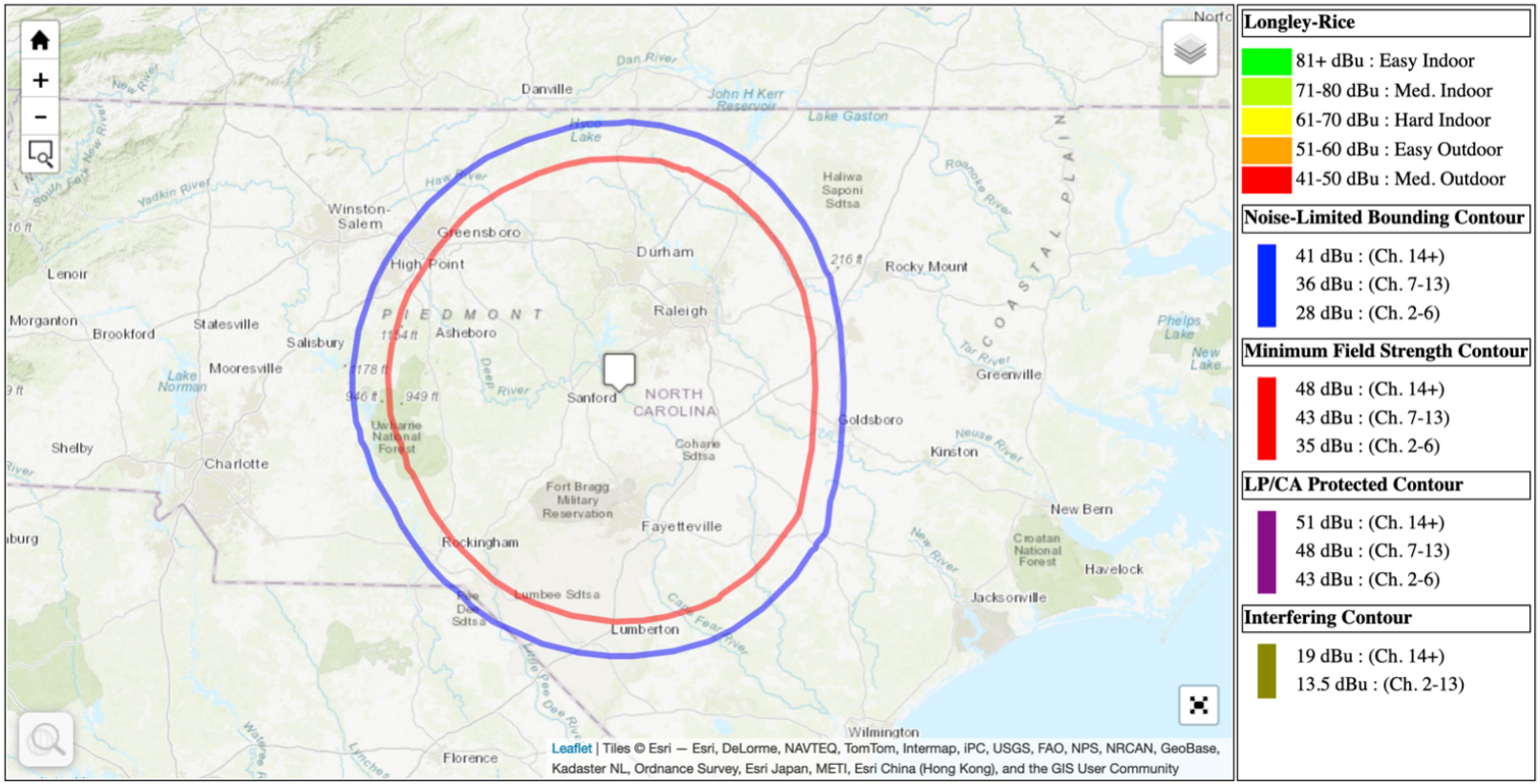
Data - General

- Instrument:
  - Identify 100 Spanish Language TV stations across the US from TMS
  - Station contours and other station data from the FCC (use data from 2015 for consistency with outcomes)
- Geocoding:
  - ArcGIS: 99.9%+ successfully geocoded
- Demographic information at county/census block group level from ACS

Coverage Map for TV Station WUVC-DT

Coverage Maps

WUVC-DT (40-1) BLCDT-20060912ACZ



Longley-Rice

- 81+ dBu : Easy Indoor
- 71-80 dBu : Med. Indoor
- 61-70 dBu : Hard Indoor
- 51-60 dBu : Easy Outdoor
- 41-50 dBu : Med. Outdoor

Noise-Limited Bounding Contour

- 41 dBu : (Ch. 14+)
- 36 dBu : (Ch. 7-13)
- 28 dBu : (Ch. 2-6)

Minimum Field Strength Contour

- 48 dBu : (Ch. 14+)
- 43 dBu : (Ch. 7-13)
- 35 dBu : (Ch. 2-6)

LP/CA Protected Contour

- 51 dBu : (Ch. 14+)
- 48 dBu : (Ch. 7-13)
- 43 dBu : (Ch. 2-6)

Interfering Contour

- 19 dBu : (Ch. 14+)
- 13.5 dBu : (Ch. 2-13)

Empirical Strategy

- Follow Velez & Newman (2019) and construct spatial RD arising from FCC TV signal regulation (OET Bulletin 69)
- TV stations protected from interference within certain coverage contour areas. Keep observations within 100 KM of boundary
  - Mechanical formula based on geographic/technical factors (not political/economic)
  - Fairly large contour areas, boundaries typically cut through small towns/suburbs
  - Most stations constructed prior to 1997 when this regulation was implemented
- Spanish Language TV: Isolate effect on Hispanic communities

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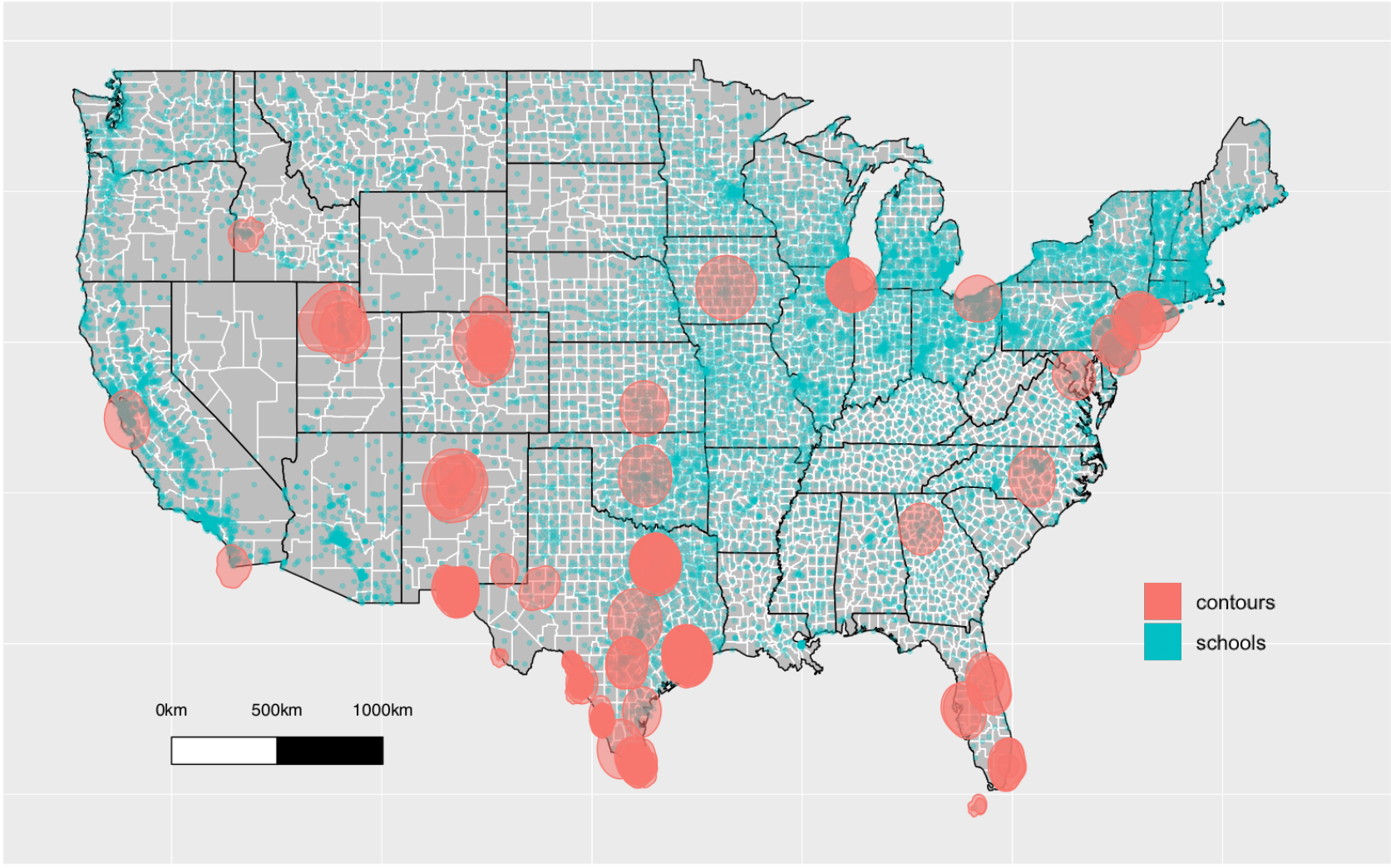
  - Most stations constructed prior to 1997 when this regulation was implemented
- Spanish Language TV: Isolate effect on Hispanic communities
- Compare against outcomes among Asians
  - Less likely to identify as Hispanic (or watch SLTV)
  - Combine RD with Asian 'control' for difference in discontinuities

SLTV coverage and public schools



Empirical Specification

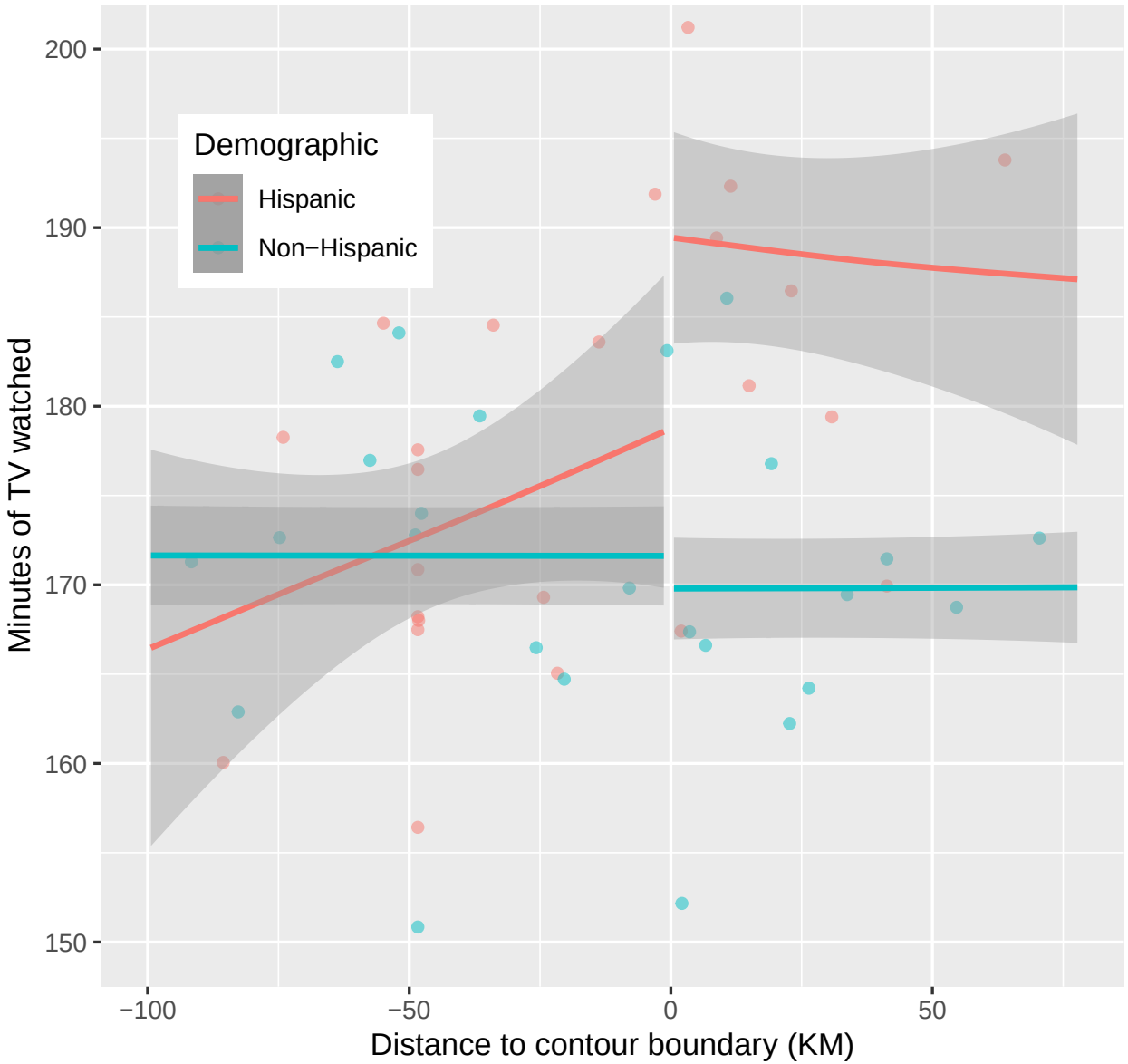
$$y_{i,j} = \beta \mathbb{I}[InsideContour_{i,j}] \times \mathbb{I}[Hispanic_{i,j}] + \gamma_k + \delta X_i + \epsilon_{i,j}$$

where $y_{i,j}$ is an outcome for observation i (which may be an individual, school, or establishment) under demographic category $j \in \{\text{Hispanic, not Hispanic}\}$, γ_k is fixed effect for school district k, and X is a vector of controls for the observation.

Evidence of first stage

- Data from American Time Use Survey over last 15 years:
  - 210,000 person-year observations
  - Average person watches 170 minutes of TV per day
- Two limitations:
  - County-level data is noisy for RD approach
  - Only overall TV viewership data, not SLTV

TV Viewership within the SLTV Boundary



Negative distances are outside coverage contour (no SLTV). ▸ Time breakdown

Effect of SLTV on the Hispanic achievement gap

Data: public schools

- Data from Department of Education's Civil Rights Data Collection in 2015:
  - 48,000 public schools in sample (unit of observation)
  - (Almost) all variables split by ethnicity
- Outcomes
  - SAT/ACTs taken
  - Calculus courses taken
  - AP exams passed
  - Limited English Proficiency (LEP)
  - Bullying
- Controls
  - Number of students (by demographic group)
  - Type of school (age range served)
  - School location

Effect of SLTV on Hispanic vs. Asian academic achievement

	(1)	(2)	(3)
Panel A: IHS(SAT/ACTs taken)			
TV dummy × Hispanic	0.1598***	0.1598***	0.1598***
	(0.0264)	(0.0264)	(0.0264)
Panel B: IHS(calculus taken)			
TV dummy × Hispanic	0.2718***	0.2718***	0.2718***
	(0.0369)	(0.0369)	(0.0369)
Panel C: IHS(APs passed)			
TV dummy × Hispanic	0.0964***	0.0966***	0.0972***
	(0.0346)	(0.0353)	(0.0360)
# Hispanic, Asian students	Yes	Yes	Yes
School size controls	No	Yes	Yes
School type controls	No	No	Yes

Notes: School district fixed effects are always included. Standard errors are clustered at the school district level.

Effect sizes

	Gap vs. white	Gap vs. Asian	Gap after SLTV
	(1)	(2)	(3)
SAT/ACTs taken	36.6 %	46.8%	38.3%
Calculus taken	15.0%	53.6%	41.0%
APs passed	17.8%	72.3%	69.6%
Gifted students	56.6%	60.5%	51.0%
Advanced math taken	25.8%	45.3%	31.7%
Biology taken	-6.2%	5.6%	-18.9%
Physics taken	25.4%	43.7%	26.2%
Chemistry taken	9.9%	27.7%	6.7%

Discussion

- Results are robust to a variety of specifications. Also rule out alternative stories regarding selection across boundary, selection between schools, measurement at the border, endogenous contour construction by network executives
- Most studies (Gentile 2004; Zavodny 2006) show that TV makes academic outcomes **worse**
- The big exception is Gentzkow & Shapiro 2008, where positive effects are driven by English language acquisition & potentially a cognitive channel
- So what is going on here with Spanish language TV?

Exploring the identity mechanism

Effect of SLTV on Hispanic vs. Asian identity outcomes

	(1)	(2)	(3)
Panel A: IHS(limited English proficiency)			
TV dummy × Hispanic	0.3042***	0.3042***	0.3042***
	(0.0379)	(0.0379)	(0.0379)
Panel B: IHS(bullied based on ethnicity)			
TV dummy × Hispanic	0.0015*	0.0015*	0.0015*
	(0.0009)	(0.0009)	(0.0009)
# Hispanic, Asian students	Yes	Yes	Yes
School size controls	No	Yes	Yes
School type controls	No	No	Yes

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▸ Disability and gender-based bullying placebo

Data: content of TV programming

- Data from archive.org's TV transcript database (2005 - 2015)
  - Use keyword matching to code content of television programs
  - Variation at the television network level
- Test three different mechanisms:
  - Identity: 10.8% of programs relate to Latin America (vs. sports/weather/local news translated into Spanish etc.)
  - Education: 15% of programs that mention schools
  - Role models: 5.0% of programs with good role models for children/adolescents (mostly telenovelas)

Differential effect of SLTV by program content

	(1)	(2)	(3)
Panel A: IHS(SAT/ACTs taken)			
TV × Hispanic × % programs on identity	2.313**		
	(0.943)		
TV × Hispanic × % programs on education		−0.516	
		(0.626)	
TV × Hispanic × % programs with role models			−2.085
			(2.151)
# Hispanic, Asian students	Yes	Yes	Yes
School size controls	No	Yes	Yes
School type controls	No	No	Yes

Notes: School district fixed effects are always included. Standard errors are clustered at the school district level. See effect for: ▸ Calculus ▸ AP exams

Data: foot traffic

- Safegraph foot traffic data in 2019 to 136,000 establishments across the US
  - Restaurants are coded by Safegraph into different types of cuisine (11.6% are Hispanic)
  - Other recreational establishments are manually classified using keyword matching (10.7% are Hispanic)
  - Use census data to impute identity of visitors

Effect of SLTV on foot traffic

	IHS(visitors to location)			
	(1)	(2)	(3)	(4)
Panel A.1: Restaurants — Hispanic establishment indicator				
TV × Hispanic × Hispanic food	0.872***	0.872***	0.872***	0.872***
	(0.062)	(0.062)	(0.062)	(0.062)
Panel B.1: Recreation — Hispanic establishment indicator				
TV × Hispanic × Hispanic brand	0.569***	0.569***	0.569***	0.569***
	(0.137)	(0.137)	(0.137)	(0.137)
County log(income)	Yes	Yes	Yes	Yes
County % Hispanic	No	Yes	Yes	Yes
County log(pop.)	No	No	Yes	Yes
County FE	No	No	No	Yes
NAICS code FE	No	No	No	Yes

Notes: Standard errors are clustered at the county level. See placebos for: ▸ Brazilian ▸ Japanese ▸ Creole/Cajun establishments

Contribution

- Prior work on Hispanic media focused on *local* political outcomes (Velez & Newman 2019; Trujillo & al. 2012).

→ Provide a first look at how media affects Hispanic educational outcomes

→ Identify causal effect on larger scale and with more granularity (geocoded microdata)

- Existing research that shows identity is a powerful mechanism driving meaningful outcomes (Benjamin & al. 2007; Bursztyn & al. 2015). New research on how identity is constructed and strengthened (Atkin & al. 2019; Bazzi & al. 2019)

→ Show how identity can be bolstered by the media and how it can help reduce inequality

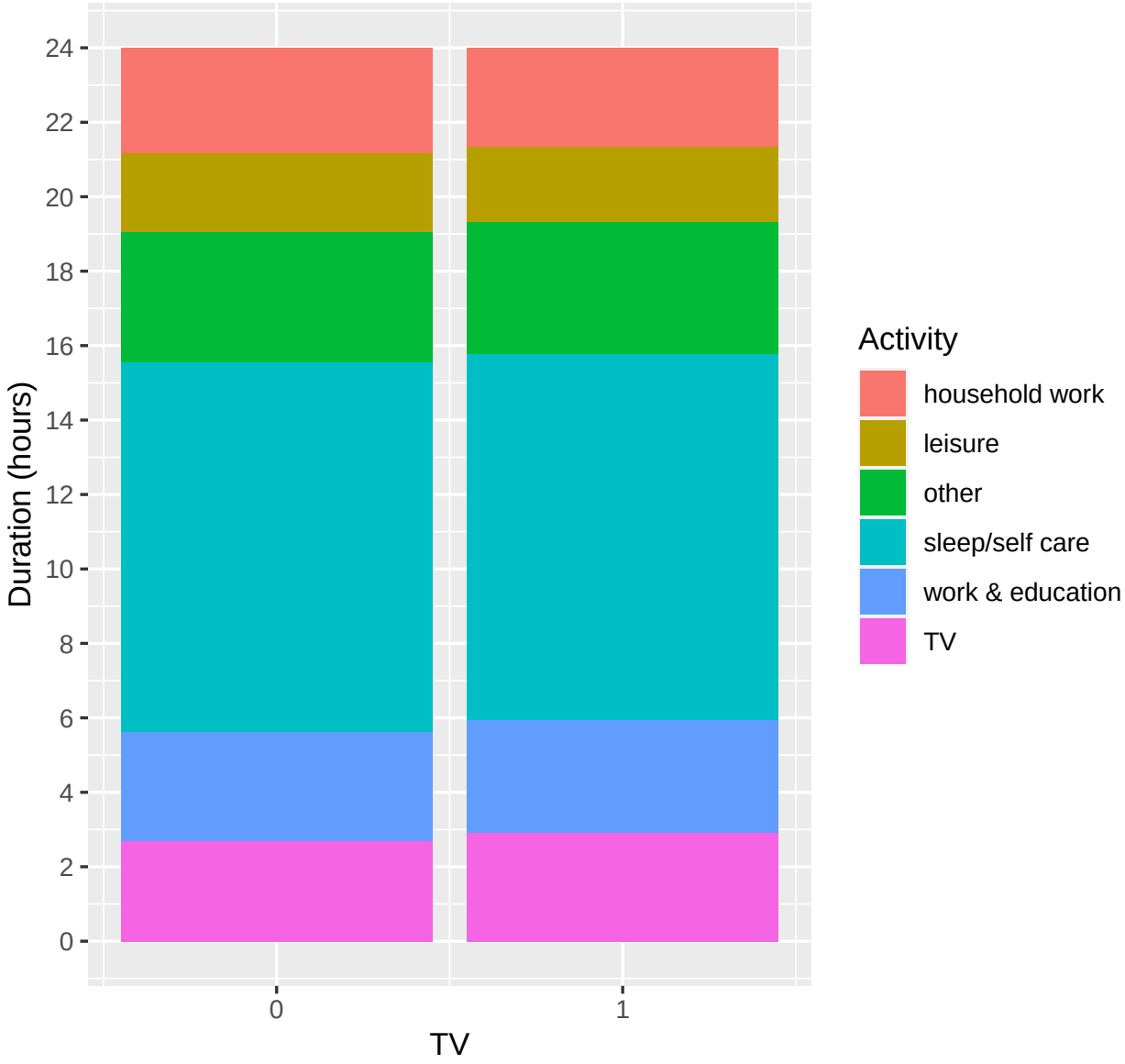
→ Contrast with education lit. where a salient minority identity is bad because of stereotype threat (Spencer, Logel, & Davies 2016)

Conclusion

- Hopefully persuaded you that an identity mechanism matters for Hispanic achievement, but could be other important ones!
- Many ways that identity mechanism itself could operate (meta-mechanisms):
  - Self-confidence from representation on screen
  - Stronger in-group ties within school community
  - Greater connection with parents and support network
  - Recognise relative privilege vs. countries of origin & raise perceived value of education
  - More engagement and intellectual stimulation
- Some other results not shown in paper: effect of SLTV on firms and entrepreneurship, on campaign contributions

Thank You!

TV Viewership within the SLTV Boundary



Hispanics with and without SLTV Back

Differential effect of SLTV by program content

	(1)	(2)	(3)
Panel B: IHS(calculus taken)			
TV × Hispanic × % programs on identity	2.788***		
	(1.034)		
TV × Hispanic × % programs on education		0.829	
		(0.666)	
TV × Hispanic × % programs with role models			1.616
			(2.463)
# Hispanic, Asian students	Yes	Yes	Yes
School size controls	No	Yes	Yes
School type controls	No	No	Yes

Notes: School district fixed effects are always included. Standard errors are clustered at the school district level. Back

Differential effect of SLTV by program content

	(1)	(2)	(3)
Panel C: IHS(APs passed)			
TV × Hispanic × % programs on identity	1.721		
	(1.280)		
TV × Hispanic × % programs on education		0.903	
		(0.922)	
TV × Hispanic × % programs with role models			−1.184
			(2.989)
# Hispanic, Asian students	Yes	Yes	Yes
School size controls	No	Yes	Yes
School type controls	No	No	Yes

Notes: School district fixed effects are always included. Standard errors are clustered at the school district level. ▸ Back

Effect of SLTV on foot traffic

	(1)	(2)	(3)
Panel A: IHS(IDEA (disability) students)			
TV dummy × Hispanic	0.0318	0.0325	0.0318
	(0.0338)	(0.0339)	(0.0338)
Panel B: IHS(bullied based on sex)			
TV dummy × Hispanic	0.0090	0.0088	0.0088
	(0.0056)	(0.0055)	(0.0055)
# Hispanic, Asian students	Yes	Yes	Yes
School size controls	No	Yes	Yes
School type controls	No	No	Yes

Notes: School district fixed effects are always included. Standard errors are clustered at the school district level. Back

Effect of SLTV on foot traffic to Brazilian establishments

	IHS(visitors to location)			
	(1)	(2)	(3)	(4)
Panel A.2: Restaurants — Brazilian establishment indicator				
Hispanic × TV × Brazilian food	0.058	0.058	0.058	0.058
	(0.241)	(0.241)	(0.241)	(0.241)
Panel B.2: Recreation — Brazilian establishment indicator				
Hispanic × TV × Brazilian brand	0.328	0.328	0.328	0.328
	(0.598)	(0.598)	(0.599)	(0.610)
County log(income)	Yes	Yes	Yes	Yes
County % Hispanic	No	Yes	Yes	Yes
County log(pop.)	No	No	Yes	Yes
County FE	No	No	No	Yes
NAICS code FE	No	No	No	Yes

Notes: Standard errors are clustered at the county level. Back

Effect of SLTV on foot traffic to Japanese establishments

	IHS(visitors to location)			
	(1)	(2)	(3)	(4)
Panel A.3: Restaurants — Japanese establishment indicator				
TV × Hispanic × Japanese food	0.010	0.010	0.010	0.010
	(0.067)	(0.067)	(0.067)	(0.067)
Panel B.3: Recreation — Japanese establishment indicator				
TV × Hispanic × Japanese brand	0.702	0.702	0.702	0.702
	(0.528)	(0.528)	(0.528)	(0.528)
County log(income)	Yes	Yes	Yes	Yes
County % Hispanic	No	Yes	Yes	Yes
County log(pop.)	No	No	Yes	Yes
County FE	No	No	No	Yes
NAICS code FE	No	No	No	Yes

Notes: Standard errors are clustered at the county level. Back

Effect of SLTV on foot traffic to Cajun/Creole establishments

	IHS(visitors to location)			
	(1)	(2)	(3)	(4)
Panel A.4: Restaurants — Cajun and Creole establishment indicator				
TV × Hispanic × Cajun and Creole food	0.174	0.174	0.174	0.174
	(0.196)	(0.196)	(0.196)	(0.196)
Panel B.4: Recreation — Cajun and Creole establishment indicator				
TV × Hispanic × Cajun and Creole brand	-0.187	-0.187	-0.187	-0.187
	(1.630)	(1.630)	(1.630)	(1.631)
County log(income)	Yes	Yes	Yes	Yes
County % Hispanic	No	Yes	Yes	Yes
County log(pop.)	No	No	Yes	Yes
County FE	No	No	No	Yes
NAICS code FE	No	No	No	Yes

Notes: Standard errors are clustered at the county level. Back