

Young Minds and Popular Charts

An empirical study on mainstream music consumption of children

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1 Introduction

Music recommender systems have a hidden yet significant influence on children's development, as musical exposure during childhood substantially impacts personality and creative development. Despite this, children remain a neglected and underrepresented demographic in research within this domain.

This study examines the connection between children's favorite artists and mainstream music charts, given the dynamic nature of their musical tastes, which adult data cannot replicate.

Utilizing multi-year listening logs from thousands of children aged 12 to 18, spanning several countries, we investigate the evolution of this relationship as they age, and examine the influence of geography on listening habits compared to age. With this, we aim to emphasize the importance of incorporating age-related developmental considerations into the design of recommender systems tailored for children.

-- Mainstream Definition --

We use the term **Mainstream** to refer to artists that are present in the top-100 most popular artist of a chart in a certain month

2 Research Questions

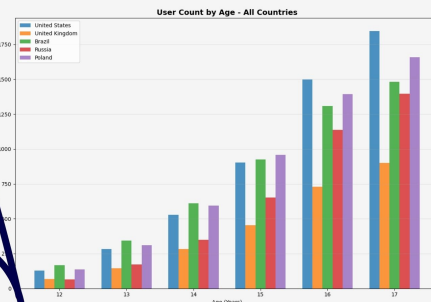
RQ1 - What is the alignment between children's most-played artists and reference mainstream charts?

RQ2 - How does aging influence children's mainstream music consumption?

RQ3 - Which scope (age vs. geography) has the highest influence when building reference charts that mirror children's mainstream listening behavior?

3 Methodology

- Our study makes use of the LFM-2b[1] dataset, comprised of 1,337,596,535 listening events.
- The user cohort are children between 12 and 18 years of age from the United States, Poland, Russia, Brazil and the United Kingdom; with a total of 10,280 young users from this five countries.

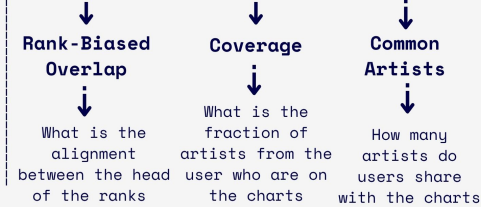


Popularity Charts

- We build 4 monthly artist popularity charts (top-100), covering both age and geographical scopes, based on monthly listeners:
 - Global All → World-wide users
 - Global Young → World-wide <18 users
 - Local Young → Country specific <18 users
 - Local All → Country specific users
- For each user, we create a monthly top-100 list of their most listened artists and map them to the corresponding development month to compare them with rank-similarity metrics

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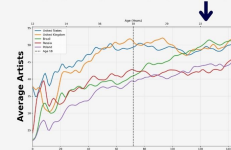
Rank-Similarity Metrics



4 Results & Discussion

Children and Chart Alignment

- Children show, on average a coverage score of 15.2% while adults have a lower 12.6% →
- RBO Scores are low for both groups, meaning that common artists are not arbitrary spread across the ranks →
- The number of common artists stays stable across development showing that adult users, on average, listen to more artists →



Age-related drifts

- In the table, we can see a clear drift between 12 and 18 years of age.
- RBO and Common artists don't show significant change, but coverage suffers a 23.7% decrease

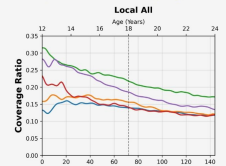
Age	ΔRBO	ΔCoverage	ΔCommon
12	0.0334	0.1927	7.2
12-13	+0.0019	-0.0099	+0.22
13-14	+0.0002	-0.0133	-0.02
14-15	+0.0007	-0.0087	+0.04
15-16	-0.0005	-0.0081	-0.03
16-17	-0.0007	-0.0057	-0.15
17-18	-0.0003	-0.0071	-0.06
18	0.0338	0.1399	7.2

Age drifts from all countries combined in global charts in rank-similarity metric mean

- Early Adolescents (12-14) show a the sharpest variations aligning with a self discovery and high importance of social image period. Mid to Late Adolescents (15-18) show that their music taste solidified, resulting in a small influence of trends and alignment with the mainstream

Chart scope comparisons

- For all countries, changing the scope from **Global** to **Local** changes coverage by +0.033, on average.
- Changing age from **All Users** to **Young Users**, only has an effect on mainstreamness of +0.011, on average, showing that age is less influential than geography for chart alignment.
- Some countries also show a larger shift in geography but lose out on the age shift. For example, **Brazil** shows a 0.050 shift with geography but only a 0.006 shift with age. Meanwhile, the **US** shows shifts of 0.025 and 0.008 for the same metrics. Showing that the age scope is still highly relevant



5 Conclusion & Limitations

In this empirical study, we can make valuable takeaways.

- Children are more aligned with popularity charts than adults.
- It is possible to observe a higher relation and variation with mainstream music consumption in early teen years (12-14) and during mid to late adolescence (15-18), the alignment tends to decrease more slowly and plateau following through adulthood.
- Geography is more relevant than age for mainstream chart ranking construction regarding aligning children with the rankings.

The main limitations were:

- Since the study used only one dataset, platform bias could be hidden in the data making generalization harder
- The dataset and scores are very sparse, making it hard to reduce the scope for smaller than a country which could be hiding regional effects

6 Future Work

- Replication of the study once new dataset is available
- Investigate mainstream trends within a smaller scope than country, such as cities or states
- Extend the mainstream charts within genres and evaluate mainstream alignment
- A Recommender experiment to predict mid to late adolescence behavior based on early adolescence data