

Holiday Season Insights

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Data Provided by MRC Data

Overview



Holiday Music Insights:

- Given that consumers are listening to holiday music within the last 20 years uniformly (refer to slide 6), I wanted to know if people are consuming this music the same across this wide time period.
- Being a jazz musician, older holiday songs resonate with me because of its jazz style or influence; this motivated me to see if people consumed old and new holiday songs differently across platforms
- Simply by splitting the data in half by its median (2004), I used visualizations and statistical tests to compare sales and streaming (refer to slides 10-13) , which I concluded with:
 - Newer albums (after 2004) sold more copies **Physically** and **Digitally** (refer to slide 14)
 - Older albums (before 2004) were **Streamed (On-Demand/Programmed)** more (refer to slide 15)
 - Old and new albums had similar amounts of **Digital Song Sales** (refer to slide 15)

Overview



Holiday Music Trends During Christmas Week:

- During the holidays, holiday music gets the most attention, which the figures (refer to slides 14 - 19) draw attention to
 - Holiday music has a greater proportion of **Physical and Digital Album Sales** during Christmas Week (refer to top graphs of slides 18 & 19)
 - The total volume of holiday music and other genres have decreased in total album sales throughout the past 4 years
 - Other genres of music have better **Digital Album Sales** on **Christmas day** surprisingly
 - Other genres of music sell more digital songs during Christmas week but have had diminishing volumes of digital song sales throughout the past 4 years
 - A higher proportion of holiday music is being consumed on **Programmed Streaming** platforms due to an overall increase in programmed streaming volume (refer to slide 21)
 - Users listen to other genres of music with **On-Demand Streaming** services except for Christmas day (refer to slide 22)

Overview



Holiday and Other Genre Trends Throughout the Year :

- **Holiday Physical Album Sales** have the highest proportion of sales during November and lowest in June (refer to bottom graph on slide 18)
- **Physical and Digital Albums Sales** along with **Digital Song Sales** have been decreasing in general for the past 4 years from 2015-2018 (refer to table on slide 26)
 - Holiday Physical Albums sales have decreased by 93%
 - Other genres Physical Album sales have decreased by 53%
 - Holiday Digital Albums sales have decreased by 92%
 - Other genres Digital Album sales have decreased by 61%
- **Airplay Interaction** has had consistent holiday music and other genre consumption throughout the years with only slight decrease in traffic volume (refer to slide 23)
- **Streaming (On-Demand/Programmed)** has become a dominant force in music consumption (refer to table on slide 26)
 - Total On Demand streaming of other genres has increased by 264%

What could be driving the trends?



Streaming services are becoming more popular as music ownership declines

- The shift towards streaming services (**On-Demand/Programmed**) can be attributed to their low cost compared to physical/digital ownership (iTunes, Amazon, etc) which is becoming less favorable or unavailable
 - Apple announced that on March 31, 2019, iTunes would be closing
 - Apple Music has had a growth rate of 2.4-2.8% compared to Spotify's 2-2.3%
(<https://www.wsj.com/articles/apple-music-overtakes-spotify-in-u-s-subscribers-11554475924>)
- Devices capable of playing discs such as laptops and cars are being phased out, making **Physical Album Sales** less likely
- Curated playlists are becoming major sources of how people find music, as noted by the growth in demand for playlist curators from companies like Spotify and Apple Music
 - <http://www.thembj.org/2017/08/the-rise-of-curated-playlists/>
- To be discovered through playlists, artists are switching from album (LP/EP) formats to singles
 - <https://spinnup.com/uc/blog/singles-vs-eps-whats-the-best-release-strategy/>

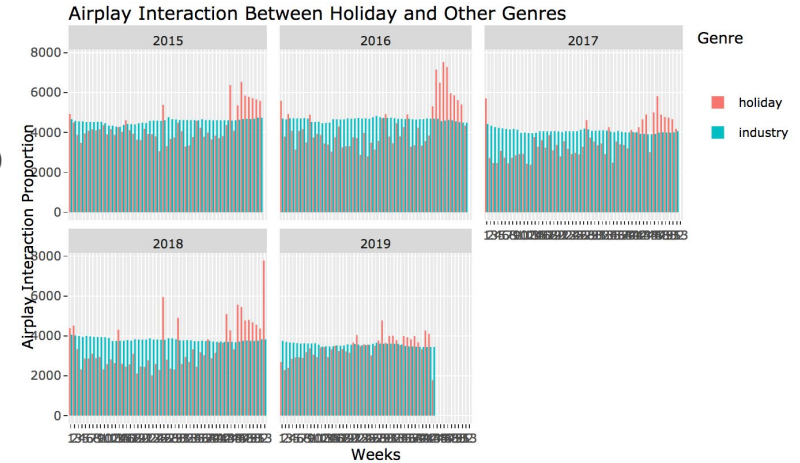
What does the future look like?



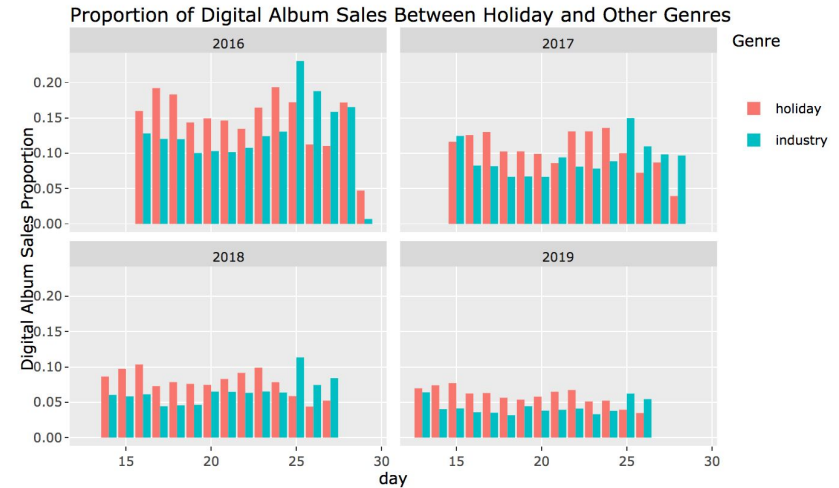
- We expect more people will turn to digital streaming methods for their holiday music (refer to tables on page 25-26) as **overall digital streaming increases**
- In light of COVID-19, streaming and non ownership will be the main choice of music consumption
 - With government mandated stay in orders, **physical ownership** will continue to decline as people no longer have the option to obtain physical albums
 - The financial implications of the coronavirus crisis will incentivize people to turn to **digital streaming/programmed streaming** as a more financially savvy option
- Artists such as Pentatonix, Michael Buble, and Mariah Carey will likely continue to dominate holiday charts (refer to slide 12)
- As the economy recovers from the coronavirus, we hope to see people make a return to album and song ownership; but a large volume of consumers will remain loyal to their current digital subscriptions
 - <https://www.nytimes.com/2020/04/13/business/coronavirus-economy.html>

Are there any anomalies in the data?

- In June on week 26, there is a random spike that occurs (graphs are interactive in html file)
- Why is there an increase in the summer?



- On Christmas Day, other digital albums from other genres of music are purchased more, otherwise, digital holiday albums are purchased more
- The spike in other album sales can be attributed to gifts and increase in disposable income



Reflections



- With this presentation, I drew upon my programming and statistical skills to produce visualizations, tables, and feature engineering
- Would love to have an opportunity to have more freedom with my findings and deploy statistical models to make predictions
- Due to lack of data and amount of uncertainty due to the current climate, I chose to analyze the current trends without relying on predictive models
- The structure of the presentation and appendix reflect my thought process of exploring data visually and tabularly before running statistical methods
- This was a very inspiring and exciting project given the data and a topic that was relevant to my artistic and academic endeavors

Appendix

Collected works of graphs, statistical methods, tables, and explanations of the trends

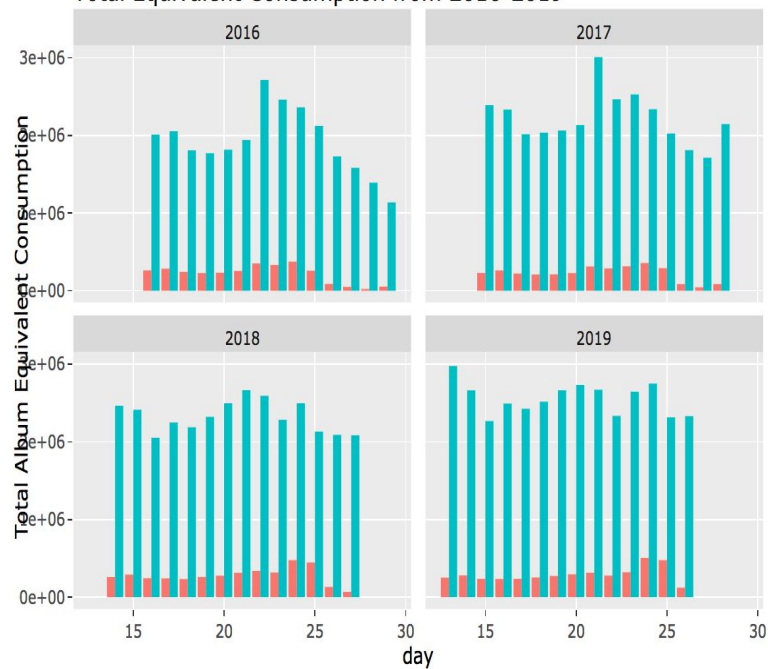
(interactive graphs are in [mrc data.html](#))

Anecdote



- The volume of the rest of the music industry album sales is enormous compared to the small volume of holiday album sales
- By dividing total album equivalent with respect to holiday and other genres of music, we can see the different ways consumers are listening to music

Total Equivalent Consumption from 2016-2019



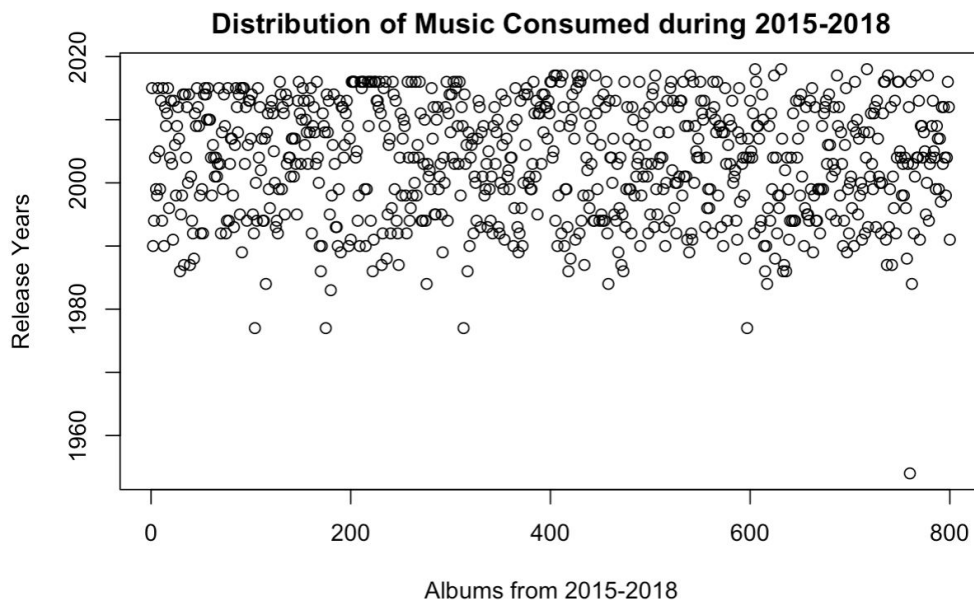
Yearly Total Equivalent Consumption from 2016-2019



How is holiday music trending?

- What music is being listened to?

- For the past 4 years, people have been mainly listening to holiday songs that have been produced in the last 20 years
- There is a uniform distribution of music listening across these 20 years in data from 2015 - 2018



How is holiday music trending?

Which artists have been trending for the past 4 years?

- The top holiday albums with highest ranking given by TAEC from 2015-2018:

Artist <fctr>	Title <fctr>
Pentatonix	Pentatonix Christmas
Merry Xmas	Merry Xmas
Christmas Hits	Christmas Hits
Michael Buble	Christmas
Magic Christmas	Magic Christmas
Pentatonix	Christmas Is Here!
Garth Brooks	Christmas Together
Frank Sinatra	Holidays & Hits
Nat King Cole	Holidays & Hits
Coolest Yule Ever	Coolest Yule Ever

- The top songs with highest rank and longest weeks on the chart from 2015-2018:

Artist <fctr>	Song <fctr>
Mariah Carey	All I Want For Christmas Is You
Brenda Lee	Rockin' Around the Christmas Tree
Pentatonix	Hallelujah
Bobby Helms	Jingle Bell Rock
Andy Williams	It's The Most Wonderful Time Of The Year
Burl Ives	Have A Holly Jolly Christmas
Brenda Lee	Rockin' Around The Christmas Tree
Burl Ives	A Holly Jolly Christmas
Michael Buble	It's Beginning To Look A Lot Like Christmas
Wham!	Last Christmas

How has holiday music been trending?



- Are there different consumer behaviors between older and newer holiday music?
(old = before 2004, current = after 2004; based on median)

```
summary(album_list_df$release.year)
```

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
1954	1996	2004	2003	2012	2018

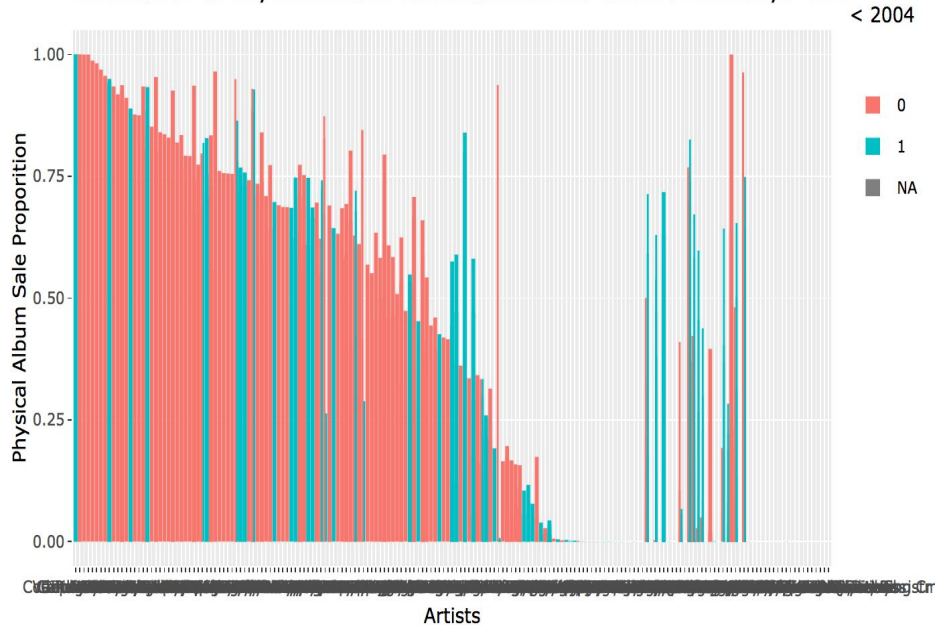
- Are people listening to older music on different platforms compared to new music?
- Are people choosing to buy new music from newer artists more so than older music?

Consumer behavior between Physical and Digital Album sales

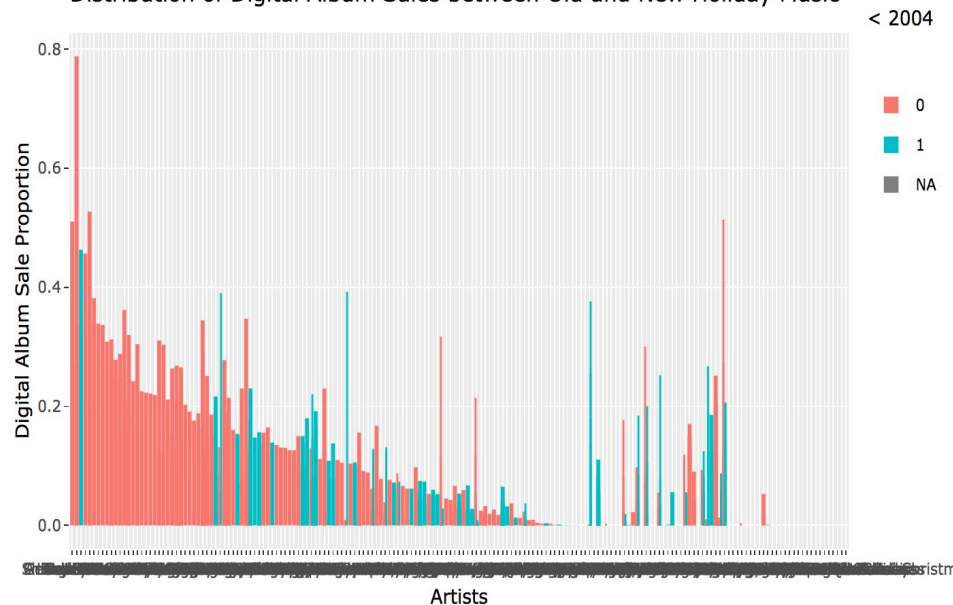


- Red = new music (after 2004), Blue = old music (before 2004)

Distribution of Physical Album Sales between Old and New Holiday Music



Distribution of Digital Album Sales between Old and New Holiday Music

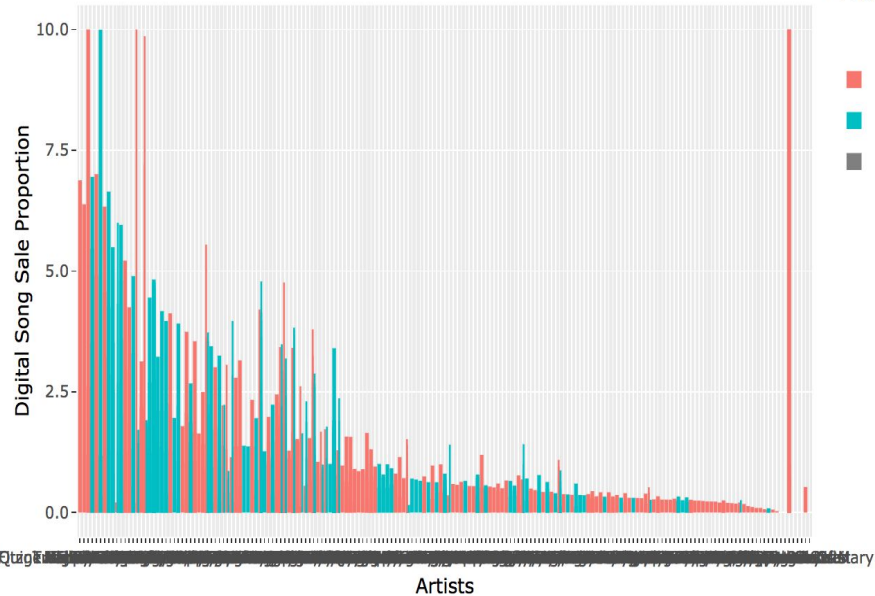


Consumer behavior for digital song sales and on demand streaming

- Red = new music (after 2004), Blue = old music (before 2004)

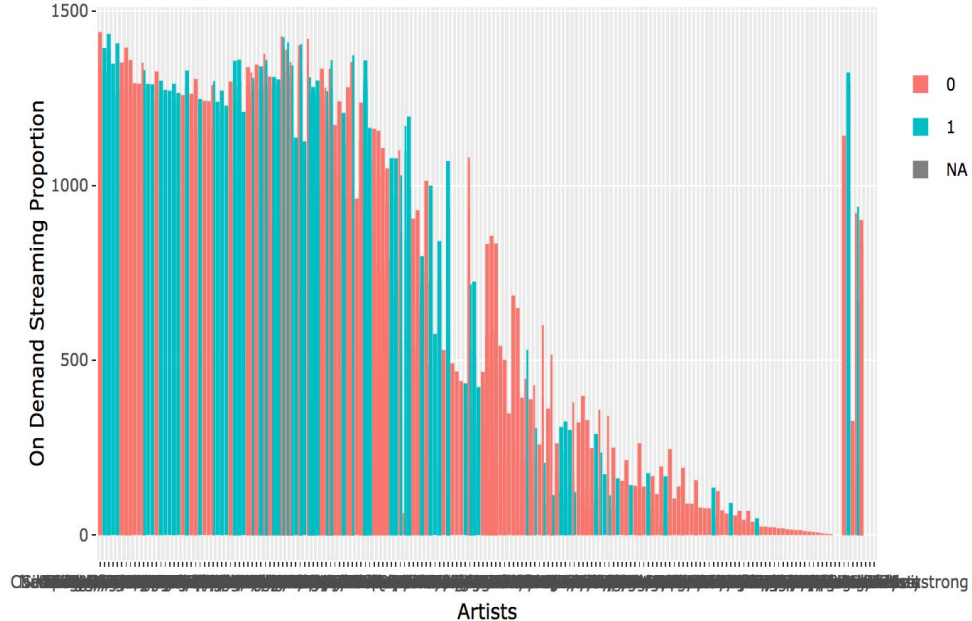
Distribution of Digital Song Sales between Old and New Holiday Music

< 2004



Distribution of On Demand Streaming between Old and New Holiday Music

< 2004



Statistical Tests



One sample t test between Digital Album Sales from before and after 2004

- P-value $< .05$, so we reject the notion that Digital Album sales are the same across old and new music
t = -11.432, df = 242, p-value $< 2.2\text{e-}16$
alternative hypothesis: true mean is not equal to 5962.03
95 percent confidence interval:
2227.208 3325.097
sample estimates:
mean of x
2776.152

One sample t test between Physical Album Sales from before and after 2004

- P-value $< .05$, so we reject the notion that Physical Album sales are the same across old and new music

t = -16.54, df = 339, p-value $< 2.2\text{e-}16$
alternative hypothesis: true mean is not equal to 23064.81
95 percent confidence interval:
8299.671 11438.276
sample estimates:
mean of x
9868.974

Statistical Tests



One sample t test between On Demand Streaming from before and after 2004

- P-value $< .05$, so we reject the notion that On Demand Streaming are the same across old and new music

$t = 3.411$, $df = 374$, $p\text{-value} = 0.0007178$

alternative hypothesis: true mean is not equal to 50735929

95 percent confidence interval:

55210963 67392530

sample estimates:

mean of x

61301747

One sample t test between Digital Song Sales from before and after 2004 (no difference)

- P-value $> .05$, so we do not reject the notion that Digital Album sales are the same across old and new music

$t = 1.0084$, $df = 375$, $p\text{-value} = 0.3139$

alternative hypothesis: true mean is not equal to 52597.42

95 percent confidence interval:

50163.78 60155.03

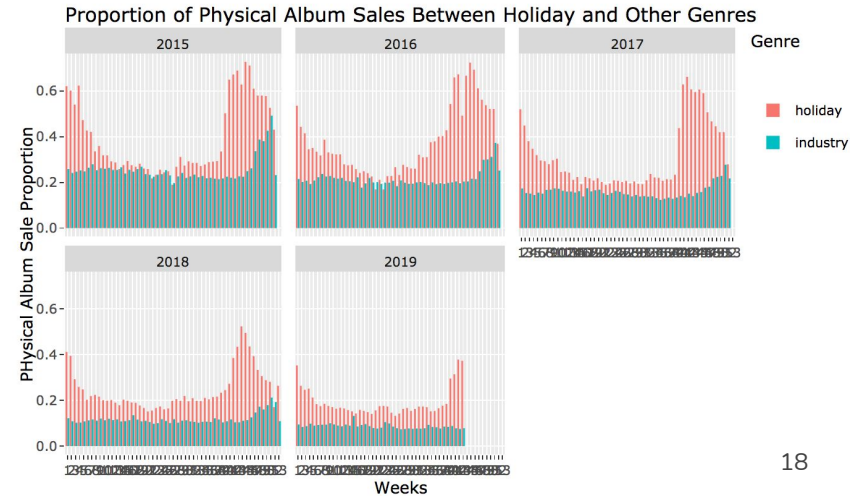
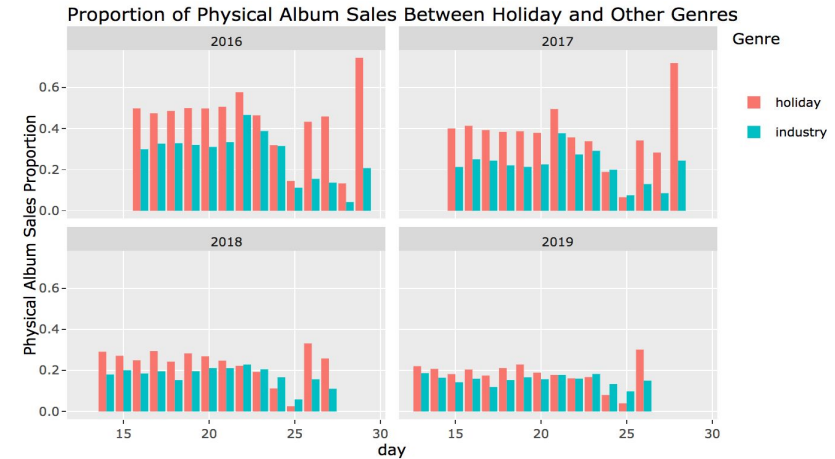
sample estimates:

mean of x

55159.4

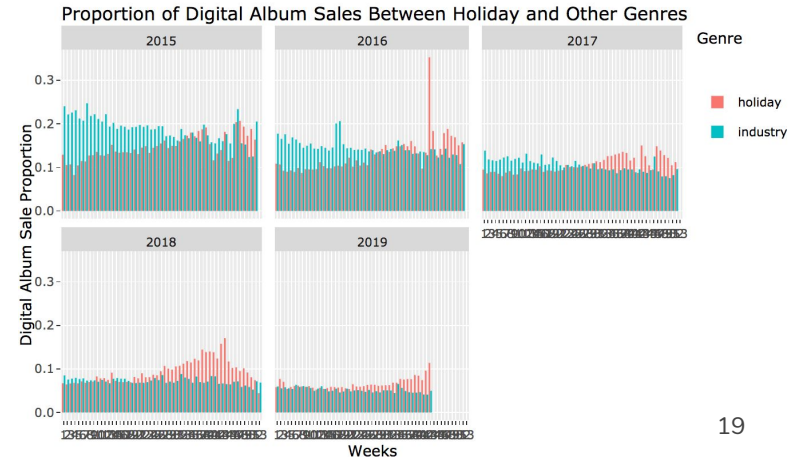
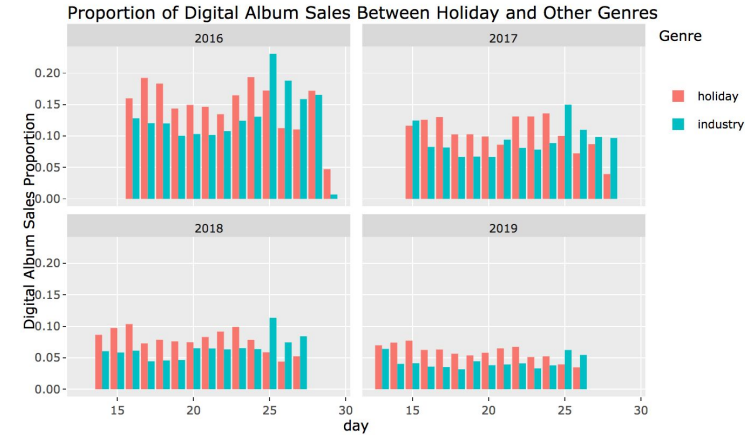
What do holiday trends look like compared to the industry as a whole?

- **Physical Album sales during Christmas Week**
 - Physical holiday albums are purchased in greater proportion than other genres during xmas week
 - Decline in sales volume for past 4 years
- **Physical Album sales throughout the year**
 - Holiday Physical Album sales hit a minimum around week 20, which is June. holiday physical album sales hit its max at week 40, which is in november



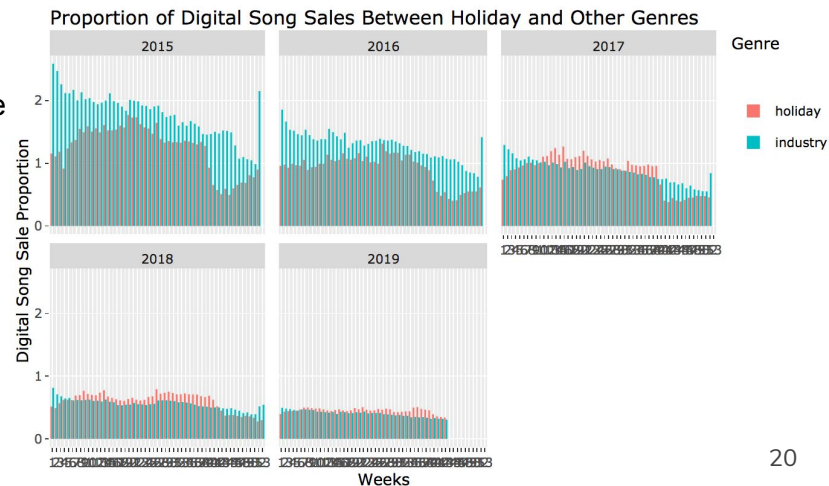
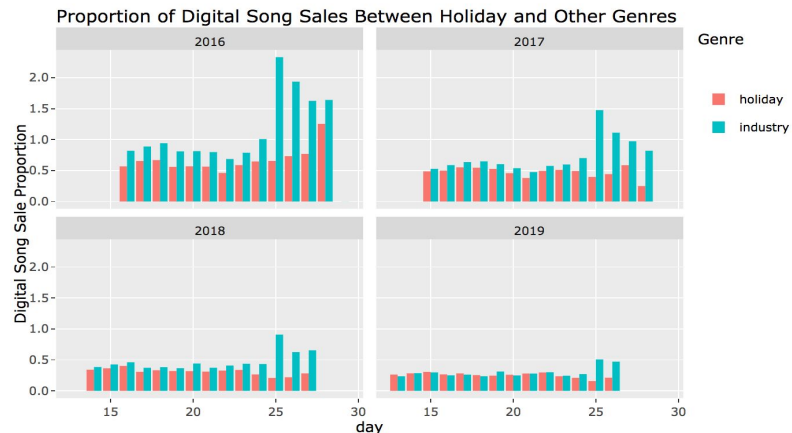
What do holiday trends look like compared to the industry as a whole?

- **Digital Album Sales during Christmas week**
 - Digital holiday albums are bought more during Christmas week except for Christmas day (easier to see in codebook)
 - Why is there a spike of other genre album sales on Christmas day?
- **Digital Album Sales throughout the year**
 - Peak of holiday digital album sales occurs around week 43 which is mid october
 - Decrease in digital album ownership over the past 4 years



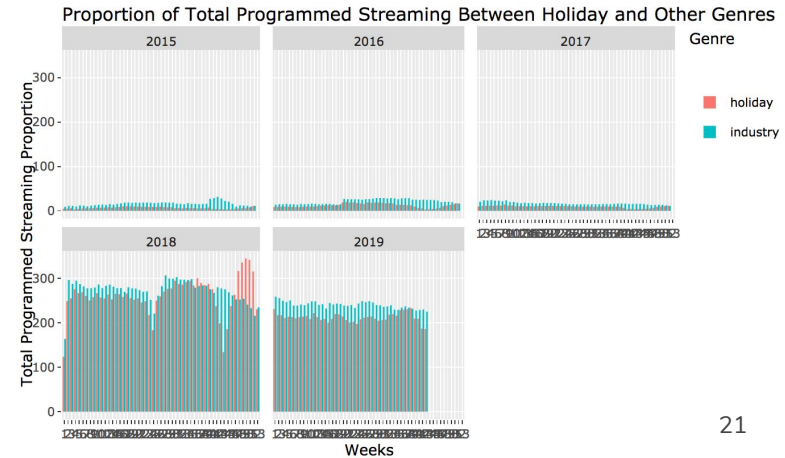
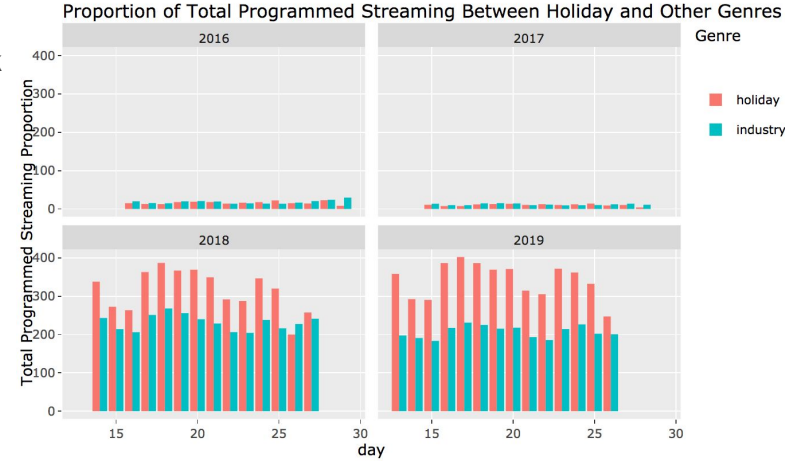
What do holiday trends look like compared to the industry as a whole?

- **Digital Song sales during Christmas week**
 - Individual song sales are more prevalent in other genres with a spike in sales after Christmas
 - Overall decline in song sales
- **Digital Song sales throughout the year**
 - There is an overall decline in individual digital song sales across the years. Holiday digital song sales trends follows streaming on demand patterns
 - There is a dip in holiday song sales during the Month of October
 - Peak in holiday song sales during May



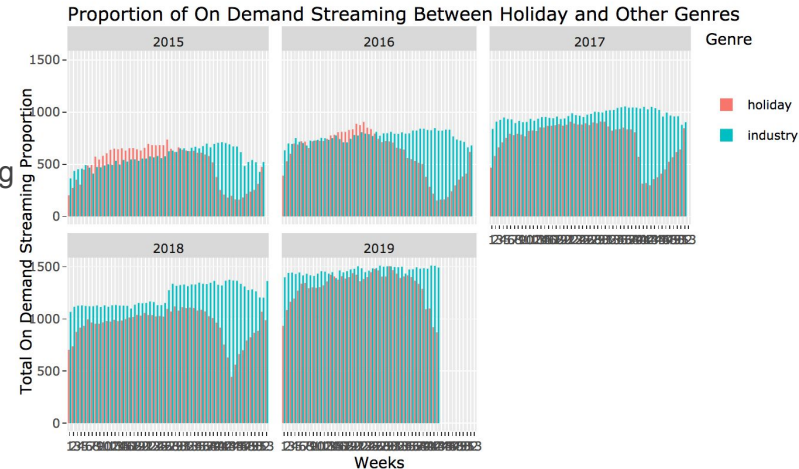
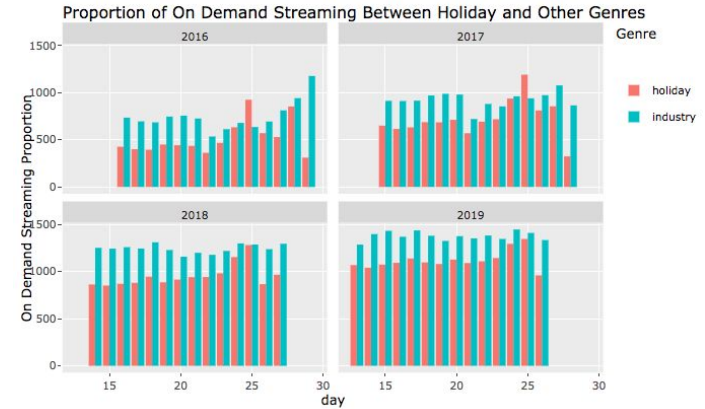
What do holiday trends look like compared to the industry as a whole?

- **Total programmed streaming during Christmas Week**
 - Holiday music is listened more frequently
 - Significant growth in programmed streaming volume for both categories
- **Total programmed streaming throughout the year**
 - Programmed streaming is gaining popularity independent of music genre



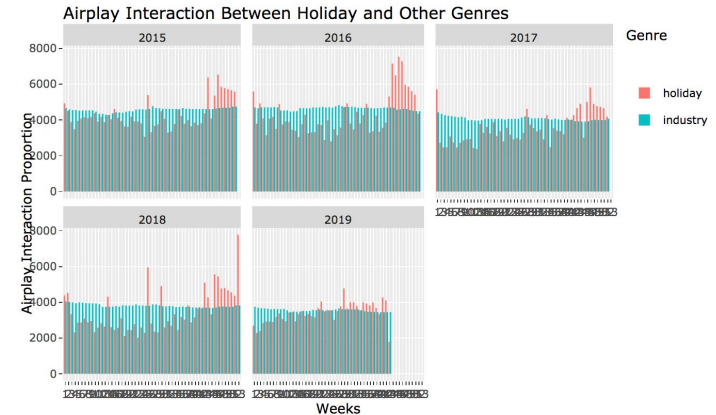
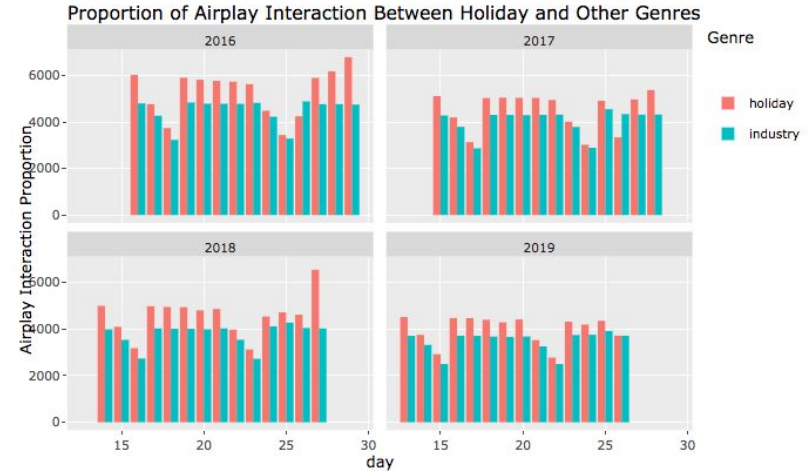
What do holiday trends look like compared to the industry as a whole?

- On demand streaming during Christmas Week
 - People are streaming other genres more Except on Christmas eve
 - The volume of streaming during xmas week Is increasing
- On demand streaming throughout the year
 - on average, other genres of music are streamed more than holiday music.
 - Holiday music streaming begins decreasing around week 35 plus or minus 3 weeks which is around late August
 - The volume of streaming in general is increasing



What do holiday trends look like compared to the industry as a whole?

- **Airplay Interaction during Christmas Week**
 - Holiday music is listened to more during xmas week
 - Slight decline in holiday radio consumption over the years
- **Airplay Interaction throughout the year**
 - Holiday music is listened to more during xmas week
 - Slight decline in radio consumption in general over the years



Trend Figures



- There is a huge growth in digital platforms (On Demand, Streaming, Programmed) and significantly diminished volume of holiday album sales during the holiday season

Holiday Album % Change from 2015-2018

Total Album Equivalent Consumption	Album Sales	Physical Albums Sales	Digital Albums Sales	Digital Song Sales	Streaming On Demand Audio
248.82267	-42.30580	-40.09810	-24.30441	-34.80904	973.27489

Generated from Annual Holiday Album Ranked List

Trend Figures

- Holiday album trends during Christmas week in % change from 2015-2018

Total Album Equivalent Consumption	Total Album Equiv Con - Audio	Albums w/TEA		Total Album Sales	Physical Album Sales		Digital Album Sales		Digital Song Sales	
34.49	41.94	-50.83		-50.93	-50.83s		-51.21		-43.87	
Total Streaming on Demand	Streaming on Demand Audio	Streaming On Demand Video		Total Streaming Programmed	Streaming Programmed Audio		Streaming Programmed Video		Airplay Spins	Airplay Audience
209.84	271.99	95.67		2732.82	2733		-100		45.6	19.47

- Other genre album trends during Christmas in % change from 2015-2018

Total Album Equivalent Consumption	Total Album Equiv Cons - Audio	Albums w/TEA	Total Album Sales	Physical Album Sales	Digital Album Sales	Digital Song Sales	
33.04	42.65	-42.03	-36.489	-27.5	-56.12	-63.34	
Total Streaming on Demand	Streaming on Demand Audio	Streaming On Demand Video	Total Streaming Programmed	Streaming Programmed Audio	Streaming Programmed Video	Airplay Spins	Airplay Audience
154.83	171.32	129.57	1466.22	1466.37	-100	17.25	-8.81

Trend Figures

Year round trends:

- Holiday music throughout the year in % change from 2015-2018

Total Album Equivalent Consumption		Total Album Equiv Con - Audio		Albums w/TEA		Total Album Sales		Physical Album Sales		Digital Album Sales		Digital Song Sales			
-82.9		-84.03		-92.77		-93		-93		-92		-90			
Total Streaming on Demand		Streaming on Demand Audio		Streaming On Demand Video		Total Streaming Programmed		Streaming Programmed Audio		Streaming Programmed Video		Airplay Spins		Airplay Audience	
-24.14		-18.33		-30.27		503.7		503.78		-100		-98.15		-98.95	

- Other genres throughout the year in % change from 2015-2018

Total Album Equ Consumption		Total Album Equiv Con - Audio		Albums w/TEA		Total Album Sales		Physical Album Sales		Digital Album Sales		Digital Song Sales			
39.96		51.62		-59.8		-56.7		-53.33		-61		-67.83			
Total Streaming on Demand		Streaming on Demand Audio		Streaming On Demand Video		Total Streaming Programmed		Streaming Programmed Audio		Streaming Programmed Video		Airplay Spins		Airplay Audience	
264.1		415.13		135.16		2022.14		2022.67		-100		25.71		-2.18	

26