

# Confirmatory Deliverable

CS1951A | Summer 2021 | SMAK

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# Reasoning



```
3 {  
4   "audio_features": [  
5     {  
6       "danceability": 0.808,  
7       "energy": 0.626,  
8       "key": 7,  
9       "loudness": -12.733,  
10      "mode": 1,  
11      "speechiness": 0.168,  
12      "acousticness": 0.00187,  
13      "instrumentalness": 0.159,  
14      "liveness": 0.376,  
15      "valence": 0.369,  
16      "tempo": 123.99,  
17      "type": "audio_features",  
18      "id": "4JpKVNYnVcJ8tuMKjAj50A",  
19    },  
20  ],  
21  "type": "audio_features",  
22  "id": "4JpKVNYnVcJ8tuMKjAj50A",  
23 }
```



# Hypothesis

Popular songs from 1990s-2010s have a higher speechiness and a lower instrumentalness than popular songs from 1960s-1990s

7 Rings, Ariana Grande



Low Instrumentalness

High Speechiness



Rich Girl, Hall and Oates



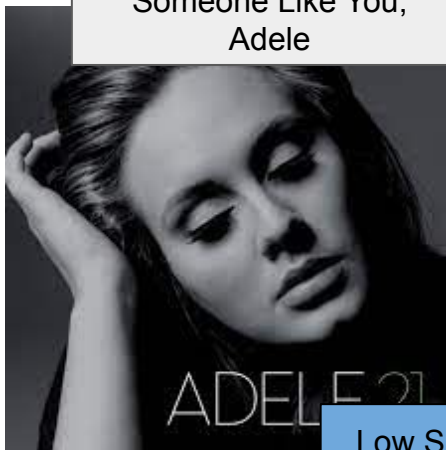
Turn Down for What, DJ Snake and Lil Jon

Another One Bites the Dust, Queen



High Instrumentalness

Someone Like You, Adele



Low Speechiness

Pumped Up Kicks, Foster and the People



Hey Jude, The Beatles



Don't You (Forget About Me), Simple Minds





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We collected data from two sources:

**Kaggle and Spotify**

# 1) Kaggle Dataset

Billboard "The Hot 100" Songs  
Dhruvil Dave

# rank	▲ song	▲ artist	# last-week	# peak-rank
1	Butter	BTS	1	1
2	Good 4 U	Olivia Rodrigo	2	1
3	Levitating	Dua Lipa Featuring DaBaby	4	2
4	Kiss Me More	Doja Cat Featuring SZA	3	3
5	Montero (Call Me By Your Name)	Lil Nas X	8	1
6	Bad Habits	Ed Sheeran	5	5
7	Leave The Door Open	Silk Sonic (Bruno Mars & Anderson .Paak)	6	1



## 2) Spotify API

```
3 {  
4     
5   "audio_features": [  
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7       "danceability": 0.808,  
8       "energy": 0.626,  
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18      "type": "audio_features",  
19      "id": "4JpKVNYnVcJ8tuMKjAj50A",  
20    },  
21  ],  
22 }  
23
```

# Assumptions/Limitations

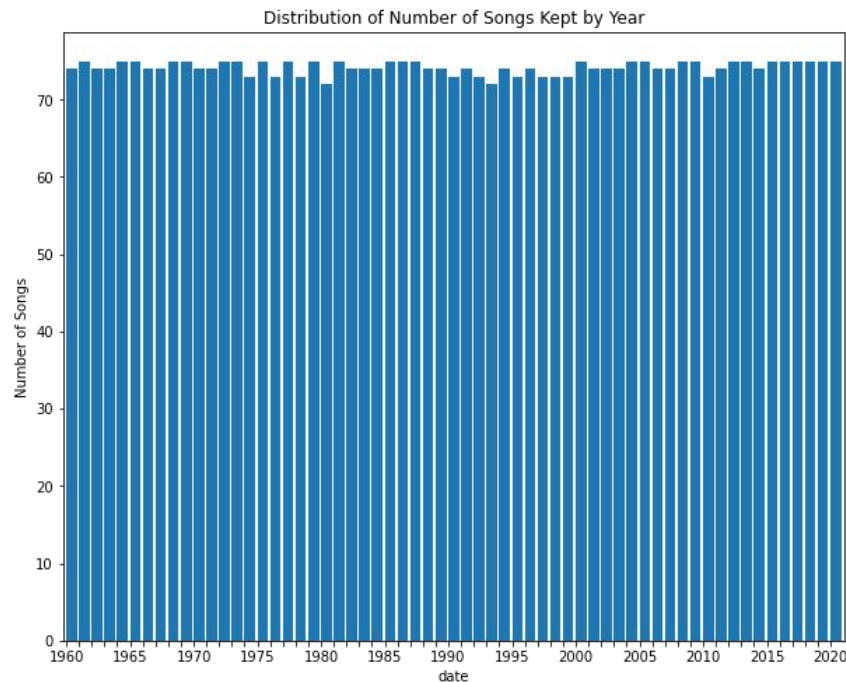
- **Only exploring popular songs in the USA**

- Cannot extend conclusions to other countries

- **Only analyzing songs on Spotify**

- 56 out of 4,725 songs removed

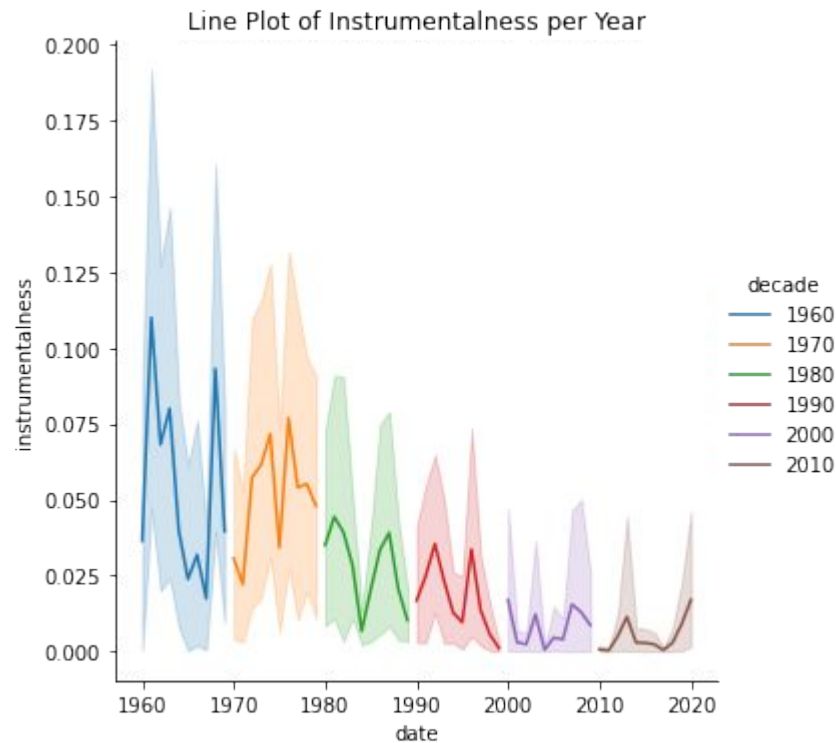
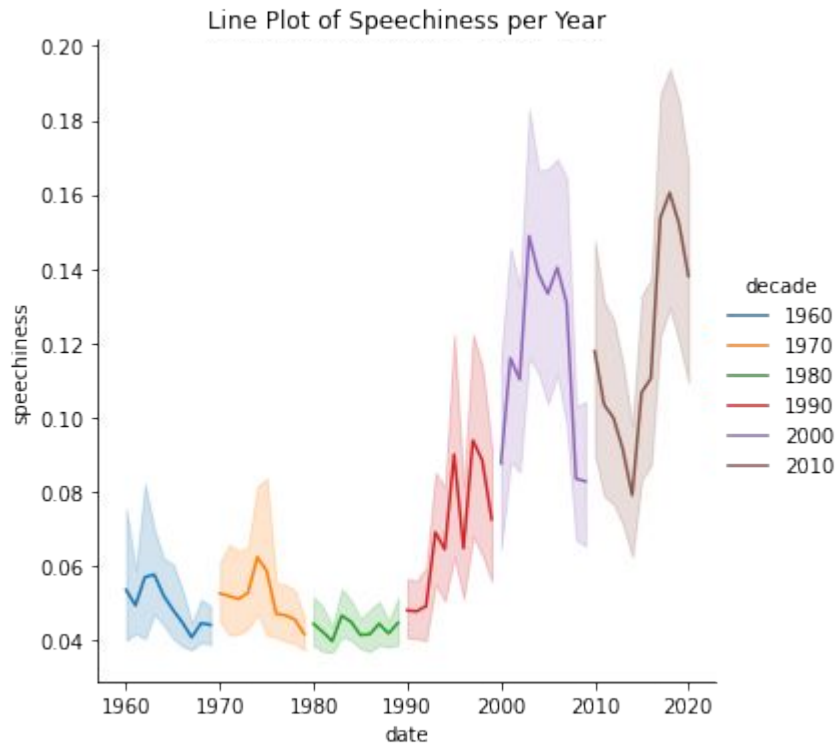
- $\leq 3$  songs removed per year
- No artist removed an abnormal amount of times.





Visualizing the Trends of  
**Speechiness +**  
**Instrumentalness**

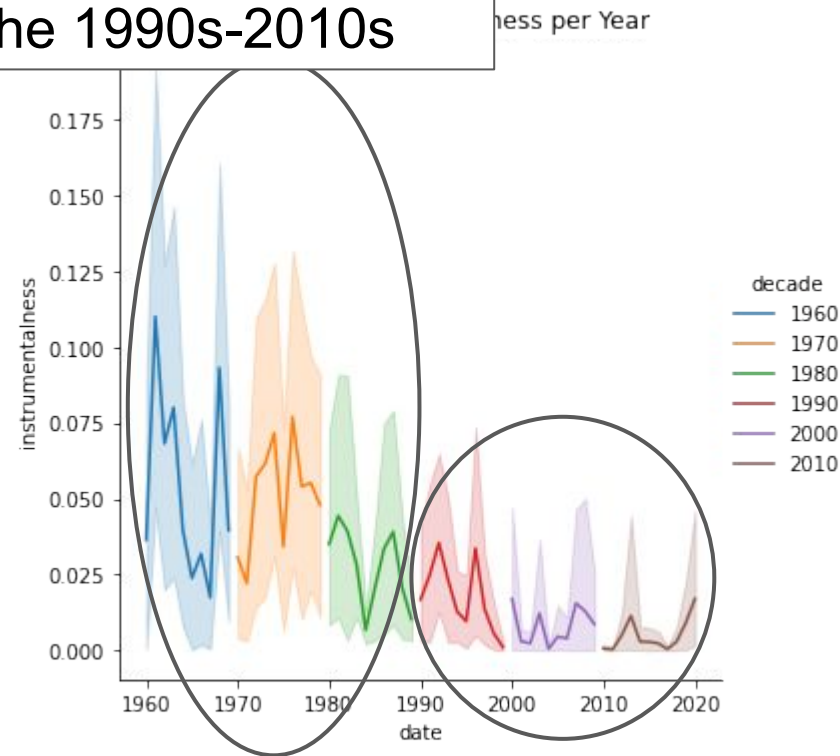
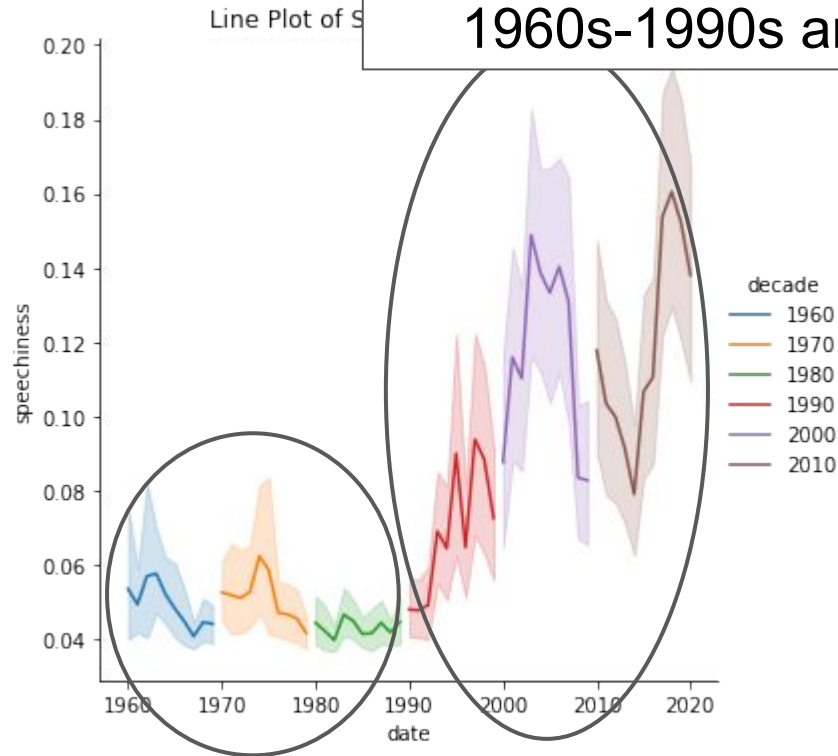
# Are there differences between decades in terms of speechiness and instrumentalsness of songs?



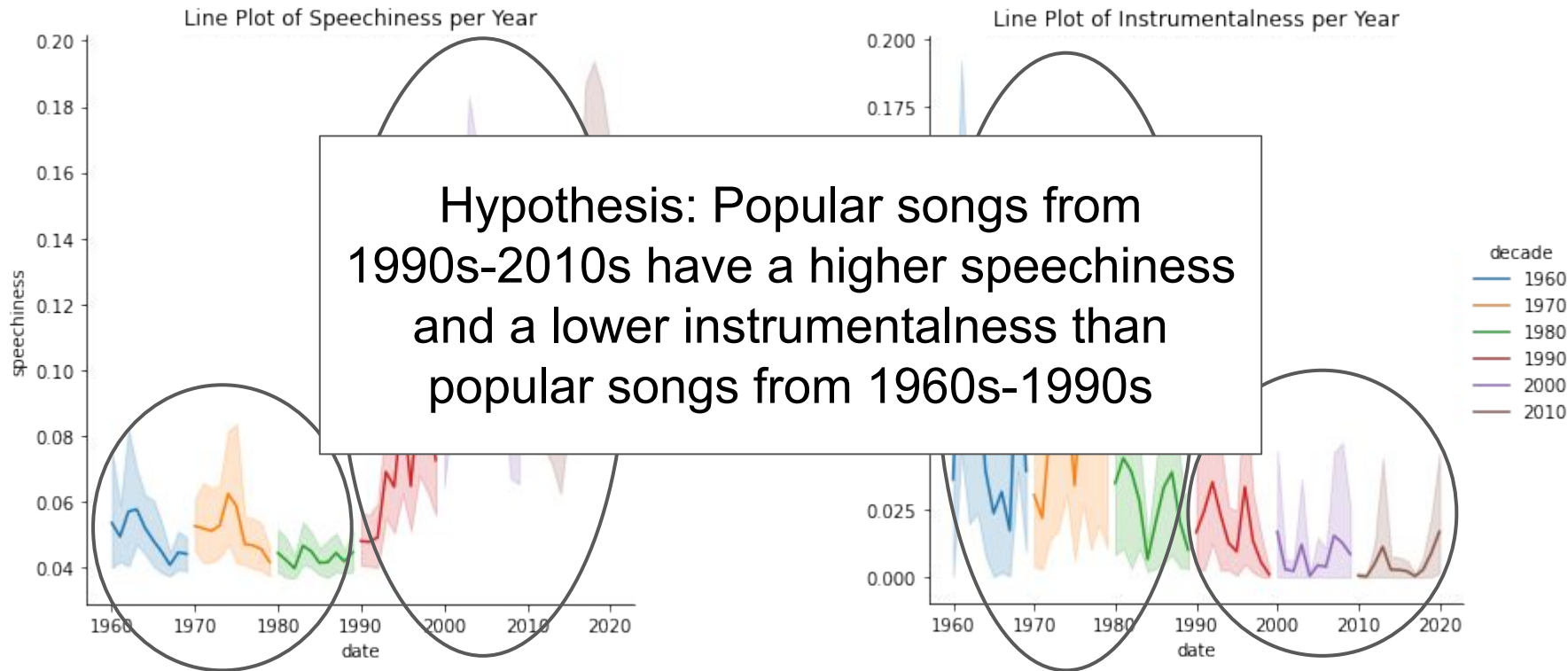
Are there  
speech

Takeaway: There are differences.  
Specifically, there seems to be a  
difference between songs from the  
1960s-1990s and the 1990s-2010s

in terms of  
songs?



# Are there differences between decades in terms of speechiness and instrumentalsness of songs?



Now on to ...

# Hypothesis Testing







# Statistical Methods

- Unpaired two sample t-test ( $\alpha = .05$ )
  - compare the speechiness and the instrumentality of songs between 1960-1990 and 1990-2020
- Linear regression
  - independent variables: speechiness and instrumentality
  - dependent variable: time

# Conclusions

# Conclusions

- t-test results:
  - songs from 1960-1990 had a higher instrumentalness and a lower speechiness than songs from 1990-2020
- linear regression
  - songs from 1960-1990 had a higher instrumentalness and a lower speechiness than songs from 1990-2020
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