GRAMMY WINS AND MUSIC REVIEW

A Causal Analysis of RateYourMusic Review Sentiment

Group 13

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Outline

Motivation

Grammy Awards: the major music competition in the world

- Created in 1959, this music award covers various genres of music including pop, rock, rap, classical, jazz, and more.
- The awards are voted on by members of the Recording Academy, which consists of musicians, producers, engineers, and other industry professionals.
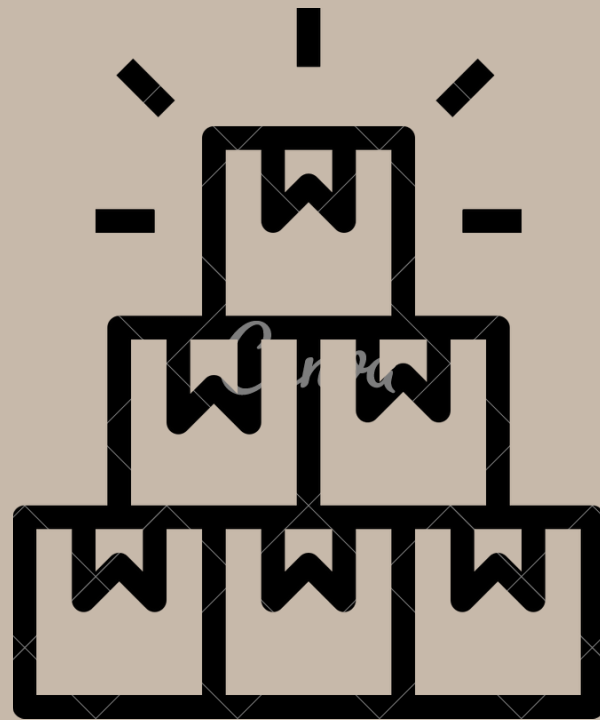- Audience of 18 Mln in 2024

What is the public's response to music industry recognition?

Research Question:

How does winning a Grammy impact public sentiment?

Hypotheses

Quantitative Increase?
Number of reviews

Grammy winners are highly mediatized, should reach new listeners

Qualitative Increase?
Reviews' sentiment and users' ratings

Role of media in shaping public opinion.

Albums Dataset

Year	Award Category	Album	Artist

Kaggle Dataset with Albums nominated for the Grammy from 1959 to 2019

Disregard Albums before 2002, as no reviews were posted before that date

Manually add the exact date of the Grammy ceremony for each year

Use Regex expressions to generate the URL of the review page for each album

Scraping

With Selenium's XPath, repetitively identify elements of interest using containers' attributes and their content.
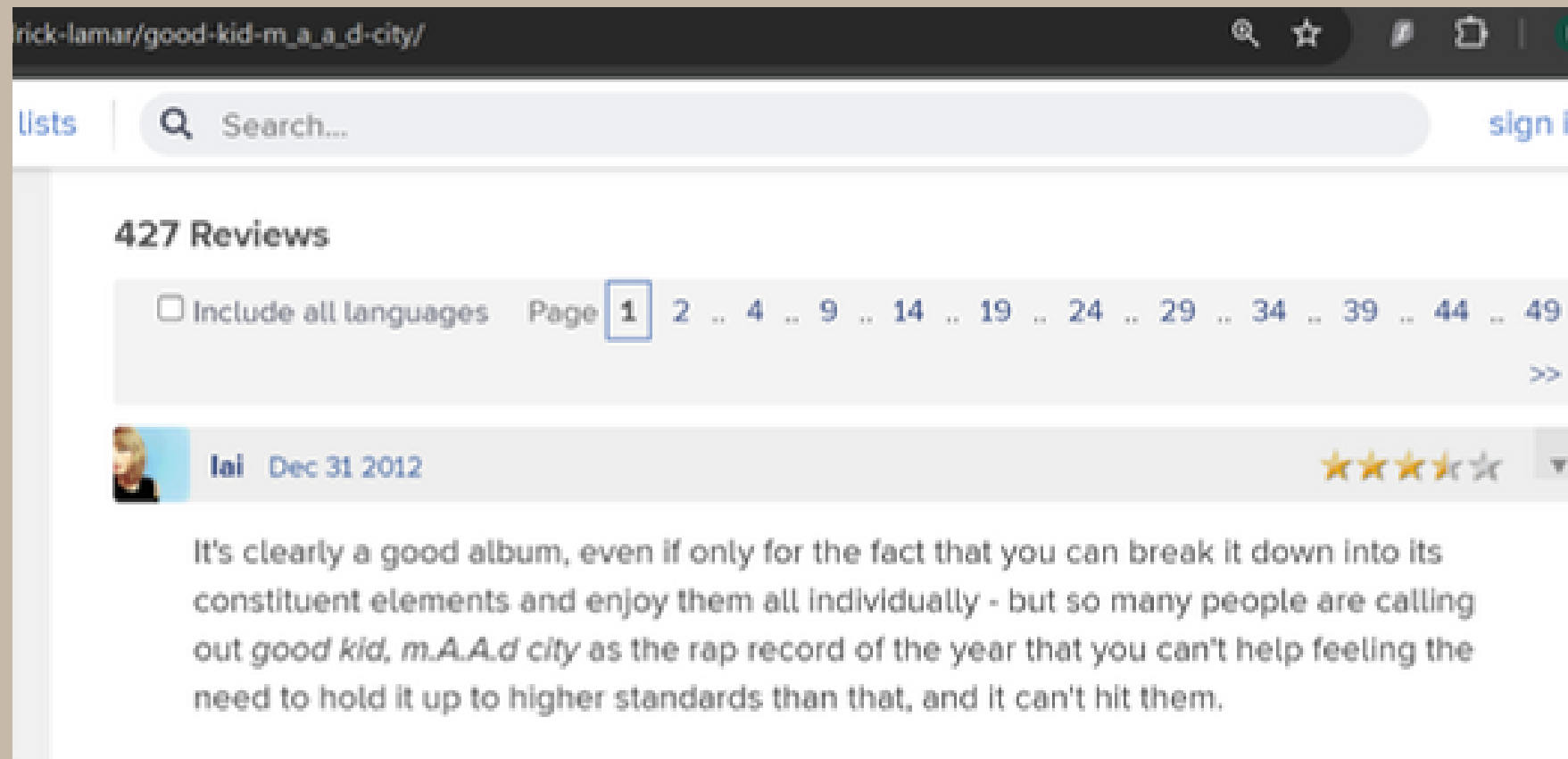
For all reviews of the current page extract:
- review_id
- rating
- text of the review

Is there another page of reviews to click?

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rick-lamar/good-kid-m_a_a_d-city/

lists   Q Search...   sign in

427 Reviews

☐ Include all languages   Page 1   2 .. 4 .. 9 .. 14 .. 19 .. 24 .. 29 .. 34 .. 39 .. 44 .. 49

>>

Iai Dec 31 2012   ★★★½☆ ▼

It's clearly a good album, even if only for the fact that you can break it down into its constituent elements and enjoy them all individually - but so many people are calling out *good kid, m.A.A.d city* as the rap record of the year that you can't help feeling the need to hold it up to higher standards than that, and it can't hit them.

Sentiment Analysis

Pre-trained roBERTa large language model (siebert/sentiment-roberta-large-english), finetuned on the English language

The output is a label ("POSITIVE" or "NEGATIVE") together with the softmax score (between 0 and 1)

Average these scores across all the reviews for a single album,
before and after the Grammy was assigned

Panel Data

Album ID	After Nomination	Winner	Sentiment Score	Users' rating	Number of reviews
0	False	False	0,48	3.5	33
0	True	False	0.20	5	39
1	False	True	0.07	4	12
1	True	True	0.89	4	23
2	False	True	0.34	4	13
2	True	True	0.65	5	29

Exploratory Analysis I
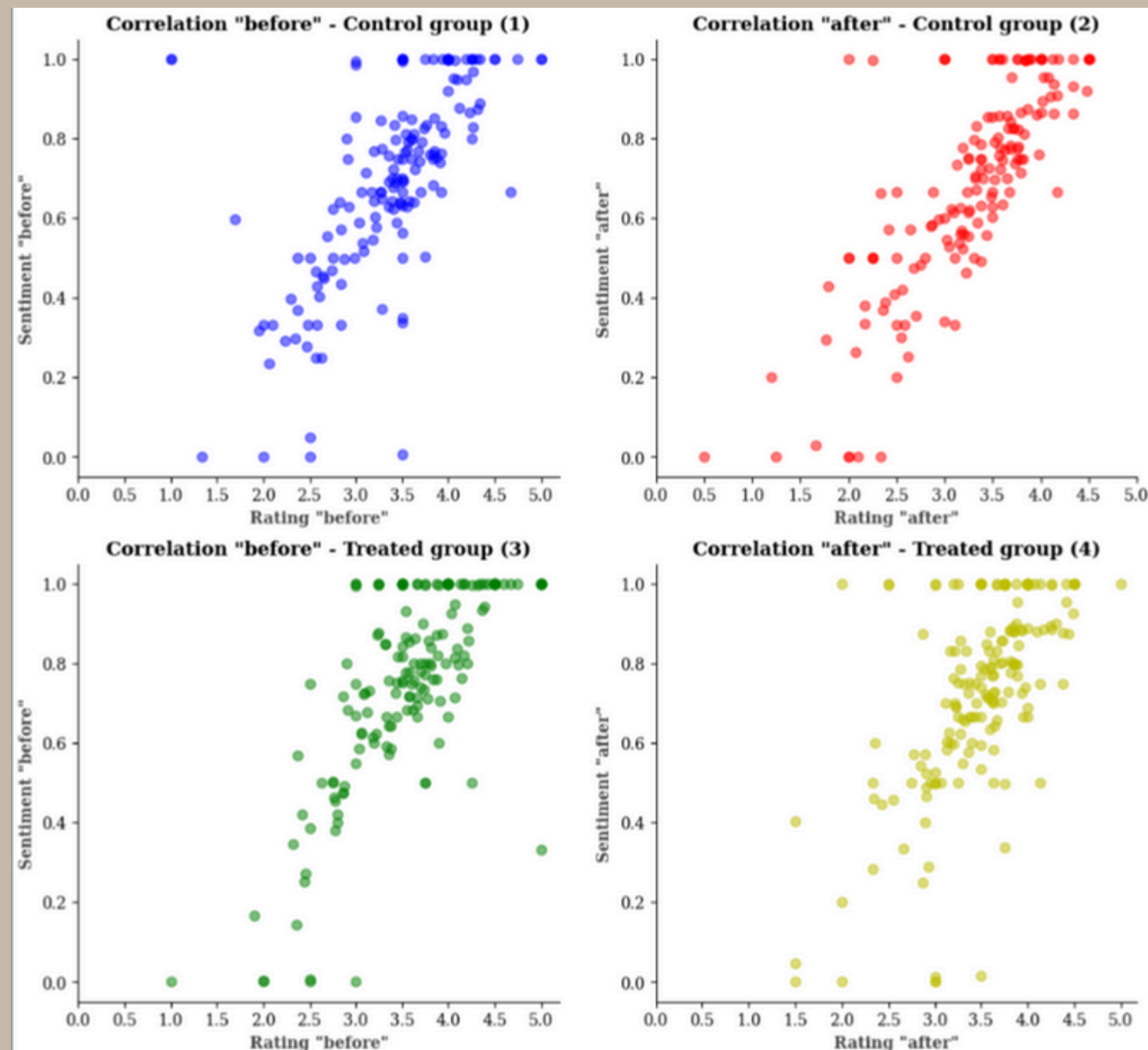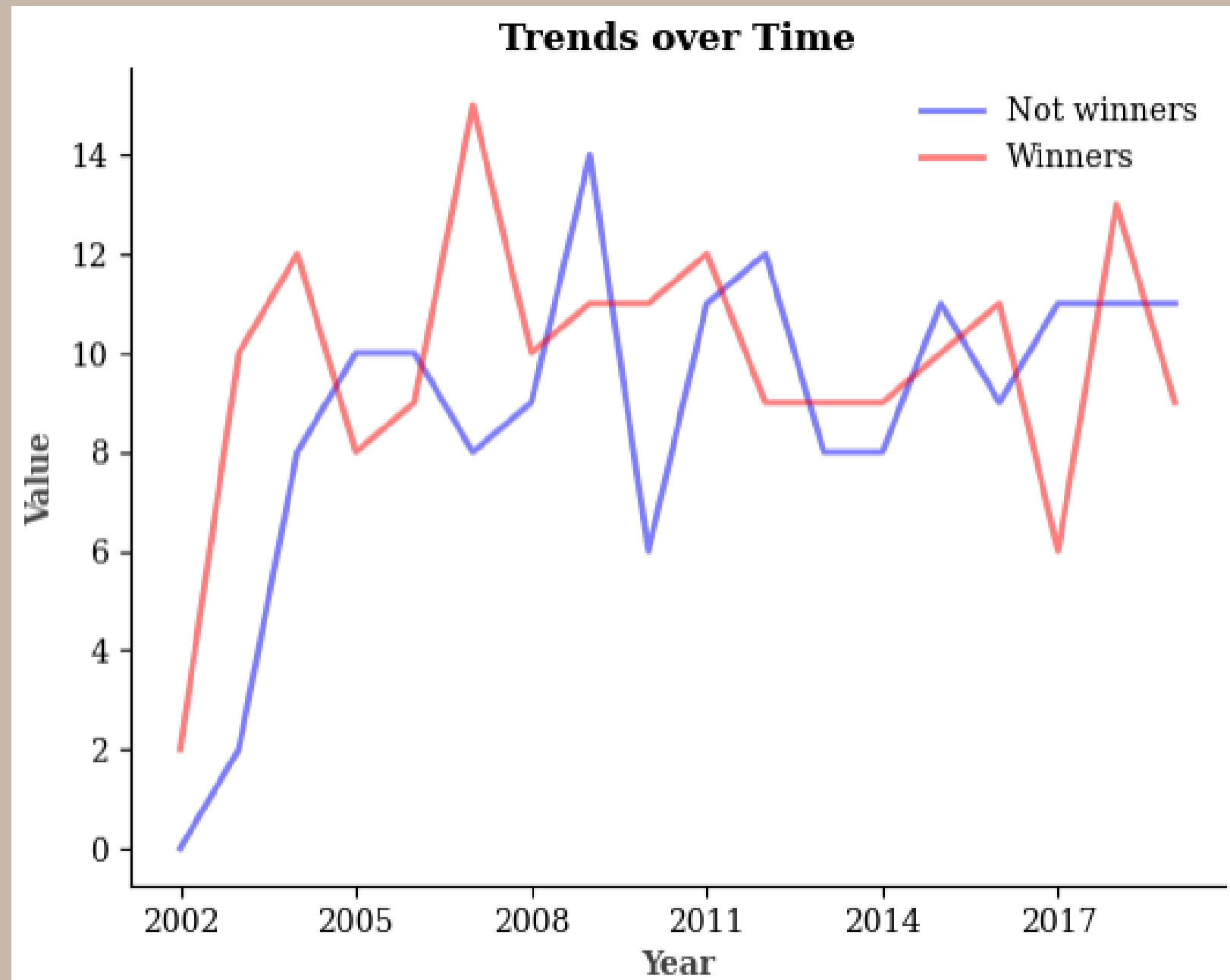

Rating v. Sentiment Score

- In DID analysis, we examine four distinct groups:
  - Control-pre
  - Control-post
  - Treated-pre
  - Treated-post
- Positive correlation between rating and sentiment scores

Sentiment Analysis performed correctly

Exploratory Analysis II
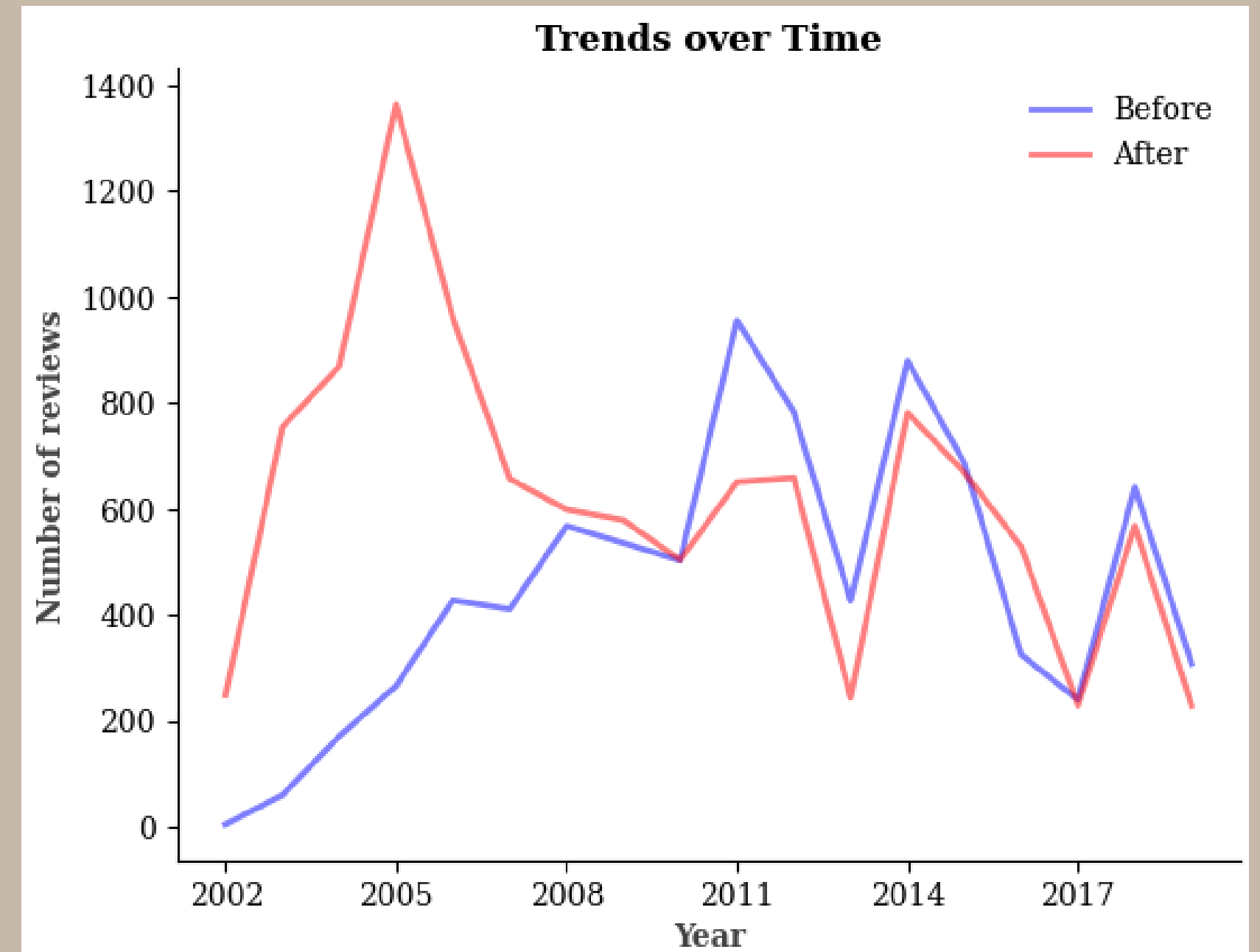
Methodology: Difference in Differences

Causal Inference

Average effect of treatment is estimated by differencing the mean outcome for the treatment and control groups over time and differencing the mean outcome of these groups.

Assumptions

- Balanced dataset of treated and control units
- Balanced representation of user engagement before and after the treatment period
- Quality of the counterfactuals: controls and treated units are similar except for the selection into the treatment

Results I

Table 2: Effect of Grammy Win on Sentiment Score, User Rating and Number of Reviews

	Sentiment Score	Rating	Reviews
Treated	0.077**	0.238**	-4.638
	(0.027)	(0.074)	(5.212)
Post	-0.009	-0.115	0.258
	(0.028)	(0.076)	(5.342)
TreatedPost	-0.028	-0.007	15.998*
	(0.038)	(0.105)	(7.370)
Constant	0.693***	3.377***	26.899***
	(0.020)	(0.054)	(3.778)
N	670	670	670
adj. R^2	0.015	0.032	0.012

Note: Standard Errors are in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
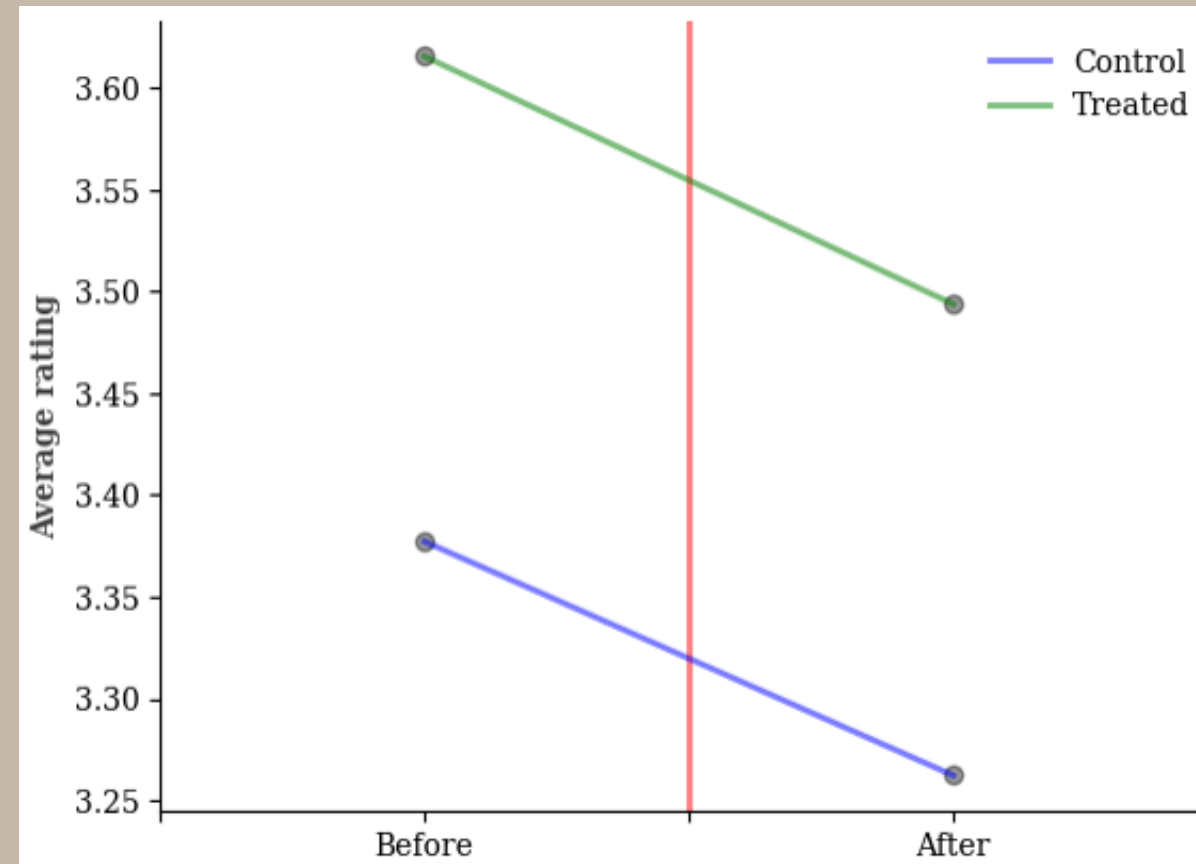
Grammy winners have a 7,7% higher sentiment score and 0,23 stars more on average

The interaction is positive and significant for the number of reviews.
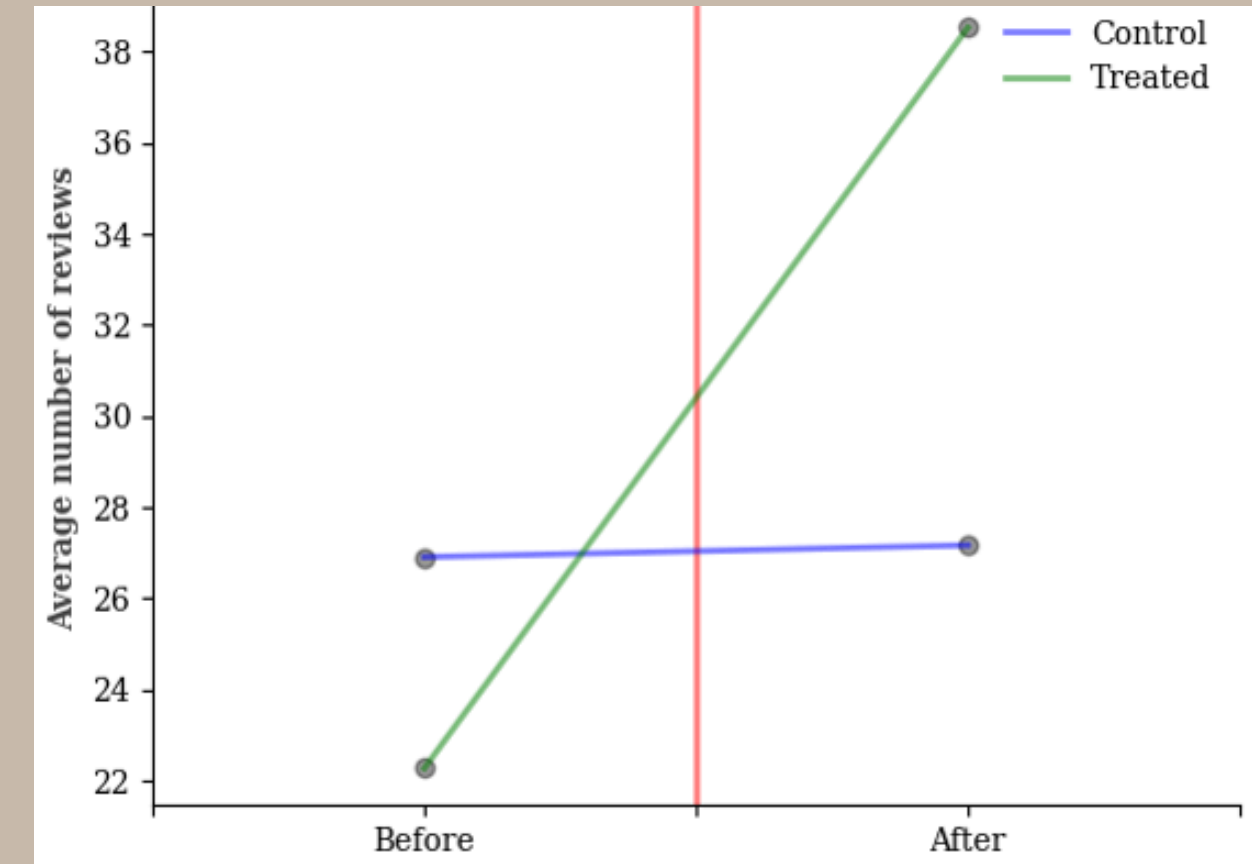**Causal effect:** winning a Grammy leads people to comment more

Results I - Graphically
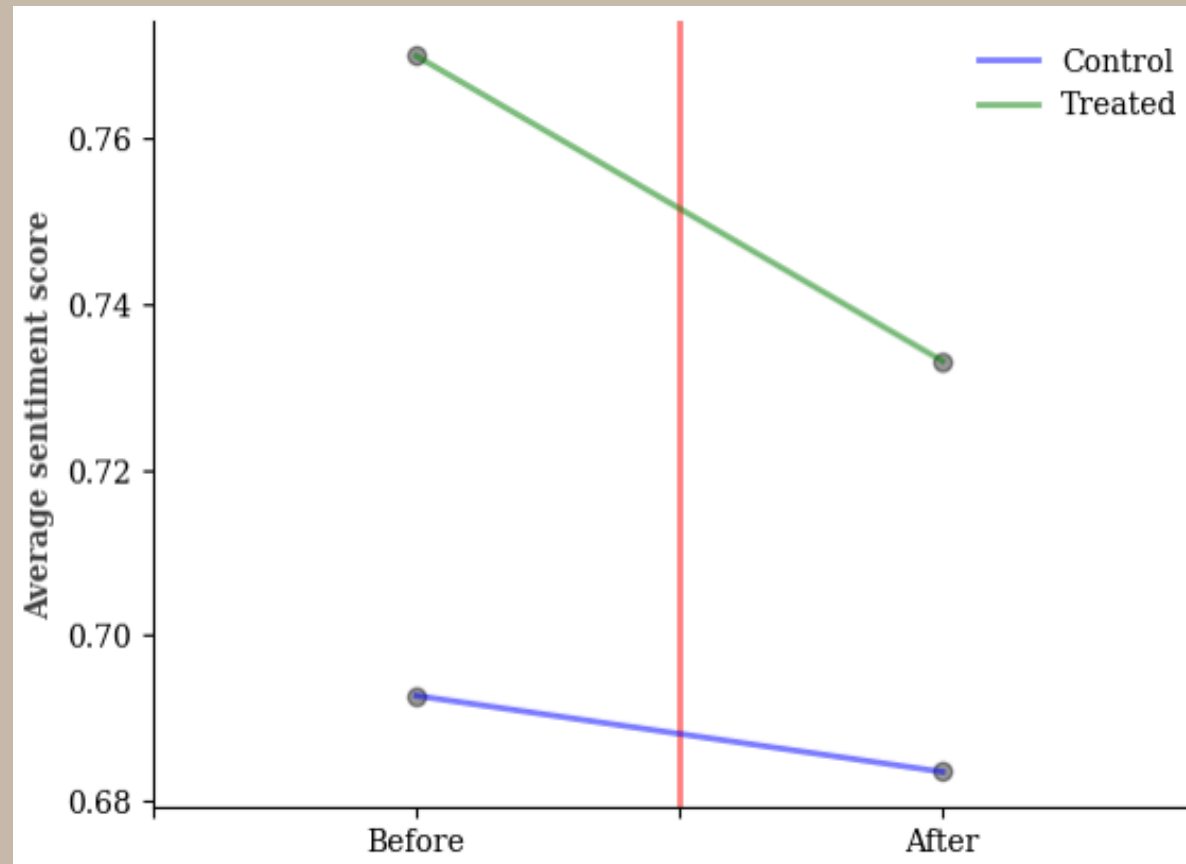
Treatment Effect on Sentiment Score (not significant)

Treatment Effect on Rating (not significant)

Treatment Effect on Number of Reviews (significant)

Results II - Weighted

Table 2: Effect of Grammy Win on Sentiement Score and User Rating, weighted

	Sentiment Score	Rating
Treated	0.018***	0.032**
Post	0.040***	0.087***
TreatedPost	−0.003	0.083***
Constant	0.690***	3.476***
N	19 292	19 292
adj. R^2	0.020	0.027

Note: Standard Errors are in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Interestingly, previous result from the "Treated" dummy weakened. Possibly bias due to some winnning albums with few and positive reviews.

"Post" dummy now significant and positive. We are able to see the rise in popularity.

Causal Effect: Winning a Grammy leads people to give slightly higher ratings (low in magnitude).

Results III - Heterogeneities

Table 3: Effect of Grammy Win on Sentiment Score and User Rating, by Popularity of Category

	Sentiment P	Sentiment NP	Rating P	Rating NP
Treated	0.019***	0.022***	0.047***	0.019
	(0.004)	(0.006)	(0.013)	(0.020)
Post	0.055***	-0.019*	0.176***	-0.211***
	(0.004)	(0.007)	(0.012)	(0.024)
Treated#Post	-0.018***	0.051***	0.024	0.300***
	(0.005)	(0.009)	(0.017)	(0.028)
Constant	0.700***	0.671***	3.492***	3.445***
	(0.003)	(0.005)	(0.009)	(0.016)
N	12920	6372	12920	6372
adj. R^2	0.027	0.025	0.043	0.043

Note: Standard Errors are in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Causal Effects: Sentiment is negatively impacted for Popular genres and positively impacted for Non-Popular. Rating is positively impacted for NP.

Interpretation: Winners of P categories often leads to upsets. Harsher reviews towards projects deemed unworthy of the prize. Winners of NP may expose new listeners to those albums; these people are discovering the album fully aware (ex-ante) that it has received the largest musical accolade, implying that they will likely be biased and see it in a positive light (5.1 percentage points increase).

Popular (P): "Album of the Year", "Best Alternative Music Album", "Best Contemporary R&B Album", "Best Country Album", "Best Electronic/Dance Album", "Best Pop Vocal Album", "Best Rap Album", "Best R&B Album"
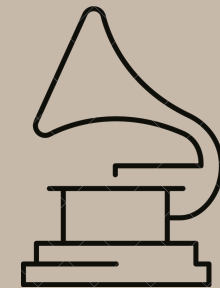
Limits and further analysis

Arguably, weak number of observations (335) having reviews and ratings for both pre and post nomination.
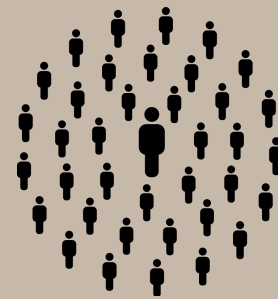
Data gathered from a single platform is probably not representative and reflects only a specific kind of user

It might very well be that winning a Grammy impacts other aspects of the music of an artist

Expand on the research question by interpreting the Grammy nomination as the treatment condition, and using similar albums in terms of popularity as a control group.

Conclusions

▶▶ Gathered a large amount of labeled data, consisting of 25,777 reviews together with its rating. Can be used to fine-tune a LLM on inferring the sentiment from album reviews.

▶▶ Significant and positive difference in the number of reviews for Grammy winner.

▶▶ The estimated effects across popular and less popular albums go in opposite directions and possibly hint at different mechanism at play

▶▶ The research has a strong methodological background, which gives us confidence about our ability to infer causality

Thank You!