Analyzing the Relationship Between Poverty and Arts Participation

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Major Question

Is socioeconomic status a relatively accurate predictor of the level and extent of participation in

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Background Information & Relevance

- Between 2002 and 2017, **arts attendance declined by 21%** in the U.S., with significant drops in attendance at performances of classical music, opera, jazz, ballet, and theater.
- Among U.S. adults, arts participation drops significantly with age. For example, only **33% of adults aged 65 and older** reported attending a live arts performance in 2017, compared to **45%** of adults aged 18-44.
- Low-income students who are highly engaged in the arts are **twice as likely** to graduate college as their peers with no arts education.
- Participation in music, theater, and visual arts can improve **critical social skills** such as empathy, communication, and collaboration, which are essential for personal and professional success.

Data Sources

- Arts Participation & Income
  - National Archive of Data on Arts and Culture
- Free or Reduced Price Lunch
  - National Center for Education Statistics (NCES)

Describing the Data

- Focused on interviews that took place in 2012
  - The broader dataset had information from a variety of years
  - 2012 was chosen because its recency as well as the number of data entries comparatively
- Used 2012-13 free/reduced priced lunch as a vector for income and therefore socioeconomic status (for a family of four)

Participation data:

PARK	BOOKS	BOOKS_N
0	0	NA
0	1	NA
0	1	NA
0	0	NA
1	1	2
1	1	1

Art type indicated by variables

Binary: (1/0) Indicating yes or no to participation in the last 12 months
nominal

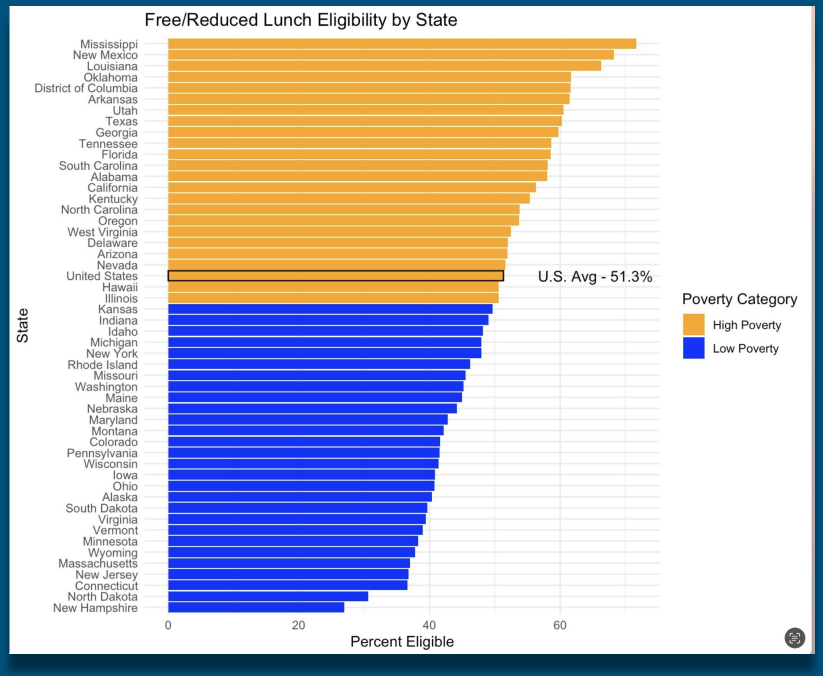
_N: (Frequency) Indicating amount of times participated in the last 12 months
discrete

Lunch data:

```
> head(lunches)
# A tibble: 6 × 5
  State         `Num Students` `Num Eligible` `Percent Eligible` `Poverty Category`
  <chr>                  <dbl>          <dbl>              <dbl> <chr>
1 United States       49084316       25188294               51.3 High Poverty
2 Alabama               740475         429604               58.0 High Poverty
3 Alaska                131483          53082               40.4 Low Poverty
4 Arizona               990378         514193               51.9 High Poverty
5 Arkansas              486157         298573               61.4 High Poverty
6 California           6178788        3478407               56.3 High Poverty
```

Var needed: percent eligible ***continuous***

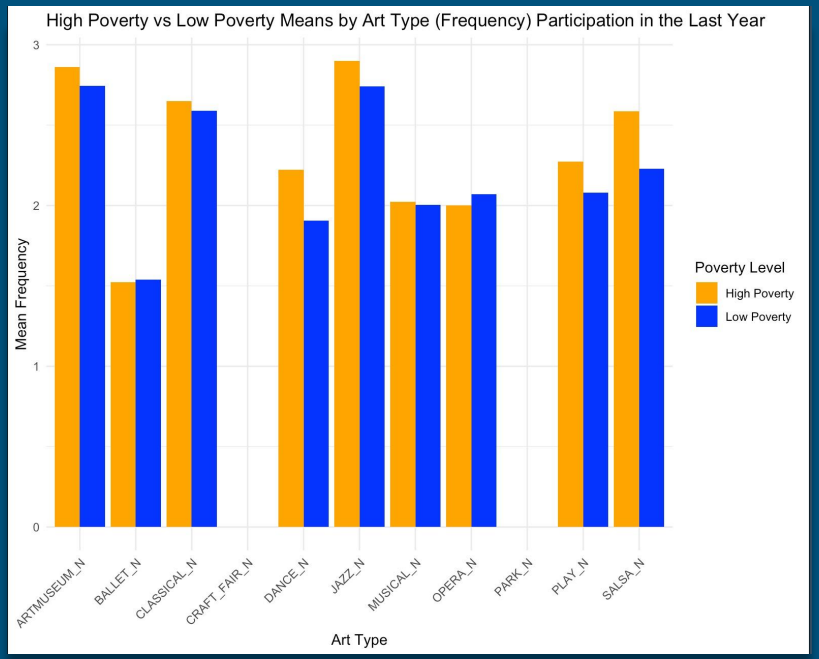
Free/Reduced Lunch eligibility by state



For our study, we're representing "High Poverty" states as those with over 50% of students eligible for free or reduced school lunch.

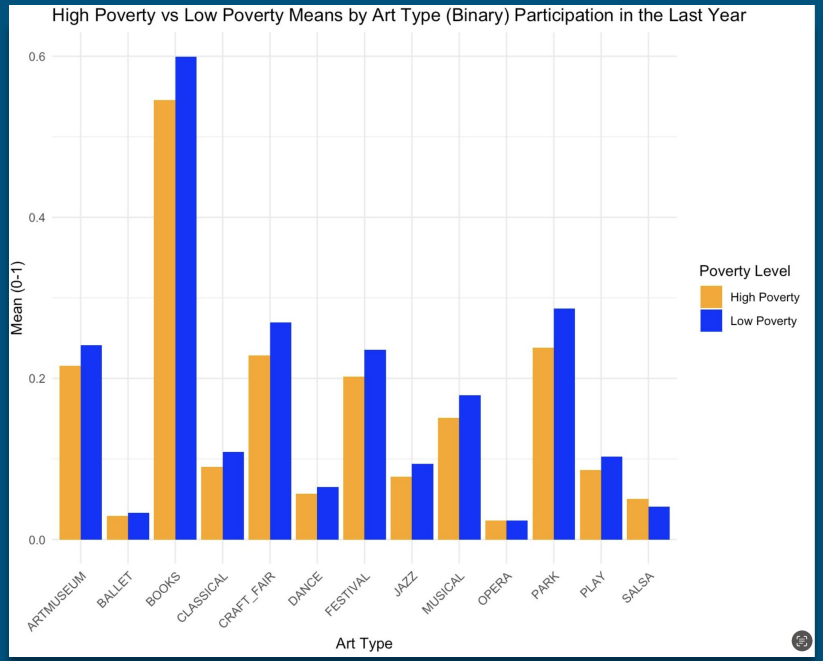
The country is divided roughly in half by this metric.

High vs Low Poverty Means by Art Type (Frequency)



	art_type	high_poverty_means	low_poverty_means
ARTMUSEUM_N	ARTMUSEUM_N	2.860269	2.743160
BALLET_N	BALLET_N	1.522449	1.540193
CLASSICAL_N	CLASSICAL_N	2.649194	2.590597
JAZZ_N	JAZZ_N	2.900312	2.740614
SALSA_N	SALSA_N	2.587530	2.227749
MUSICAL_N	MUSICAL_N	2.023828	2.002966
PLAY_N	PLAY_N	2.271967	2.080579
OPERA_N	OPERA_N	2.000000	2.070093
DANCE_N	DANCE_N	2.222458	1.904605
PARK_N	PARK_N	NaN	NaN
CRAFT_FAIR_N	CRAFT_FAIR_N	NaN	NaN

High vs Low Poverty Means by Art Type (Binary)



	art_type	high_poverty_means	low_poverty_means
FESTIVAL	FESTIVAL	0.20227681	0.23556263
CRAFT_FAIR	CRAFT_FAIR	0.22831816	0.26964267
ARTMUSEUM	ARTMUSEUM	0.21582475	0.24152901
PARK	PARK	0.23787224	0.28660999
BALLET	BALLET	0.02955195	0.03303779
CLASSICAL	CLASSICAL	0.08990367	0.10854018
DANCE	DANCE	0.05678158	0.06513936
JAZZ	JAZZ	0.07764343	0.09402157
SALSA	SALSA	0.05037424	0.04073063
MUSICAL	MUSICAL	0.15072084	0.17898176
PLAY	PLAY	0.08596638	0.10304054
OPERA	OPERA	0.02354340	0.02316521
BOOKS	BOOKS	0.54545455	0.59965819

Hypothesis Test

H0: There is no association between poverty level and arts participation.

(u1 - u2 = 0)

Ha: There is an association between poverty level and arts participation.

(u1 - u2 -= 0)

R can run non-pooled t tests easily!

```r
# run t-tests for binary participation variables (art types)
binary_t_test_results <- sapply(arts_vars, function(var) {
  t.test(high_participation[[var]], low_participation[[var]], na.rm = TRUE)
})

# run t-tests for each frequency-based participation variable
# remove two N/A variables from arts_n_vars
clean_arts_n_vars <- arts_n_vars[!(arts_n_vars %in% c("PARK_N", "CRAFT_FAIR_N"))]
# now, run t-tests on the cleaned arts_n_vars
frequency_t_test_results <- sapply(clean_arts_n_vars, function(var) {
  t.test(high_participation[[var]], low_participation[[var]], na.rm = TRUE)
})
```

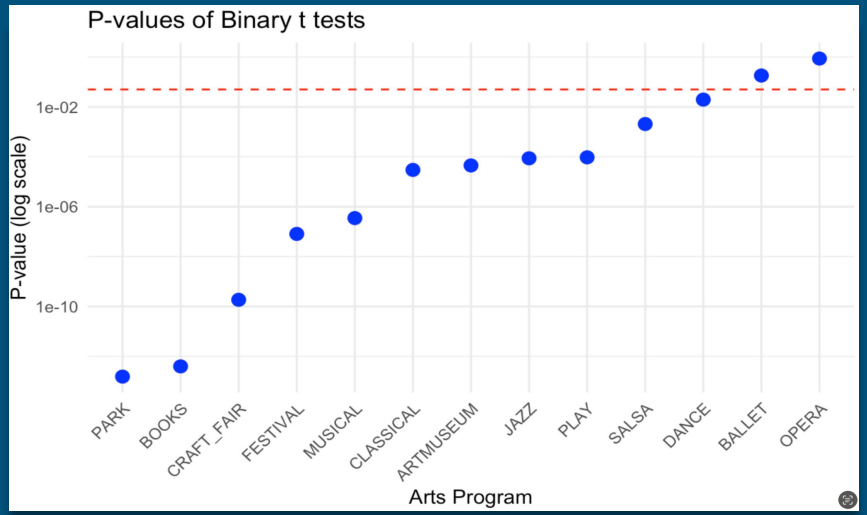
Example output:

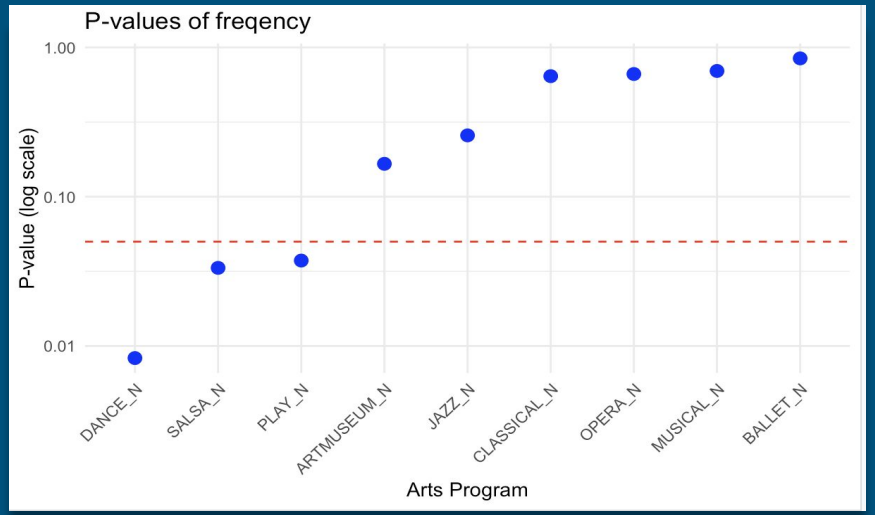
	FESTIVAL
statistic	c(t = -5.36752174631558)
parameter	c(df = 17685.0866129758)
p.value	8.08318818780678e-08
conf.int	c(-0.04544105260853, -0.0211305878591431)
estimate	c(`mean of x` = 0.202276812462554, `mean of y` ...
null.value	c(`difference in means` = 0)
stderr	0.00620133868236023
alternative	two.sided
method	Welch Two Sample t-test
data.name	high_participation[[var]] and low_participation[[v [...]

All art types with a p-value under 0.05 provide evidence to reject the null hypothesis

*'Festival' has a p-value of 8*10^-8, which is much smaller than .05, suggesting an association between poverty and arts participation.*

P-value comparison (line indicates 0.05)





Almost all art types reject the null hypothesis for yes/no answers. There is enough evidence to claim that people in lower poverty states partake in more events (once) than people in higher poverty states.

The sample frequency of dance, salsa, and play attendance provides enough evidence to claim there is an association between poverty and attendance rate. These show people in higher poverty attending events more frequently than people in lower poverty states.

Conclusion

- Data addresses the question: Is socioeconomic status a predictor of arts participation?
- Clear linkage found between arts participation and socioeconomic status.
- Affluent individuals had more opportunities to try artistic pursuits.
- Lower-income individuals showed more repeated and ongoing participation.
- Participation may serve as catharsis or rebellion for lower-income individuals.
- Project limitation: Lack of qualitative data for deeper understanding.
- Future studies should include testimonial questions to explore individual motivations for engaging in the arts.

Sources

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