

# IMAGE(S)

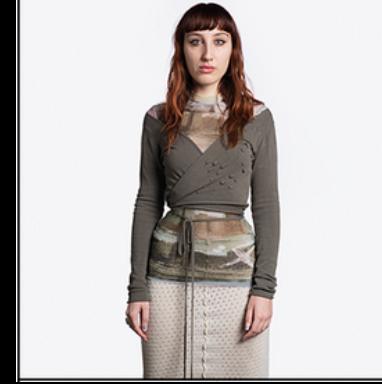
**Fashion Choice as Indicators of Cultural Change**

By Hans-Joachim Voth & David Yanagizawa-Drott

Presented by Jan Bauer, Yosef König, and Alexandros Sobczyk

Modes of self-expression reflect on contemporary culture

Can analysing these modes give insight how culture *changes* over time?



**Key challenge in the visual analysis of cultural  
change:**

**lack of high-frequency, granular data and  
consistent measurements**

Yearbook portraits  
of US high school  
seniors 1930-2010

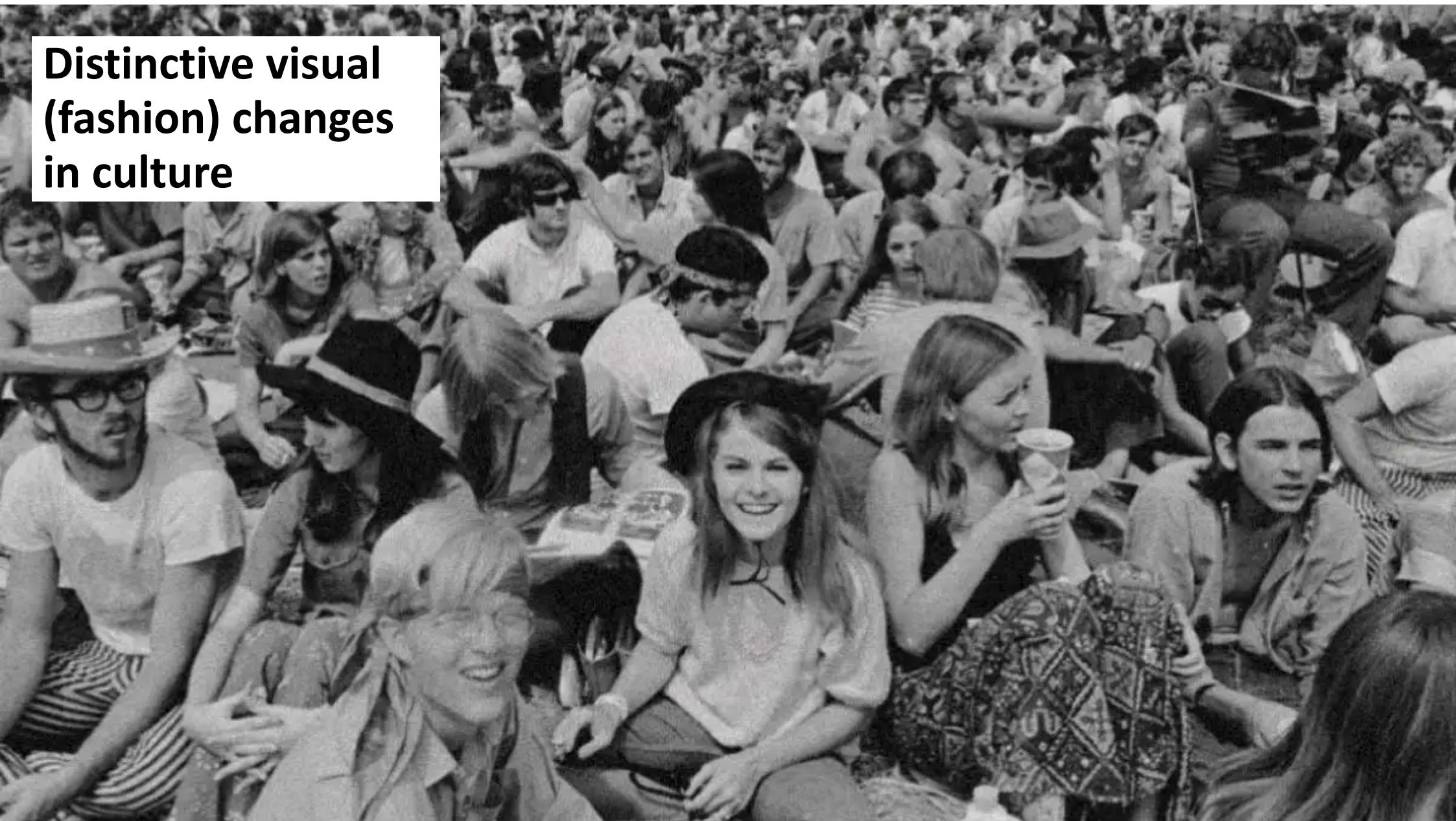


Note: First row is from 1964, second row is from 1984.

# US post-war cultural dominance



## Distinctive visual (fashion) changes in culture



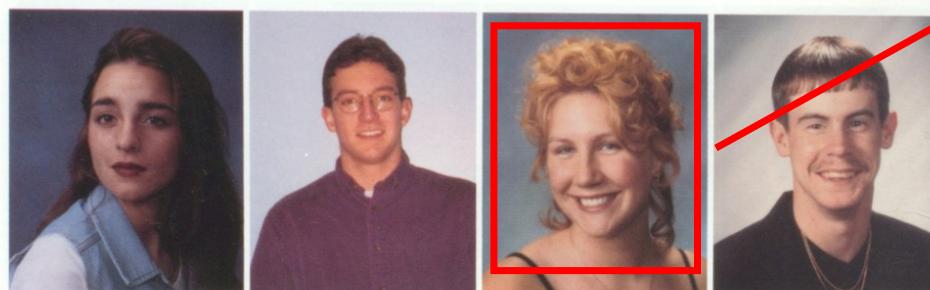


Ronald Michaels

Tonya Morgan

Alicia Mortier

Jeremiah Mozal



Elizabeth Murray

Kevin Muylaert

Nicole Nelson

Jeremy Nichols



Ryan Nyeholt

Aimee Owen

Wade Owens

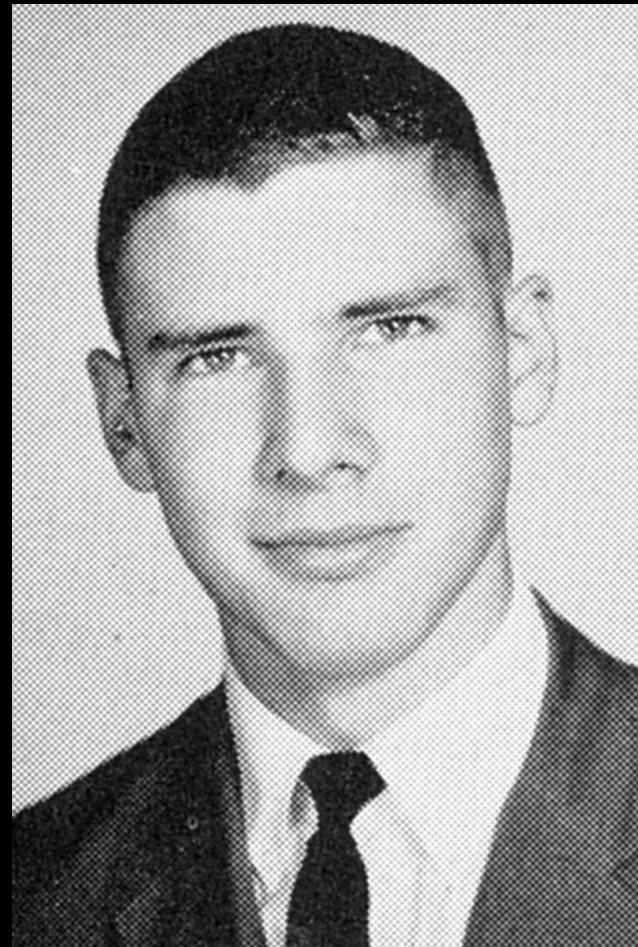
Fighting Iris

Iluminada Pagan



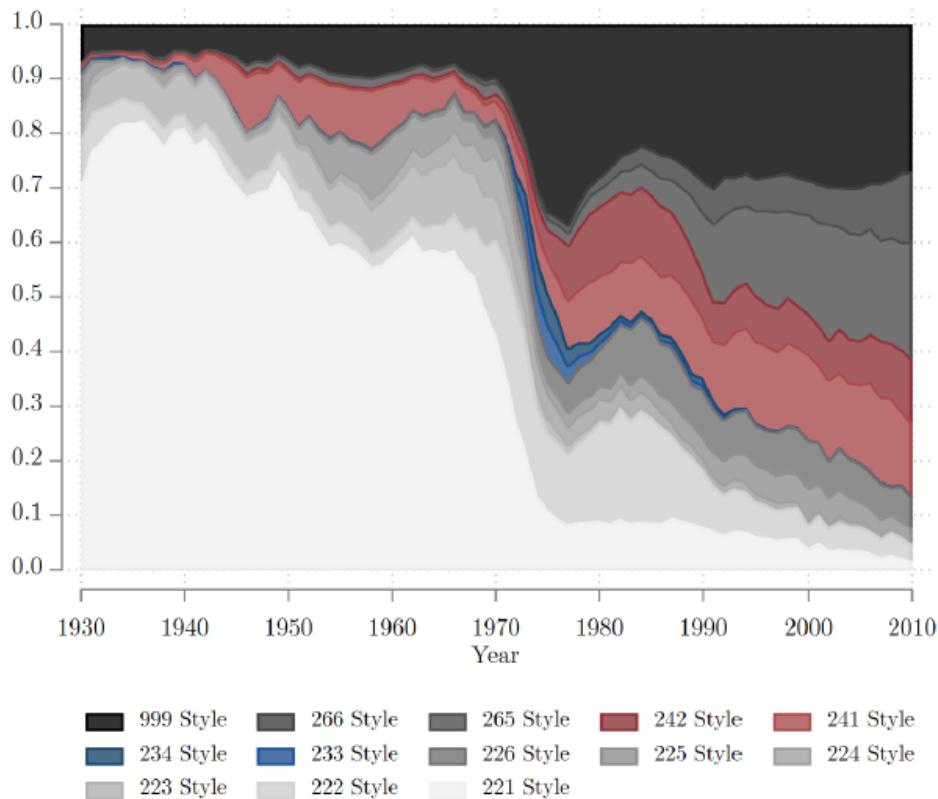
## Classification of Style Markers:

- **Gender**: Male / Female (93%)
- **Hair**: Long / Short (91%)
- **Tie**: no tie / normal tie / bow tie (97%)
- **Clothing**: dress / suit / shirt without collar / shirt with collar (76%)
- **Glasses**: yes / no (99%)
- **Jewelery**: yes / no (91%)
- **Facial hair**: yes / no (70%)



**Style Vector:** HF = {male, short, normal tie, Suit, no, no, no}  
(Style 221)

Figure 2: Males - Styles in High School Senior Yearbook Pictures.



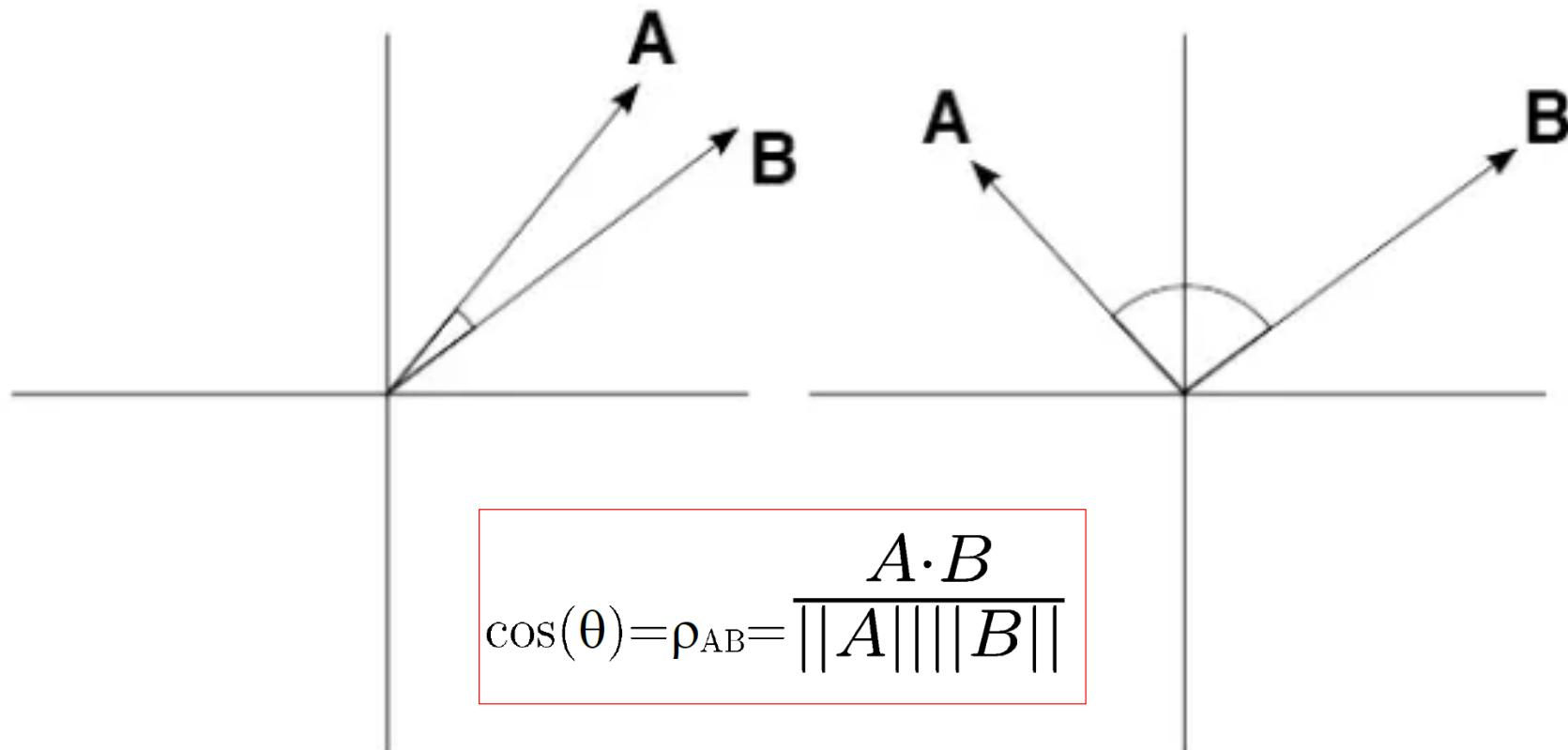
Style 221: suit/short hair/normal tie/no glasses/no facial hair/no jewelry  
Style 222: suit/short hair/normal tie/no glasses/yes facial hair/no jewelry  
Style 223: suit/short hair/normal tie/yes glasses/no facial hair/no jewelry  
Style 224: suit/short hair/normal tie/yes glasses/yes facial hair/no jewelry  
Style 225: suit/short hair/bow tie/no glasses/no facial hair/no jewelry  
Style 226: suit/short hair/bow tie/no glasses/yes facial hair/no jewelry  
Style 233: suit/long hair/normal tie/no glasses/no facial hair/no jewelry  
Style 234: suit/long hair/normal tie/no glasses/yes facial hair/no jewelry  
Style 241: shirt with collar/short hair/no tie/no glasses/no facial hair/no jewelry  
Style 242: shirt with collar/short hair/no tie/no glasses/yes facial hair/no jewelry  
Style 265: shirt without collar/short hair/no tie/no glasses/no facial hair/no jewelry  
Style 266: shirt without collar/short hair/no tie/no glasses/yes facial hair/no jewelry  
Style 999: Others

~~Style A: shirt / white collar / long hair / no glasses / yes glasses / no facial hair / yes jewellery~~

Style B: suit / short hair / normal tie / no glasses / yes facial hair / no jewellery

Similar

Unrelated



# Individualism and persistence

- **Individualism:**

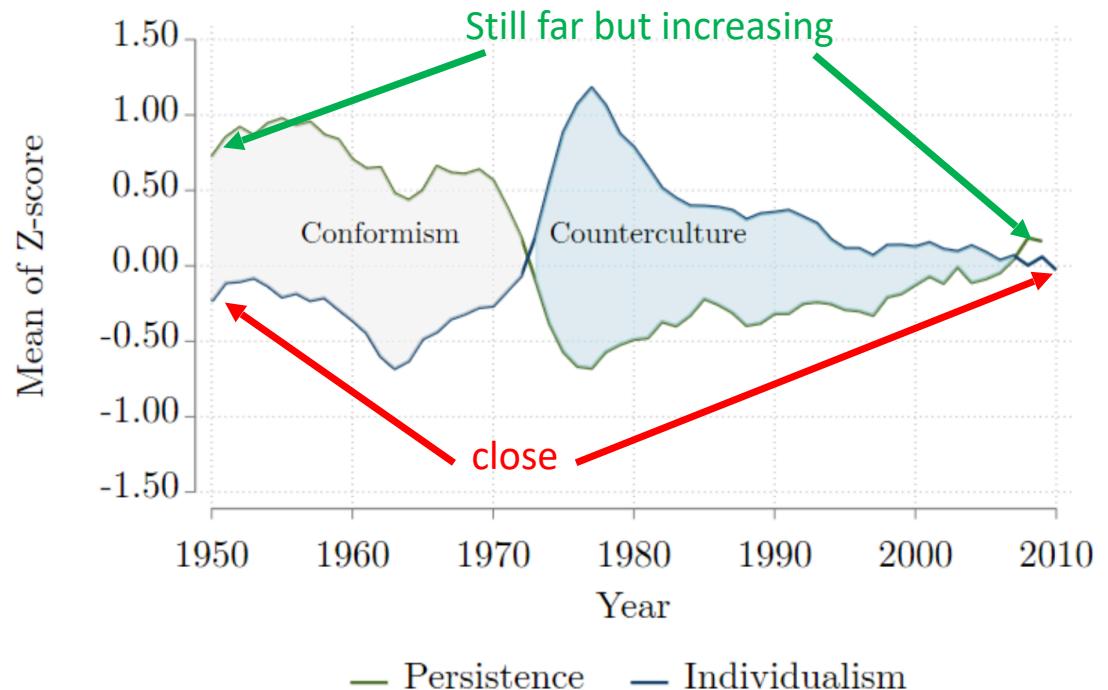
How **different** (“individual”) is a random student compared to their **classmates**

- **Persistence:**

How different are the students in the **same school** after **20 years**.

(Z-scored cosine similarity)

Figure 3: Individualism and Persistence in US High School Yearbook Images, 1950-2010.



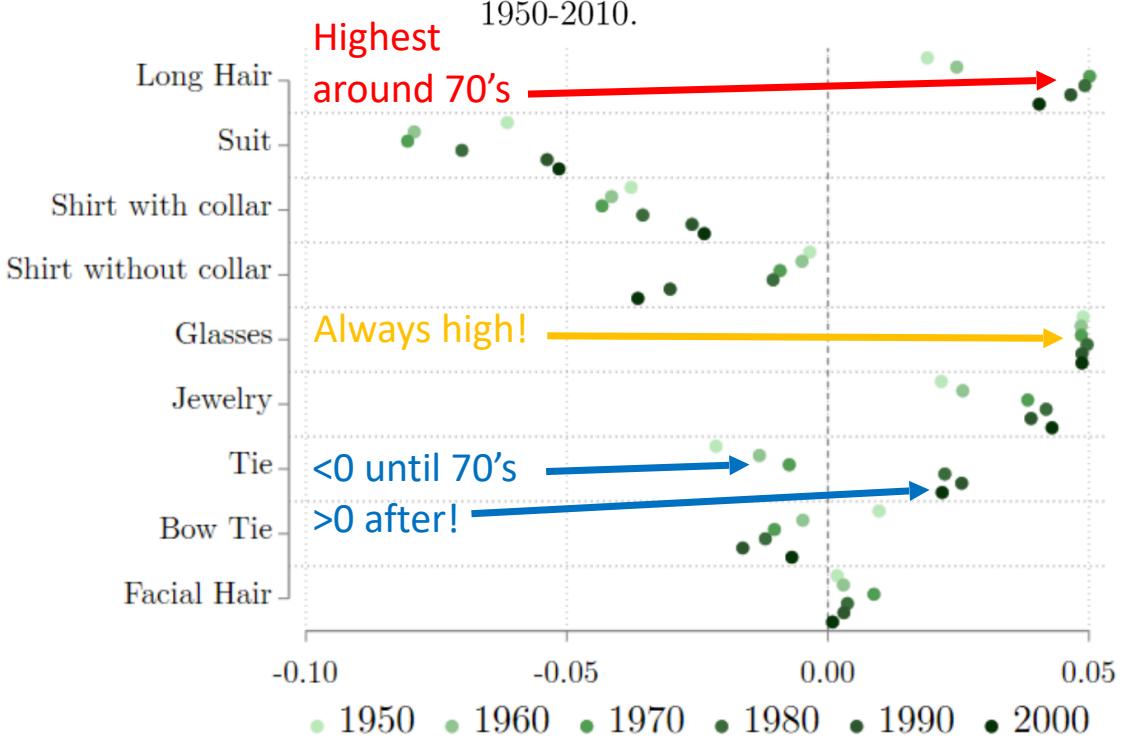
Note: All individuals across US, each compared with all individuals from same high school from their own year (individualism) and 20 years before (persistence). Cosine similarity is inverted for individualism, both are Z-scored.

# What drove change?

- Quantify importance of factors based on LASSO regression model:

$$R(\beta) = \sum_{i=1}^n (y_i - \beta_0 - \sum_{j=1}^p \beta_j x_{ij})^2 + \lambda \sum_{j=1}^p |\beta_j|$$

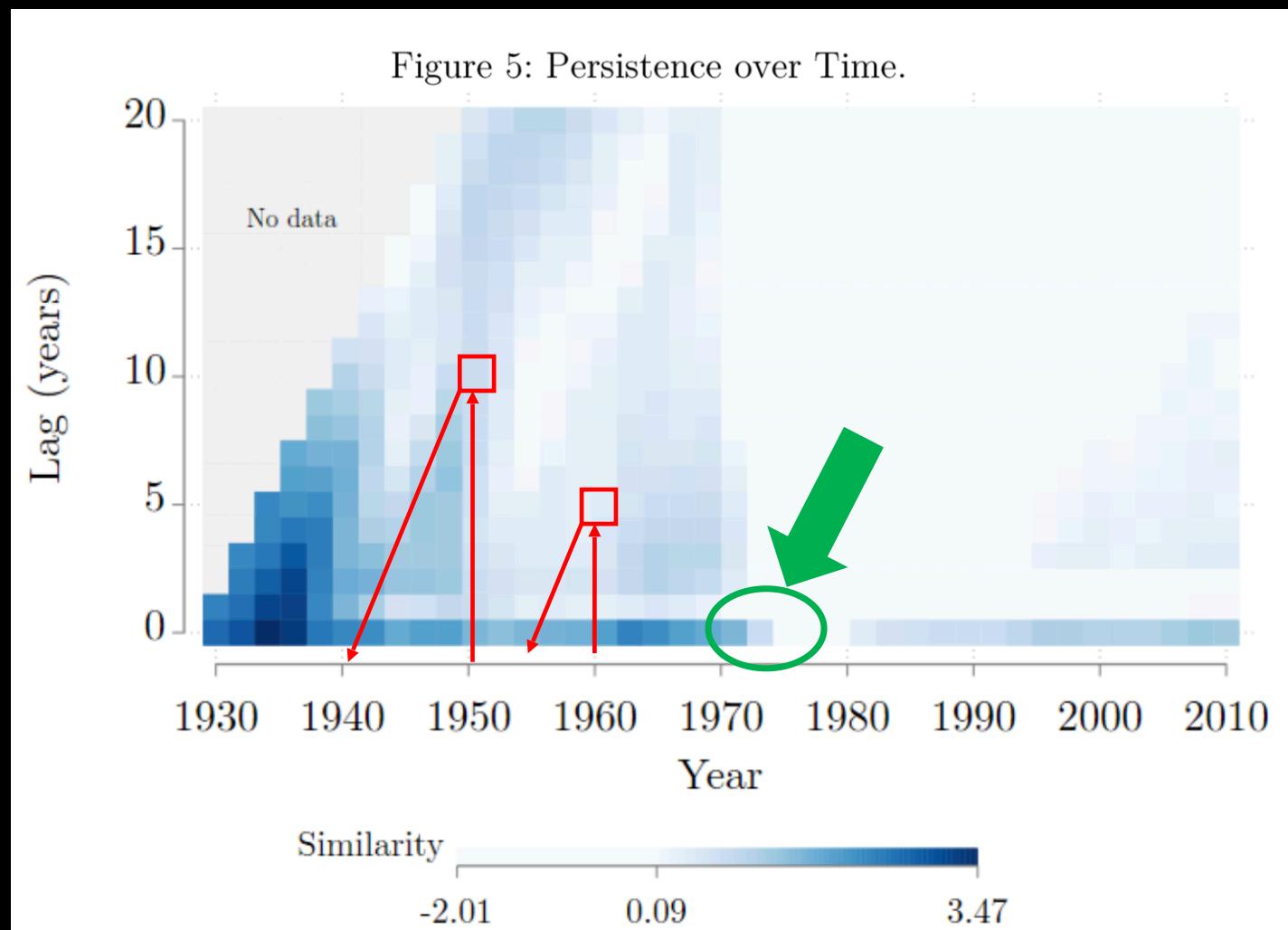
Figure 4: Drivers of Individualism in US High School Yearbook Images, 1950-2010.



Note: Dots represent coefficient estimates from a Lasso regression of individualism score on style characteristics. Each dot represents a single coefficient for a style, derived from bi-variate regressions. Values greater zero indicate a positive contribution to students' individualism score.

# Persistence analysis in-depth

- Compare against different “time windows”
- **Up to 1970:** good persistence up-to 15 years back
- **Early 70's:** sharp rise of counter-culture (almost zero persistence!)
- **After 80:** short-term persistence increases



# Innovative styles

- Which style is **innovative**?
  - Should be **novel** and **influential**
- **Backward Similarity** of individual j ( $\tau$  years):

$$BS_j^\tau = \sum_{i \in \mathcal{B}_{j,\tau}} \rho_{j,i}$$

- BS **Low** + FS **High**:
  - **Innovative style**
  - A style that was novel and influenced the others

- **Forward Similarity** of individual j ( $\tau$  years):

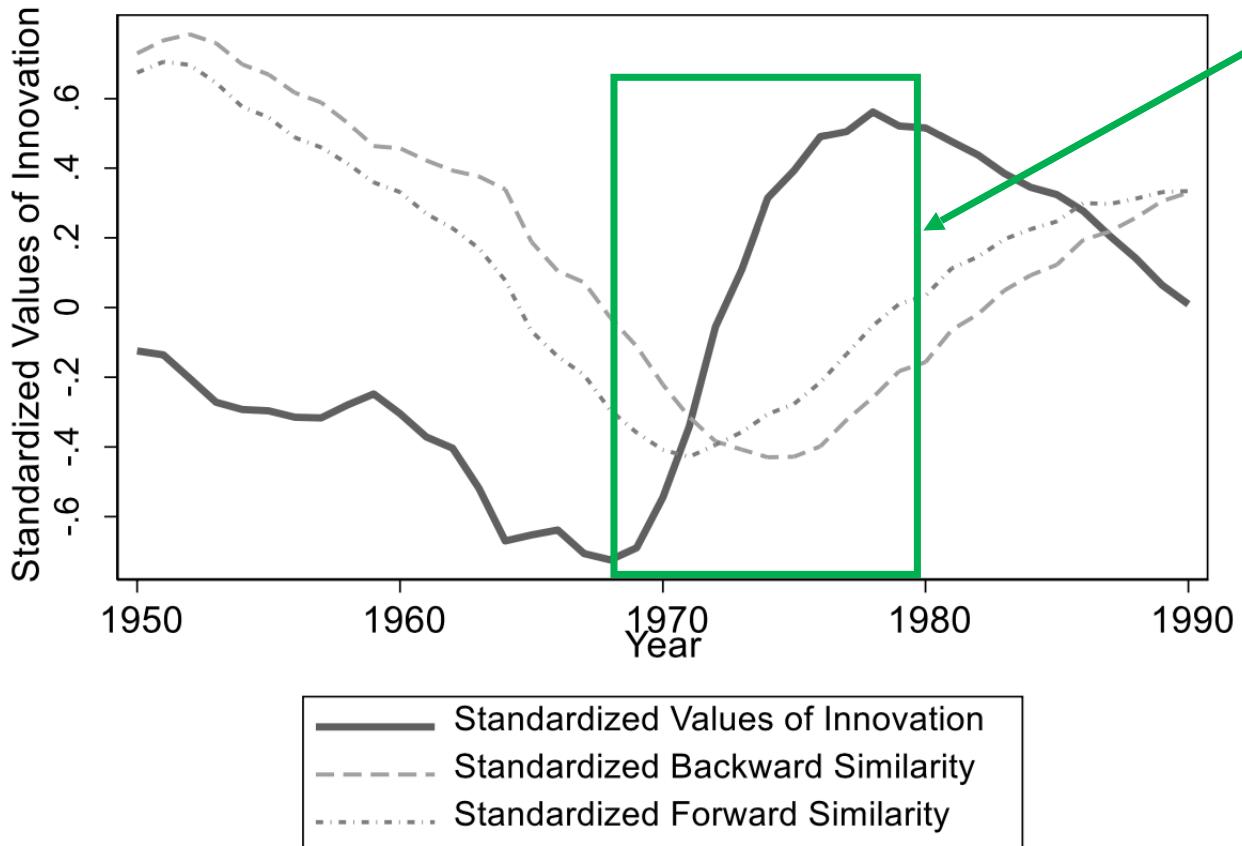
$$FS_j^\tau = \sum_{i \in \mathcal{F}_{j,\tau}} \rho_{j,i}$$

- BS **Low** + FS **Low**
  - Failed innovation
  - A style that was novel but didn't catch up

- **Innovation score** of individual j:  $q_j^\tau = \frac{FS_j^\tau}{BS_j^\tau}$

# Innovation: 5-year window

Figure 6: Influential Innovation in Style over Time, Decomposed into Forward and Backward Similarity



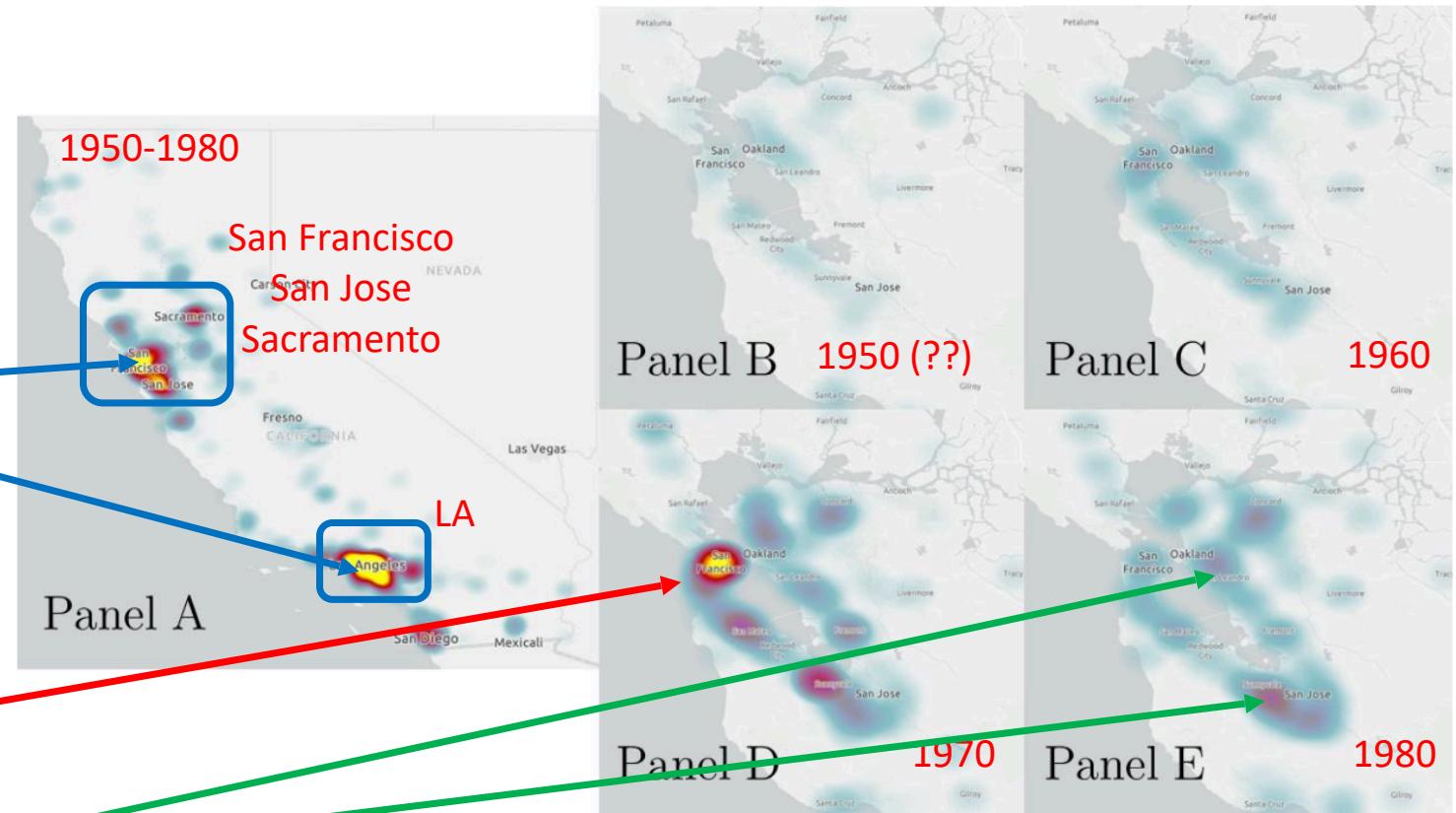
- Innovation of  $j$ :

$$q_j^\tau = \frac{FS_j^\tau}{BS_j^\tau}$$

# Culturally leading areas

- Overall "centers of new style": SF+LA
- San Francisco dominates the 70's:
  - Hippie movement
  - Haight-Ashbury scene
- San Jose and Oakland dominate the 80's

Figure 7: Kelly et al. Measure of Innovation in California, 1960-1990

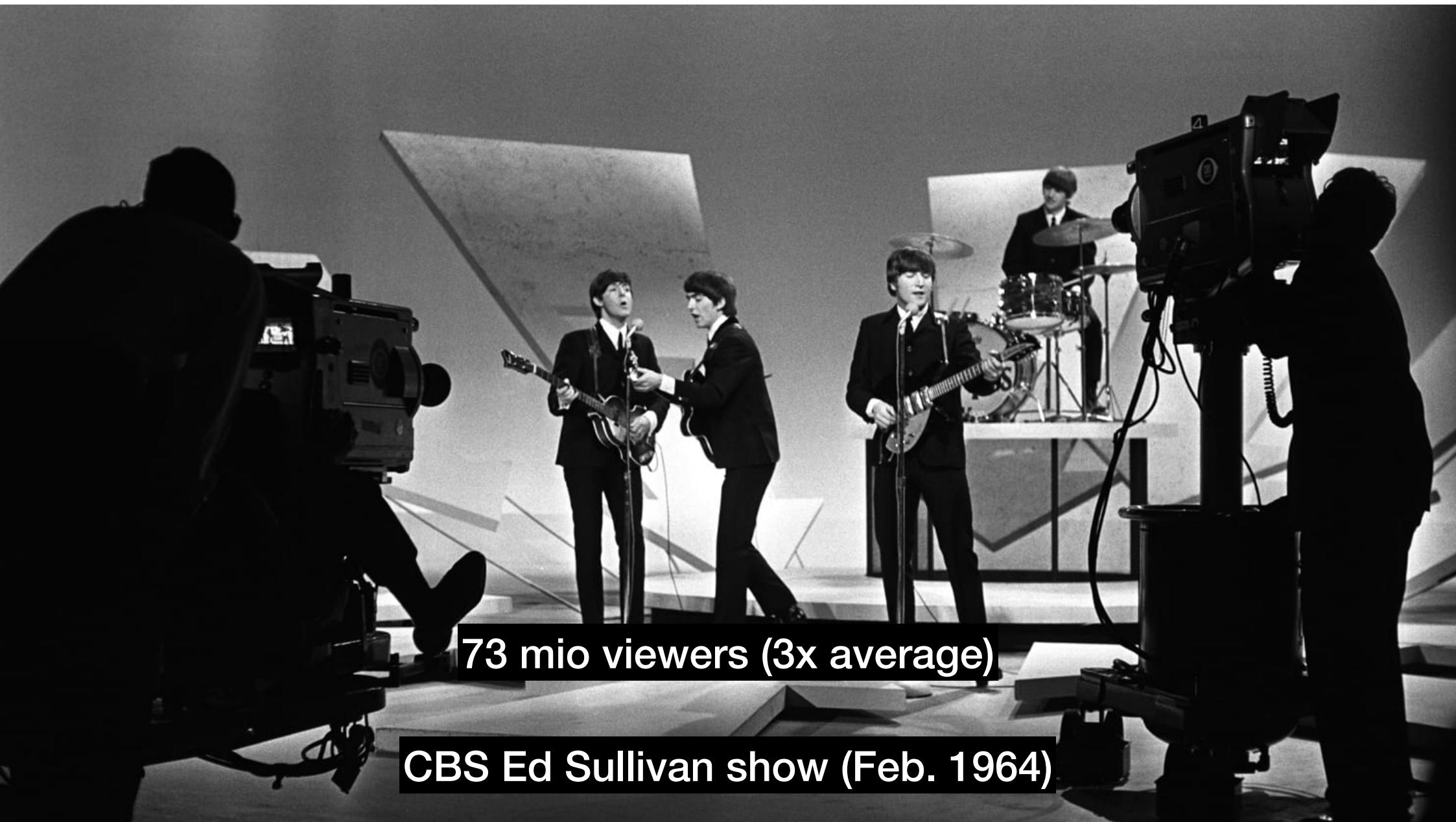


Note: For 25% of the images in California, we calculate the innovation index using a five year window forwards and backwards. We calculate city averages of innovation for each year from 1950 to 1980. Panel A shows a heat map of innovation according to the Kelly et al. measure for the period as a whole; Panel B is for 1960, C for 1970, and E for 1980.

Can the data detect  
rapid cultural change?



Beatles 1963



73 mio viewers (3x average)

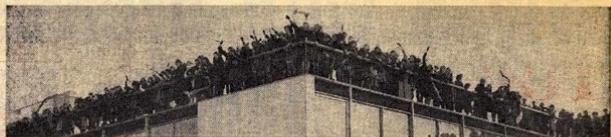
CBS Ed Sullivan show (Feb. 1964)

# Daily Mirror

3d. Saturday, February 8, 1964

No. 18,704

## Goodbye, Britain—Hello New York



Fans on a roof at London Airport wave goodbye to the Beatles yesterday.

# YEAH! YEAH! U.S.A!



That old Beatlemania hits New York . . . a screaming girl tries to get nearer the Beatles.



February - 2.5 mio records sold

April - beatles singles occupy place 1-5 record sales

## FATHER FLIES TO GET IRENE

PRINCESS Irene of Holland, whose romance has started a constitutional crisis, is going home today.

It was announced last night that her father, Prince Bernhard, would fly to Spain to pick her up.

And in Madrid, the Spanish capital, Irene's secretary stated early to-

Engagement news soon'

Royal family is gathered for an important meeting when Irene arrives today. The announcement that Irene would be returning home today said that she had been spending several days in the house of Irene—who recently be-

From BARBIE HARDING  
New York, Friday

**FIVE thousand**  
screaming, chant-  
ing teenagers—most  
of them playing  
truant from school  
—gave the Beatles  
a fantastic welcome  
here today.

More than 100 extra  
police were on duty to  
control the crowd as  
the group's jet landed  
at the John F. Kennedy

**5,000 scream  
'welcome' to  
the Beatles**

crowd rivaled anything  
seen since the Martin  
Luther King funeral  
returned from Korea.

The airport Press confer-  
ence, which followed the  
Beatles' arrival, was chaos.  
Hundreds of reporters  
and photographers, plus  
several V.C. cars, had the  
room bursting at its seams.

### Money

The world has gone mad,"  
There were screams and  
shouts as their guitars  
appeared on a luggage  
trolley.  
And a veteran airport  
employee said: "I saw it—  
but I don't believe it."  
As the Beatles waved, There were fresh squalls

Part of the question-and-  
answer period between re-  
porters and Beatles went  
like this:

"Do you sing some-  
thing?"

John Lennon: "No!"

"Can you sing?"

"Not without money."

"How much money?"

# Maloney Fires No-Hitter\* at Cubs 1-0

See 4  
Page 1

Written and Edited  
with Your Confidence

# THE HOUSTON POST

\*\*\*\*\*  
**SPORTS**  
**FINAL**

HOUSTON 1, TEXAS, FRIDAY, AUGUST 26, 1965

EAD. NUMBER 11,218

FOUR SECTIONS

DEAL-WANT ADS

TELEPHONE: FA 1-3111

Published Every Morning in the Houston Post, Dallas  
Morning News, and San Antonio "Express-News".

TEN CENTS

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BOB NASH  
and Weather

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X-15 flight was  
by E. E. Ochsner  
General at the

## MANIA

# 300 Beatle Fans Taken to Hospital

Singers  
Protected  
By Armor

By GEORGE CHRISTIAN

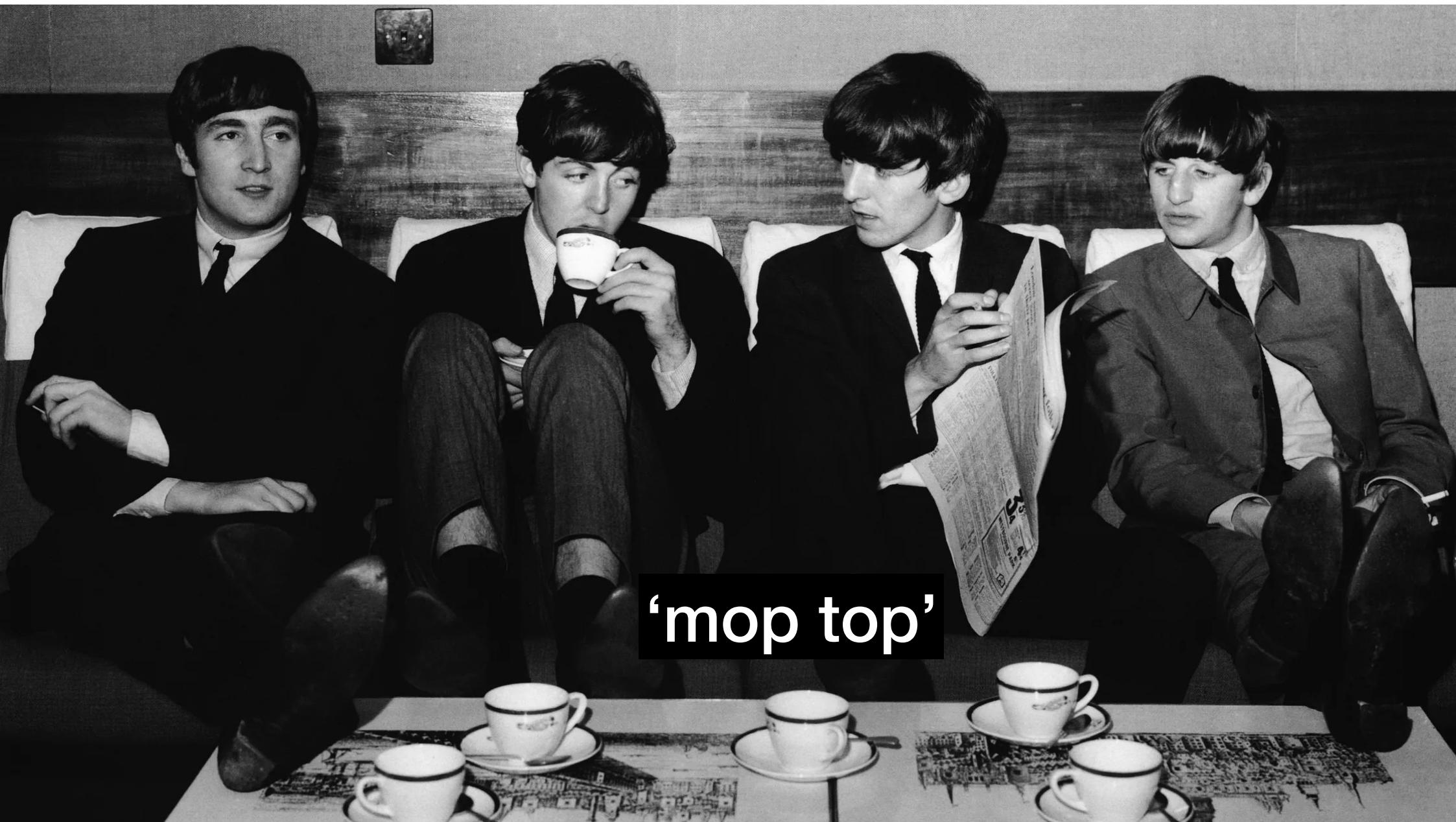
**Some Parents Secret Beatle  
Fans, Psychiatrist Claims**

By LYN BILLIMORE  
Post science writer

A lot of parents are secret  
fans of the Beatles. The singers  
have an image of innocence

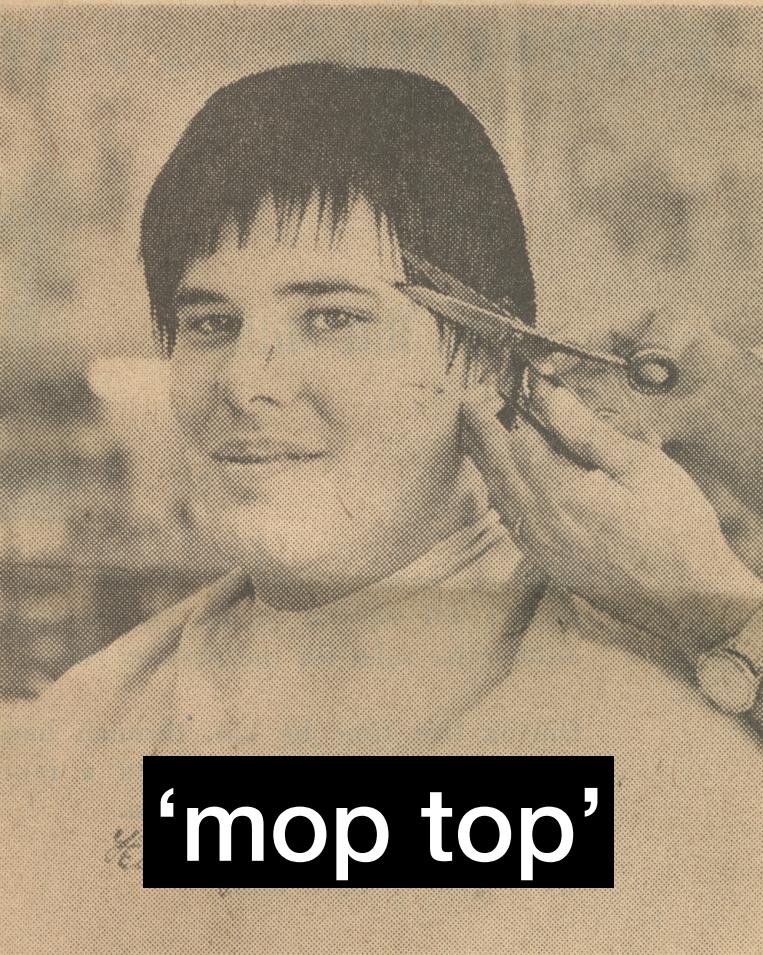
and love, aging and parents  
have a correspondence with the  
British Beatles. The singers  
have an image of innocence

And some psychiatrists  
might think there is some serious  
harm in all of this, but  
I don't really know," he said.



'mop top'

# Bugged By Beatles



'mop top'

Frederick F. Burrell, 21, of 821 Packard went right out Monday and bought a wig styled like hairdos of the members of the Beatles music combo, but found it needed a bit of trimming to suit him. The "haircut" was done at the Dascola Barbershop in Arborland. Why was Burrell, a sopho-

more at Eastern Michigan University in Ypsilanti, so eager to buy the wig? It seems that his girl friend is a Beatles fan and her enthusiasm was heightened by watching them on television Sunday night. "If I can't beat them, I'll join them," Burrell commented.

## BOY FACES SUSPENSION —

### Beatle Haircut Out At School

A 13-year-old boy who wants to be a musician or an actor is going to try Monday to get enrolled in school with a "sort of Beatle haircut."

He's going to try to enroll in the eighth grade at Orange Glen elementary school.

The boy — Donald Rogers of 1815 Summit Drive — hasn't been to a barbershop in six months but has let "almost anyone around" cut his hair on occasion. The result has been a rather neat, bowl-like haircut.

The boy is the son of Mrs. Nellie McHenry. His stepfather is George McHenry, a project engineer at General Dynamics.

Donald, informed that he would have to sport a more usual haircut, went to see Ron Jahelka, the new Orange Glen principal. Mrs. McHenry says that Donald told her he was informed by Jahelka that if he came to school Monday with the controversial haircut he would be taken home. If he returned to school still with the haircut, he would be suspended. Mrs. McHenry quotes him as saying he was told. And if he went back a third time, she related, he understood he would be expelled.



DONALD ROGERS,

13-year-old Escondido boy, is shown here with his "sort of Beatle haircut" which he plans to wear to Orange Glen School on opening day Monday. He says he has been told he'll be returned home if he shows up with it at school.

\* \* \*

# Hair Style Classifier

p = mop top probability

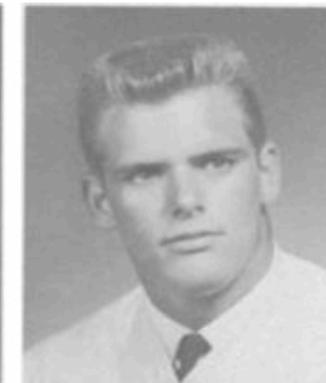
Accuracy 83%



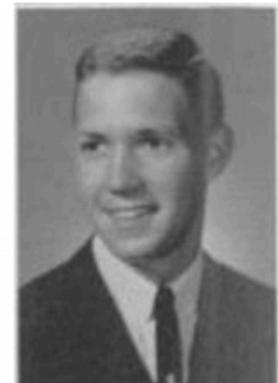
p = 0.01



p = 0.06



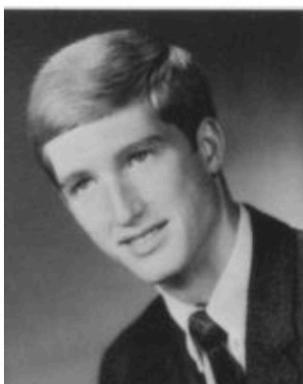
p = 0.15



p = 0.25



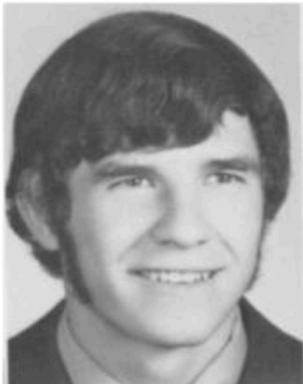
p = 0.37



p = 0.52



p = 0.64



p = 0.75

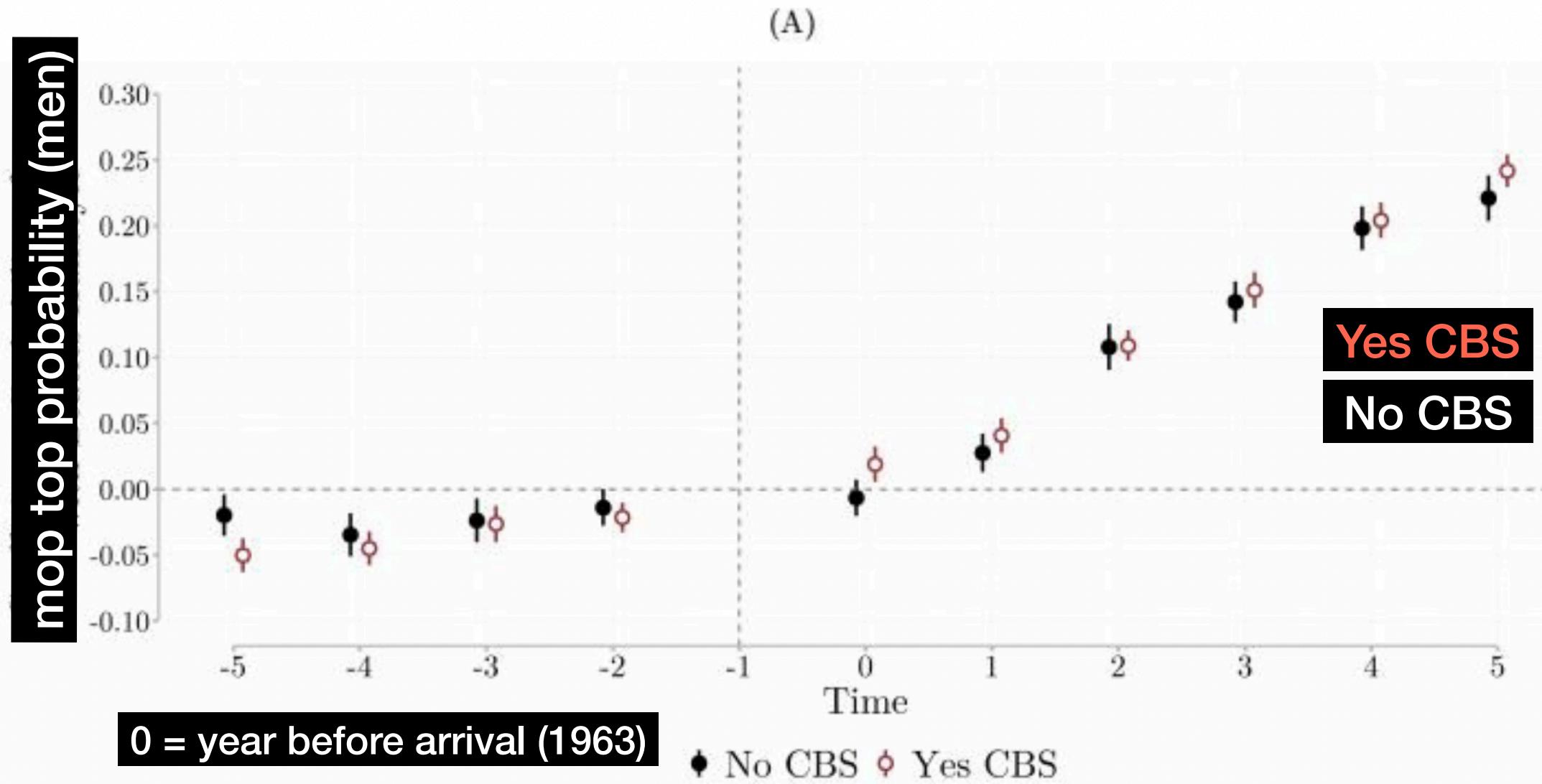


p = 0.89



p = 0.95

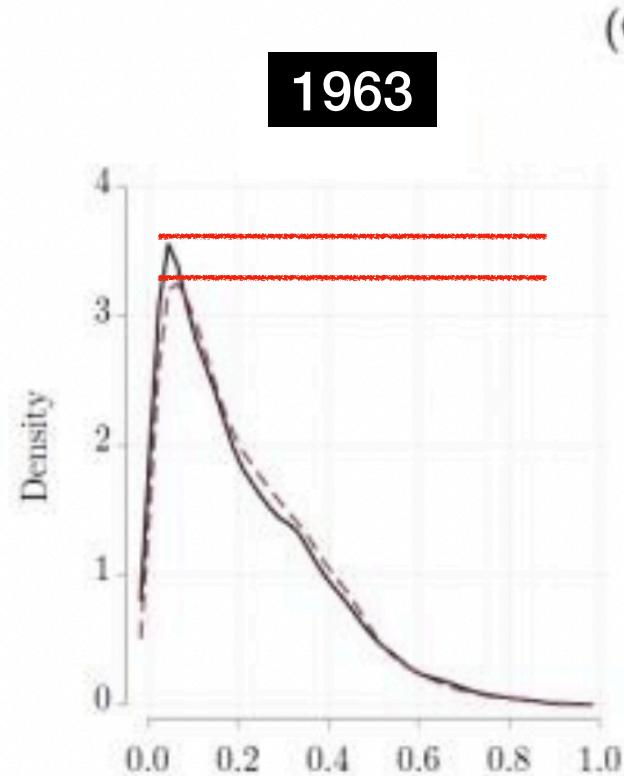
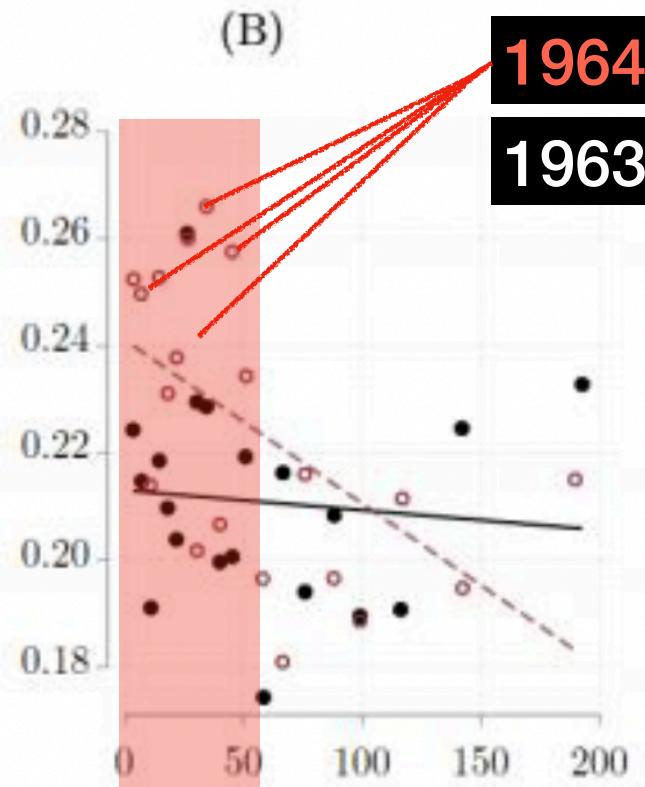
Figure 8: Beatles-style “Mop-Top” Hair in High School Senior Portraits



	No CBS	Yes CBS	Difference (No - Yes)
Total population, 1960	62807.705	172100.547	-109292.842**
Share of men, 1960	0.500	0.494	0.006**
Share non white people, 1960	0.092	0.089	0.004
Share of population (14 to 17) in schooling , 1960	0.869	0.877	-0.007
Share urban population, 1950	0.354	0.520	-0.166**
Unemployment Rate, 1950	0.042	0.041	0.001
Observations	319	318	

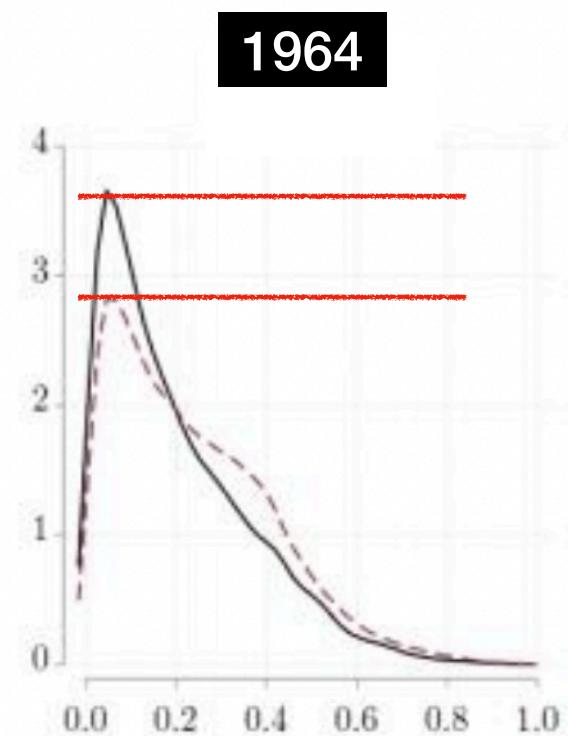
Descriptives are done at the county level. Table reports means and differences in demographic variables between CBS and No CBS group. We use Demographic Variables from Census 1950 and 1960 available at NHGIS. As the variable CBS/No CBS is constructed at high school level, there are some counties that have school with CBS signal and schools without CBS signal. Only counties without any school with CBS signal are considered as No CBS counties.

mop top probability (men)



Yes CBS

No CBS



# Discussion