

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

Andrew Kao
Harvard

February 2022

Motivation

- ▶ The Hispanic achievement gap is wide and persistent:
 - ▶ They are the least likely to complete high school and college out of all major ethnic/racial groups

Motivation

- ▶ The Hispanic achievement gap is wide and persistent:
 - ▶ They are the least likely to complete high school and college out of all major ethnic/racial groups
- ▶ Americans spend more time watching TV than any other activity but sleep
 - ▶ **50%** of Hispanics watch satellite or broadcast Spanish Language TV (SLTV)

Motivation

- ▶ The Hispanic achievement gap is wide and persistent:
 - ▶ They are the least likely to complete high school and college out of all major ethnic/racial groups
- ▶ 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)
- ▶ Could Spanish Language TV (SLTV) affect Hispanic educational outcomes?

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?

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? Propose an **identity** mechanism. Four strands of evidence:

1. More bullying on the basis of ethnicity (but not gender)
2. Hispanics perform better where SLTV focuses more on Hispanic identity (but not on education)
3. Hispanics with SLTV visit Hispanic branded establishments more (but not Brazilian branded ones)
4. Counties with SLTV are more socially connected to LatAm

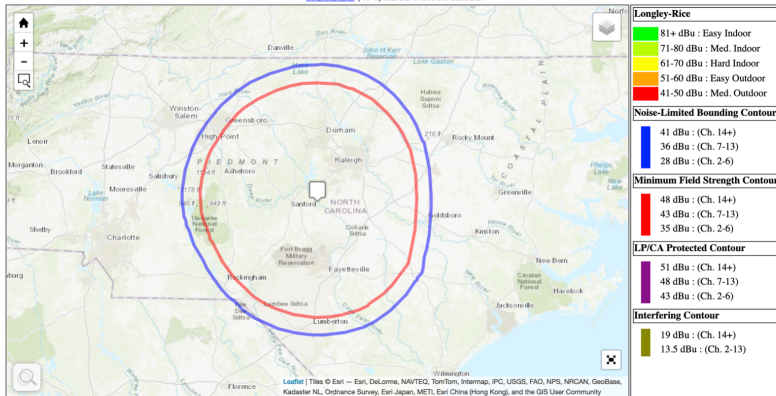
Data - General

- ▶ 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



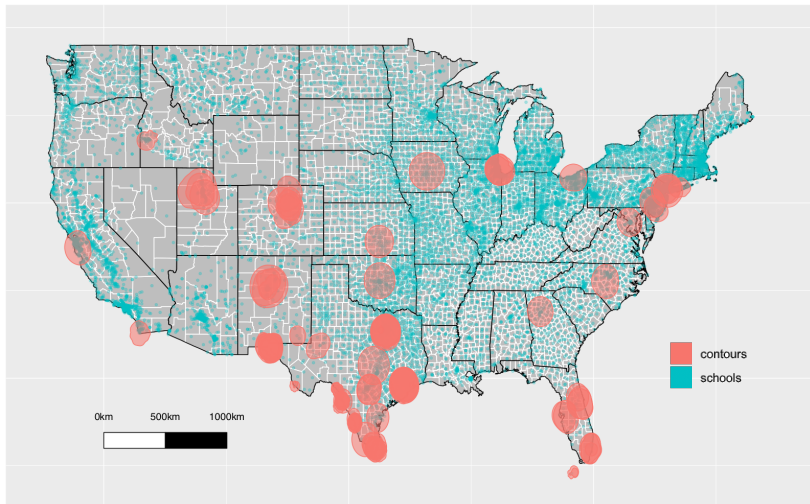
Empirical Strategy

- ▶ 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

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
- ▶ 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

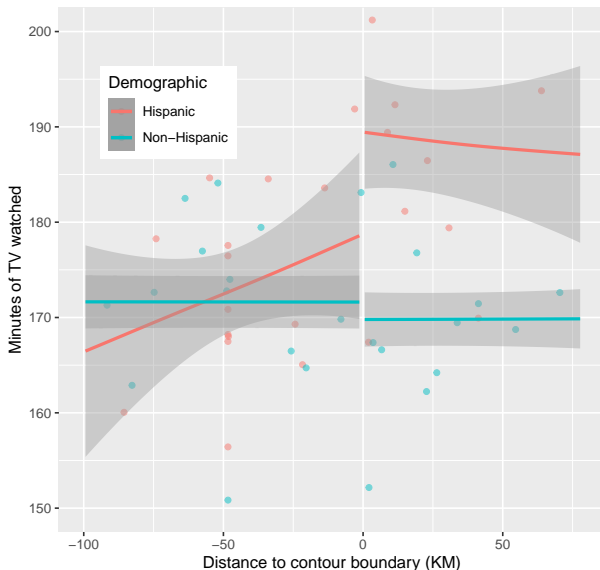
$$y_{i,j} = \beta \mathbb{I}[InsideContour_{i,j}] \times \mathbb{I}[Hispanic_{i,j}] + \gamma_k + \delta X_i + \epsilon_{i,j}$$

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 \times Hispanic	0.1598*** (0.0264)	0.1598*** (0.0264)	0.1598*** (0.0264)
Panel B: IHS(calculus taken)			
TV dummy \times Hispanic	0.2718*** (0.0369)	0.2718*** (0.0369)	0.2718*** (0.0369)
Panel C: IHS(APs passed)			
TV dummy \times Hispanic	0.0964*** (0.0346)	0.0966*** (0.0353)	0.0972*** (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: how much is inequality reduced?

	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 \times Hispanic	0.3042*** (0.0379)	0.3042*** (0.0379)	0.3042*** (0.0379)
Panel B: IHS(bullied based on ethnicity)			
TV dummy \times Hispanic	0.0015* (0.0009)	0.0015* (0.0009)	0.0015* (0.0009)
# 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.

► Disability and gender-based bullying placebo

Examining identity in the public school context

- ▶ More Hispanic students are classified as having “Limited English Proficiency”
 - ▶ Suggests that this is not a (1) English learning channel or (2) purely cognitive channel
 - ▶ Result makes sense in the context of different cultural background, or simply more exposure to Spanish vs. English
 - ▶ Placebo: no difference in Hispanics classified as disabled
- ▶ More Hispanic students are bullied on the basis of their ethnicity
 - ▶ Identity is likely more salient to others in the school
 - ▶ Placebo: no difference in Hispanics bullied on the basis of their gender

The content of SLTV programs

- ▶ 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 \times Hispanic \times % programs on identity	2.313** (0.943)		
TV \times Hispanic \times % programs on education		-0.516 (0.626)	
TV \times Hispanic \times % 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](#)

Examining identity through the content of television programs

- ▶ Where SLTV focuses more on the Hispanic identity, Hispanics perform better
 - ▶ On the other hand, no evidence for “education” or “role models” as a mechanism through which TV acts
 - ▶ Potential endogeneity (although unclear what would confound results: do network executives tailor programming for the small audience at the peripheries of the contour?)

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
- ▶ Run regressions at the establishment-visitor demographic level to see what kind of places Hispanics are more likely to visit
 - ▶ Main focus is on Hispanic-branded establishments
 - ▶ Three placebos: Brazilian, Japanese, and Creole/Cajun

Effect of SLTV on foot traffic

	<i>IHS(visitors to location)</i>			
	(1)	(2)	(3)	(4)
Panel A.1: Restaurants — Hispanic establishment indicator				
TV × Hispanic × Hispanic food	0.872*** (0.062)	0.872*** (0.062)	0.872*** (0.062)	0.872*** (0.062)
Panel B.1: Recreation — Hispanic establishment indicator				
TV × Hispanic × Hispanic brand	0.569*** (0.137)	0.569*** (0.137)	0.569*** (0.137)	0.569*** (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

Examining identity through the foot traffic data

- ▶ Hispanics more likely to engage with establishments branded with their own culture
 - ▶ Specific to language: no effect for Brazil
 - ▶ Geographically specific: even Spanish Creole doesn't show up in the data
 - ▶ Potentially a means of expressing identity, following papers like Atkin et al. 2019
 - ▶ Could also be an advertising effect bundled in

Data: Social Connectedness

- ▶ Facebook Social Connectedness Data from 2020
 - ▶ County-country pairs coded by $\frac{FBConnections_{ij}}{FBUsers_i \times FBUsers_j}$
 - ▶ Captures relative strength of connection between US county and foreign country
 - ▶ Connectedness with other countries ranges from 0.02 to 381, mean value 9.388

Effect of SLTV on connection to Latin America

	<i>SCI index</i>		
	(1)	(2)	(3)
Panel A: Latin America vs. rest of world			
TV dummy \times Latin America	22.023*** (6.837)	22.023*** (6.838)	22.023*** (6.839)
Panel B: Latin America vs. Brazil			
TV dummy \times Latin America	19.703*** (6.219)	19.703*** (6.220)	19.703*** (6.221)
County log(income)	Yes	Yes	Yes
County % Hispanic	No	Yes	Yes
County log(pop.)	No	No	Yes

Notes: Standard errors are clustered at the state level.

Contribution

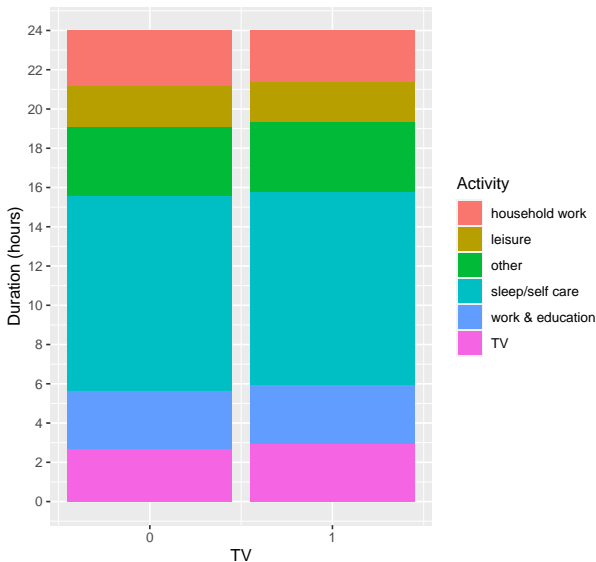
- ▶ Prior work on Hispanic media focused on *local* political outcomes (Velez & Newman 2019; Trujillo & al. 2012).
- Provide a first look at how media affects Hispanic educational outcomes
- Identify causal effect on larger scale and with more granularity (geocoded microdata)
- ▶ Existing research that 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 educational achievement
 - ▶ But there could also be other important ones!
- ▶ Many ways that identity mechanism itself could operate (meta-mechanisms):
 - ▶ Stronger ties abroad
 - ▶ 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
- ▶ Ideas for next steps?

Thank You!

TV viewership across 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 \times Hispanic \times % programs on identity	2.788*** (1.034)		
TV \times Hispanic \times % programs on education		0.829 (0.666)	
TV \times Hispanic \times % 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 \times Hispanic \times % programs on identity	1.721 (1.280)		
TV \times Hispanic \times % programs on education		0.903 (0.922)	
TV \times Hispanic \times % 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 \times Hispanic	0.0318 (0.0338)	0.0325 (0.0339)	0.0318 (0.0338)
Panel B: IHS(bullied based on sex)			
TV dummy \times Hispanic	0.0090 (0.0056)	0.0088 (0.0055)	0.0088 (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

	<i>IHS(visitors to location)</i>			
	(1)	(2)	(3)	(4)
Panel A.2: Restaurants — Brazilian establishment indicator				
Hispanic \times TV \times Brazilian food	0.058 (0.241)	0.058 (0.241)	0.058 (0.241)	0.058 (0.241)
Panel B.2: Recreation — Brazilian establishment indicator				
Hispanic \times TV \times Brazilian brand	0.328 (0.598)	0.328 (0.598)	0.328 (0.599)	0.328 (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

	<i>IHS(visitors to location)</i>			
	(1)	(2)	(3)	(4)
Panel A.3: Restaurants — Japanese establishment indicator				
TV × Hispanic × Japanese food	0.010 (0.067)	0.010 (0.067)	0.010 (0.067)	0.010 (0.067)
Panel B.3: Recreation — Japanese establishment indicator				
TV × Hispanic × Japanese brand	0.702 (0.528)	0.702 (0.528)	0.702 (0.528)	0.702 (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

	<i>IHS(visitors to location)</i>			
	(1)	(2)	(3)	(4)
Panel A.4: Restaurants — Cajun and Creole establishment indicator				
TV × Hispanic × Cajun and Creole food	0.174 (0.196)	0.174 (0.196)	0.174 (0.196)	0.174 (0.196)
Panel B.4: Recreation — Cajun and Creole establishment indicator				
TV × Hispanic × Cajun and Creole brand	-0.187 (1.630)	-0.187 (1.630)	-0.187 (1.630)	-0.187 (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](#)