

# Exploring Local Music's Place in Global Streaming

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## ABSTRACT

Music is intertwined with geography as part of the cultural fabric that transforms a physical space into what we consider a "place." But in an increasingly online world, where music's distribution has shifted massively towards digital streaming on global platforms, what role does geography now play in shaping peoples' music consumption? Here, we employ a multi-part, mixed-methods study of "local" music, exploring its current definition as well as exploring its potential role in online music recommender systems. We present, first, findings from a qualitative study designed to identify themes in how listeners and artists defined local music across three international locations. Second, we present results of a quantitative analysis that operationalizes this definition and investigates the impact of surfacing local context in a real-world recommendation setting, conducted in one location. Together, our results illustrate that "local" continues to play a crucial role in shaping music's enjoyment and represents an important mechanism for facilitating the discovery of lesser-known artists in online algorithmic recommendations.

## CCS CONCEPTS

• **Human-centered computing** → *Empirical studies in collaborative and social computing*.

## KEYWORDS

Computational Social Science, Recommender Systems, Globalization, Music

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## 1 INTRODUCTION

Throughout history, music has enjoyed a special connection to the places where it is created. For much of human history, in fact, music and place were necessarily connected, as the technologies that have enabled music to be recorded and transported, and for both music and musicians to travel great distances are all relatively recent developments. Prior to these technologies, music was at once created and enjoyed in a place (see [23] for a thorough discussion), generally in accordance with its local traditions and utilizing familiar sounds, languages, and instruments crafted from nearby materials [8]. Long after recording technology, still, music continues to be crafted with careful consideration for the people and places, even specific venues where artists intend for it to be heard [3].

With that said, over the years, technological innovations have gradually expanded music's reach by easing the constraints that once restricted its enjoyment in time and space. The resulting global exchange of music has in turn fueled the mixing of cultures, sharing of customs and instruments, and, generally speaking, peoples' broader exposure to and enjoyment of music from all over the world. It has also sparked important discussion and investigation into the effects of local music cultures mixing globally [6]. As part of this ongoing discussion, a number of studies have investigated globalization's role in the ebb and flow of countries' consumption of – and, implicitly, their demand for – their own, locally-produced music [14, 19, 38]. One most recent study from this literature analyzed trends from the world's largest music streaming platform and found, perhaps surprisingly, that countries' consumption of local music rose from 2014 through 2019, during a time when people's access to the rest of the world's music was expanding rapidly [39].

This ongoing thread of literature on the globalization and localization of music, however, suffers two key limitations. First, how "local" music is defined in these studies tends to generally inform policy making at the national level rather than advancing, for instance, an understanding of how listeners and artists define the concept and, based on that understanding, how to recommend it. Second, the observed ebb and flow of countries consuming their residents' music assumes a degree of causality and implication of demand that has not been validated experimentally. That is, while countries may be listening to their own music more in recent years, there's no evidence that this is driven by a special, conscious preference for "local" music.

In this study, we address these two limitations directly. We begin by introducing relevant background and related literature, followed by two studies investigating the concept of "local" in the context of music. The first, a qualitative study, builds upon existing literature

to develop a conceptual framework for capturing key considerations of what listeners and artists currently consider to be “local.” In the second study, we present a quantitative analysis that operationalizes the definition advanced by the first study in order to test for causality and evaluate the potential for incorporating this framework into real-world recommendations of local artists. For the quantitative study, our evaluations focus on whether and to what degree contextualizing recommendations as “local” affects their outcomes, notably in a time when music’s listening is as unbound to geography as it has ever been.

## 2 BACKGROUND AND RELATED LITERATURE

Supporting our goal of investigating geography’s current role in shaping people’s music preferences online, we’re fortunate to build upon vast bodies of literature on related subjects. Among these, the field of cultural geography establishes an important perspective and starting point for thinking about people’s attachments to place, offering distinction between what people consider to be a physical “space” and a “place.” Seminal works from this domain [31, 36] suggest places take root in familiarity, providing a sense of security that allows us to explore beyond.

The notion of place and peoples’ connections to places are at the focus of multiple related disciplines, including place attachment psychology and environmental psychology, which explore the “emotional bonds that form between people and their physical surroundings,” [27], and the many ways in which those emotional bonds shape our preferences and behaviors. Scannell and Gifford [31] assert that the sort of bonding that underlies our attachment to places is itself a core component of the human experience, that we “necessarily form meaningful connections with particular people, groups, objects, and places.” Further, the strength of these connections to places is generally understood to be greater, the smaller the geographic scale in question [26]. That is, what is “closest” in the geographic sense also tends to be held closest in the emotional sense, though attachments can form as broadly as the level of continents [25].

Localization has received relatively little attention in music recommendation and retrieval literatures. Turnbull et al. [37] explored a map-based approach to discovering local music and found that it incited “fear of missing out” among evaluators, which the authors suggest might usefully encourage local concertgoing. More recently, from the music retrieval community, Cheng et al. [5] explored an application to create listening experiences that interleave familiar music with similar-sounding music from lesser-known, local artists. The study focuses primarily on the viability of the acoustic matching approaching, however, and less so on advancing a wider understanding of how people conceptualize and to what extent may prefer local music.

Beyond music, globalization has also brought special attention to other “local” goods and services across a wide range of industries similarly transformed by technology [7]. As has been noted across many domains, such as agriculture [1, 28] and food production [21, 22] ranging all the way to industries like sports entertainment [11], mass-produced and globally-distributed products are increasingly available to consumers. Amidst this heightened global competition,

“local” has emerged as a competitive differentiator for products and their consumers [17], serving as marker of quality, an opportunity to take pride in and support one’s community, and, to some, a form of “neolocal” or anti-globalization protest [15, 33]. While this trend is certainly not universal across all industries [16] nor unchanged over time, the widespread and continued demand for “local” within increasingly global industries motivates continued study.

Finally, two recent studies of algorithmic fairness offer crucial perspective on artist sentiment towards localized programming. Interviews by Ferraro et al. [13] establish important considerations for how to properly define the scope of “local” and suggests that artists may desire some control in the degree to which they are localized. A later study by Dinnessen et al. [10], indicated mostly positive receptivity to localized recommendations and suggests that local should be used to enhance recommendations (i.e., musical relevance is paramount).

## 3 STUDY I: A QUALITATIVE INVESTIGATION INTO LOCAL’S CURRENT MEANING

Our first study sought to understand how listeners and artists around the world currently conceptualize local music. Our goal for this portion of work was to establish a working definition for “local” music, bearing in mind existing literature and paying special attention to the attributes that contribute to music feeling local, as well as their boundaries with respect to dimensions like geographic range, population size, and musical styling. Participants were recruited in three cities: Port Harcourt in Rivers, Nigeria; Houston in Texas, US; and Salvador in Bahia, Brazil. We selected these cities to span a range of cultural environments, focusing on places that were populous enough to sustain vibrant music communities.

We recruited  $N=24$  music listeners (8 per city) to participate in a two-day digital cultural probe [24], centered around a series of creative tasks involving the sharing and discussion of artifacts (e.g., playlists, photos, videos, etc.) depicting local music. We required that all participants must have lived in their city for at least two years and indicated by way of a screening survey that they listen to, read about, attend live shows of (or did, prior to the COVID-19 pandemic), and/or follow artists online representing “local music.” We further narrowed the pool of potential participants, prioritizing those who expressed having familiarity with at least two local artists in their region. With these requirements in place, we invited a group of participants with an even balance of men and women, who spanned diverse ethnic backgrounds, and ranged in age from 18-35 years old.

The cultural probe tasks drew inspiration from photo elicitation studies [20], which use artifacts to stimulate detailed discussion of themes that may be difficult to articulate without context but can become more concrete when discussing specific examples. Use of this technique is common in place attachment research [29, 30]. Here, participants were asked to bring playlists of music that they considered to be local, affording discussion about why a particular song or artist was included and what qualities contribute to their localness.

After the cultural probe, we scheduled follow-up, one-on-one interviews with 6 of the 24 participants (2 per city), focusing on individuals who were especially knowledgeable about their area’s

music scenes. These interviews dove deeper into the topic of local music and particularly the meaning of local music in the participants' lives.

In addition to these follow-ups with listeners, we also conducted similar interviews with 6 artists (also 2 per city) who were based in the study locations and actively engaged in a musical career. The musicians were selected to encompass a range of music styles and levels of experience, who could comment on how they define a "local" artist, whether they consider themselves to be local artists, and what sentiments they hold towards localized recommendation. We recruited an even split of male and female artists in all locations, except Port Harcourt where we interviewed two male local musicians. Their ages ranged from 22-28 years old. Some of them were full time local musicians, others were part-time. They spanned a mix of solo and band musicians. None of them were signed by a local or national music label at the time when they were interviewed, but they all expressed the intention to advance their music career as independent, established musicians. The musicians came from diverse ethnic backgrounds and created music in a variety of genres, some of them were local genres, some were mainstream, global genres. To qualify for the interviews, the musicians had to live and perform and/or create in the music scene local to them for at least 2 years prior to 2019. This was verified by asking them to share their professional social media accounts where they promoted their music and shared flyers of their performances. Privacy and anonymity of data were guaranteed to all participants, and all were financially compensated for their time.

Through these interviews and exercises with listeners and creators, we reached data saturation (i.e., the same topics were repeatedly mentioned across the interviews) and transitioned to analyzing our findings. We analyzed the data from Study I by listening to the recordings of the interview conversations, reviewing the interview notes and artifacts sent in by the participants and using the affinity diagramming methodology [34] to organize our findings. We let local music's definition emerge from the data without having any pre-defined notions of what "local" music might mean to our participants, but with keeping in mind considerations noted in the Related Literature section. The listener data were analyzed separately from the artists' data to keep track of any significant differences between these two groups. Following the affinity diagramming methodology, distinct observations per participant were extracted from the audio recordings, notes, and artifacts. Next the observations from each participant were clustered into common themes between the participants. Finally, in a group exercise, the researchers did a review of the themes. They discussed why certain observations were clustered together and reached a final agreement on the proposed clusters and their descriptions. The following sections recount the recurring themes in participants' responses.

**3.0.1 The listener perspective.** As a first, overarching theme, participants emphasized the evolving nature of localness. As people come and go from a place, its character and the characteristics of its music constantly change. Participants in Salvador, for example, pointed to the genre of Axé, which has deep ties to the region and city specifically. Even this very important style of music is constantly evolving in its sound, suggesting attempts to identify and recommend local music need to respect its fluidity.

Despite the fact that local music's definition is constantly evolving, there were three consistent themes that emerged from participants' inputs across all locations, if emphasized somewhat differently. These themes were: (1) artists incorporating "signifiers" of place in their music, (2) artists being "from" that place, (3) artists currently being accessible to people in that place. Notably, the themes emphasize the central role that artists play in defining local music.

In the first theme, participants frequently described how artists imbue their music with locally-familiar sounds and references, or "signifiers" that suggest the music had been created by someone in that place. These signifiers take many forms and can be incorporated into lyrics (e.g., through the use of local language, slang, or references to important topics), as well as in the music itself (through the use of local instruments, genres, rhythms, and sounds). Signifiers also range in their distinctiveness: some explicitly identify the locale, while others serve as almost coded language that speaks directly and sometimes exclusively to people in that place. As examples, Houston participants referenced "chopped and screwed" styling, a deejaying technique developed by area musicians, which involves carving up samples that have been slowed down dramatically, creating a unique sound that's immediately recognizable to music fans in Houston. In Port Harcourt, participants emphasized the use of local languages and slang, including phrases like "who goes there," which subtly signal experience with the city's culture.

The second theme emphasized by study participants suggests an artist's localness takes root in the depth and duration of time spent living in that place. Being "from" or born in that place or nearby was frequently mentioned. However, simply having spent a significant amount of time living there was also sufficient for many to impart localness. This sentiment of being perhaps a current or recent resident rather than a lifelong resident was highlighted particularly by participants in Houston, a city that is among the most diverse in the US [4] and generally regarded as a melting pot of cultures. Participants noted, too, that even when an artist no longer resides in a location, they can often still feel local, provided the artist continues in some way to maintain their association to the place.

This second theme deals the most directly with geography. Naturally, this theme was expected, and so our interviews pressed to explore where the boundaries of who is "from" a place lie. We also explored the boundaries of "place" itself and what geographic scales are implied for local music. Here, we noted some consistency and also some variation across the three interview locations. Consistently, participants across the three places emphasized that the closer an artist was geographically, the more local they feel, mirroring existing literature from place attachment psychology. The boundaries where local stops, however, ranged from extending up to the country level (Nigeria) in Port Harcourt, the state level (Bahia) in Salvador, and the metropolitan area (Greater Houston) in Houston.

The third theme emphasized by participants shares some relation to the second on geographic closeness but widens its focus to include artists' current accessibility to the people in that locale. Here, accessibility was referenced in two forms: physical and emotional accessibility. With respect to physical accessibility, participants drew distinction based upon the ease or difficulty of attending live performances (e.g., due to cost, frequency of shows, etc.), blurring

the lines between being physically and emotionally close to an artist. Participants noted that lesser-known artists, such as musicians performing in small venues, restaurants, even street corners, could be approached with ease, facilitating a sense of connection and thus localness. To many, this necessarily implied that the more popular an artist became, the less accessible and therefore less local they tended to feel. That said, exception was granted based on artists' emotional accessibility. That is, artists who made effort to maintain their associations to place as their popularity grew also continued to be characterized as local. In Port Harcourt, participants referenced a local act who had recently achieved international fame but continued, for example, to wear recognizably local clothing in their music videos, a clear signal to city residents that the artists remained local.

**3.0.2 The artist perspective.** The previous section combined insights from listeners and artists, as consumers of music themselves. We now pivot to focus specifically on artist's considerations for localizing music recommendations.

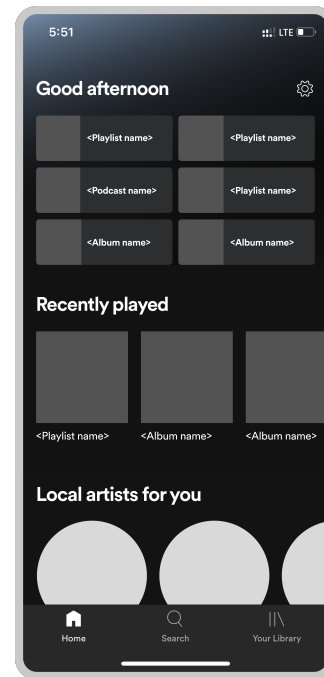
Across all interview locations, the artists expressed deep appreciation for and pride in their local music communities. Their localness was described as both part of their situational identities (i.e., an appreciation for where they are right now in their career, and the music scenes to which they belong) as well as their personal identities (as representatives of their respective places, and ambassadors of its local culture). To them, being a local musician meant belonging to a community that serves as an invaluable source of inspiration and ideas, of knowledge sharing and mentoring, and of networking and relaying of opportunity.

When asked about their attitudes towards algorithmic recommendations of local music, artists expressed a few common sentiments. First, artists generally believed that localized recommendations could, if done responsibly, create an opportunity to cast a spotlight on lesser-known artists. Several artists expressed concern that care should be taken to ensure that all local artists – not just the ones whose music aligns with locally-popular genres – could be featured. Relatedly, several other artists emphasized that the opportunity to highlight local artists should not focus on artists who perhaps already enjoy widespread popularity. Instead, a desire was expressed to focus on “genuinely local” artists, suggesting that artists' localness wanes as their listenership becomes more and more geographically diffuse.

The prospect of being labeled as a local artist was received somewhat differently across the artists interviewed. The word “local” itself carried different connotations that ranged from being fashionable at best to, at worst, uncool. Artists who self-identified as pop musicians noted that the word may be unwelcome to some, especially those whose aspirations of achieving wider and decidedly non-localized acclaim may be demeaned by the label.

## 4 STUDY II: LARGE-SCALE EXPERIMENTS OF LOCAL ARTIST RECOMMENDATIONS

The qualitative study presented in the previous section provides clear guidance for how “local” is currently defined in the context of music listening. In this section, we aim to follow this guidance as exactly as possible in order to formulate recommendations that align with this definition. Delivering these recommendations at



**Figure 1: Example screenshot of the Spotify Home screen at the time of our experiment. The interface then consisted of six listening “shortcuts” at the top, followed by a shelf of “Recently played” items, followed by a series of other shelves. In our experiment, this second shelf was a shelf of artist recommendations. Note that the names and likeness of streamable entities (squares) and artists (circles) have been hidden in the image.**

scale as part of a randomized experiment will inform whether the apparent interest expressed by listeners in the qualitative study generalizes to music listeners more broadly<sup>1</sup>. Concretely, in a time when music is no longer necessarily bound to location, to what extent does localness continue to shape its consumption?

In the subsections that follow, we outline the simple approach taken to operationalize the definition of “local” and formulate suitable recommendations. We then detail the process of delivering these recommendations via a large-scale experiment. And, finally, we discuss the results.

**4.0.1 Formulating local recommendations.** As a starting point in translating our observed definition of “local” music into suitable recommendations, we first had to determine where and what listeners would see. That is, recommendations are delivered in a variety of ways on Spotify, varying in terms of their targeted use-cases, visibility, as well as the actual entity being recommended (e.g., recommending a playlist, artist, track, etc.). For our purposes, we sought to reach the broadest possible set of listeners and therefore decided to surface recommendations directly on the Spotify Home screen (see Figure 1). On Home, recommendations are delivered

<sup>1</sup>Recall that participants were selected based on having some level of interest in local music already and may not predict broader interest.

via “shelves” or vertically stacked rows of content, each appearing with a “contextualization” or label communicating the theme or intention for the shelf. Finally, we decided to focus on recommending a shelf of artists (rather than, say, albums or playlists), as our observed definition of local music primarily centered around local artists. This choice also aligned with what artists specifically noted would be desirable to them (i.e., to use the recommendations to help grow their audiences). Finally, this choice also usefully minimizes the complexities of curating content into playlists and inadvertently introducing biases related to how well we might perform that additional step.

**Listener localities.** Resolved to recommending artists to listeners, we next needed a process for determining who is local to where, first for listeners. As mentioned in the introduction and as some Study I participants volunteered, as well, people can feel significant attachment to multiple places. What’s more, localized recommendations could, in principle, help a person reconnect to places other than their current location. However, for the purposes of our study, we elected to focus on where listeners currently reside. This decision usefully narrows the interpretation of listeners’ attachments to place and aligns with sentiments of driving audience growth amongst listeners who might find the artists, their work, and specifically their performances most accessible. While Spotify does not collect precise location data from its users, geolocation of IP addresses affords approximate locations (i.e., ones that are generally accurate to the city or metropolitan area level), which the platform uses for reporting, calculating licensor payouts, and to surface concert recommendations. As such, we used these to estimate listeners most frequent, approximate location in the two months leading up to our experiment.

**Artists’ localness.** Next, we needed to identify local artists along with the locales to which they are associated. While no exact formulation or requirements exist, Study I emphasizes a number of dimensions that combine to contribute to an artist feeling “local.”

- Local artists were generally described as having distinct popularity (if not exclusively so) to particular locations, places where they may or may not be “from” originally
- Emotional and physical accessibility of artists contributes mightily to artists feeling local to listeners, suggesting an inverse relationships between an artist’s localness and their popularity as well as their geographical distance from the listener
- Local artists may publicly share or emphasize their association with a particular area
- Local artists create music that contains signifiers of place, including sounds, instruments, slang, and other influences that may be emphasized within that locale

As a practical matter, we decided not to focus directly on the last element listed here (i.e., music’s local signifiers). Incorporating this dimension, however important, would require a precise, scalable approach for recognizing locally-specific references and sounds, many of which involve subtle, almost coded references to that location. For example, lyrical references to “the six” would almost certainly defy statistical recognition but might easily catch the ear of listeners in Toronto’s six municipalities. As such, we instead focus

on how these references might manifest indirectly, contributing to the distinct popularity of the music.

With that perspective, the foundation of our approach builds upon local artists being described as having geographically distinct listenership. To have “distinctly” localized listening could imply a variety of interpretations. Ultimately, we adopted a straightforward implementation in order to minimize unnecessary complications to downstream analyses. Our implementation identifies distinctly or surprisingly localized listenership in the statistical sense. That is, if the actual size of an artist’s listenership in a particular location exceeds what would be expected or predicted by some model, we conclude that they are, to some degree, “local” to that place.

Making the general process described above more concrete, we focused our calculations on artist “follows” on the Spotify platform<sup>2</sup>. Artist follows are a low-frequency but high-intent signal from listeners, indicating that they are explicitly (a) familiar with that specific artist and (b) interested in receiving notifications about them, for example, when they release new music.

We calculated an artist’s localness score  $L$  according to the following procedure. First, let  $F$  denote the number of followers for the artist’s earliest  $k \leq 5000$  followers on Spotify, requiring a minimum of  $k \geq 100$  followers. Let  $F$  be indexed by  $r$ , denoting each region (e.g., “states” in the US) in the full set of regions  $R$  contained in that country, such that  $F_r$  denotes how many of the artist’s earliest listeners were located in region  $r$ . Similarly, let  $T_r$  denote the total number of followers of all artists in region  $r$ .

Next, compute the expected number of followers in the target region  $r^*$ ,  $\mathbb{E}(F_{r^*})$ , as the average of all individual-region estimates, based on how many follows in one region tends to predict in another.

$$\mathbb{E}(F_{r^*}) = \frac{1}{|R|-1} \sum_{r \in R \setminus r^*} \left( \frac{T_{r^*}}{T_r} \right) \cdot F_r \quad (1)$$

Finally, let  $L_{r^*}$  represent the ratio of actual to expected number of followers in region  $r^*$ , the “localness” of the artist in region  $r^*$ .

$$L_{r^*} = F_{r^*} / \mathbb{E}(F_{r^*}) \quad (2)$$

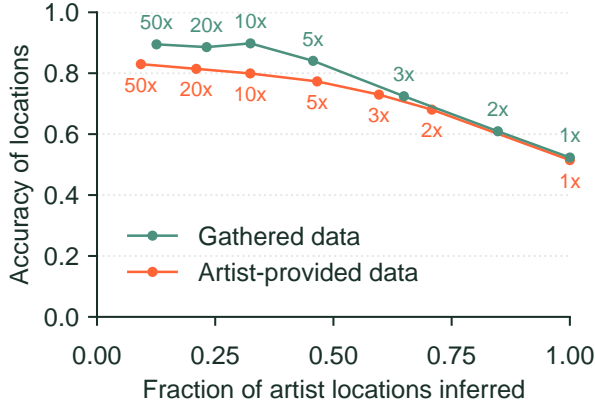
Equation (2), computed for all regions, provides a wide view of an artist’s localness. However, Study I indicated that a much more granular definition is desirable, ideally achieving city-level localness. To achieve this level of granularity, we applied a similar process to compute city-level actual-to-expected follower counts, allocating our region-level estimates ( $\mathbb{E}(F_{r^*})$ ) according to the probability that a follow in  $r^*$  came from city  $c^*$ .

$$\mathbb{E}(F_{c^*}) = \mathbb{E}(F_{r^*}) \cdot \Pr(c^* | r^*) = \mathbb{E}(F_{r^*}) \cdot \frac{T_{c^*}}{T_{r^*}} \quad (3)$$

As detailed, this formulation affords a usefully variable measure of localness: the more an artist’s actual audience size exceeds expectation in some locale, the more confident we might be in their localness (which we confirmed can be used to tune labels to be

<sup>2</sup>In addition to follows, we evaluated a number of other on-platform signals that might indicate localized listenership. To choose among these, we compared signals’ ability to reproduce both artist-supplied location data and an independently-gathered dataset. This gathered data involved manually noting locations specified through artists’ biographies and social media profiles. If multiple locations were mentioned, we selected the one where the artists career began, rather than where it’s taken them since.

more or less permissive – see Figure 2). What’s more, as an artist’s geographic reach widens and dilutes their distinctly localized following, this measure of localness also dilutes, providing a dynamic signal that aligns well with the themes expressed in Study I, namely that the recommendations should ideally serve to elevate artists whose listenership is distinctly localized.



**Figure 2: Accuracy versus coverage of artist locale prediction at the region level for two data sets: (green) artist-provided location data for a sample of  $N=59500$  US-based artists, and (orange) a manually-gathered dataset of  $N=152$  US-based artists. Each dot represents a unique threshold on the actual:expected follower counts per artist. Thresholds near the middle indicate that about half the artists in either sample can be localized with about 80% accuracy overall, and about 90% can be localized with about 60% accuracy.**

**Matching local artists and listeners.** Equipped with listener locations and artists’ localness scores for those locations, the last element required for experimentation is some process for deciding which local artists to present to which listeners. Participants in Study I discussed localness as *enhancing* their interest in an artist’s music (i.e., being a secondary not primary source of relevance). For the purposes of recommending local artists in this experiment then, this implies that, above all else, the recommendations should surface music that the person is likely to enjoy. Accordingly, we decided to base the matching of artists and listeners on the affinity that a listener holds for the styles of music performed by that artist, and apply localness as a multiplier of that affinity.

Putting this formula into action, we leveraged Spotify’s production systems that apply “microgenre” labels to artists and for calculating each listeners’ affinity to these microgenres. Microgenres are applied by a machine learning system that takes as inputs both on- and off-platform signals evidencing the relatedness of artists, creating a framework for detecting and annotating music genres. A listener’s affinity for these microgenres is then signaled by their interactions with content having that label. More concretely, affinity is computed as a weighted non-negative summation of positive behavioral indicators ranging in how frequently they occur and how clearly they signal interest. For example, where listening to

a song indirectly signals some level of interest in a genre, saving that same song implies a desire to hear it again in the future, signaling a perhaps deeper level of interest. Other signals combined by this model include artist follows, playlist creation, and others, where weights have been tuned to assist in Spotify’s production recommender systems.

With all components of our calculations defined, the process of surfacing local artists to listeners was accomplished as follows. First, let the pool of all eligible artists contain those having between 100 and 50k followers, and having between 100 and 500k monthly listeners in the month prior to our experiment. These signals ensure, on the low end, sufficient data to signal currently-active artists and reliably estimate localness, and, on the high end, ensure alignment with listener-expressed sentiment from Study 1 about popularity tending to contribute to diminished perceived accessibility<sup>3</sup>. Further, we required artists to have localness scores of at least 1.5 (i.e., 50% more followers than expected<sup>4</sup>) at either the region or city level to be considered eligible as “local.” Among these artists, we calculated listeners’ affinity to each by summing together the listeners’ microgenre affinities ( $A$ ) for each of the artist’s associated microgenres ( $M$ ). The resulting sum is multiplied by the artist’s localness score,  $L$ , for both the city and region of the listener, lending distinct preference for city-level local artists. This quantity is further multiplied by boosting terms  $\alpha_{city}$  and  $\alpha_{region}$  wherever the location the artist supplied to Spotify matched the listener’s city and region, respectively. These boosting terms served to prioritize artists who we might be more certain would be considered local to that listener. Together, this calculation produces the quantity  $\theta$ , denoting the affinity score for the listener-artist pair.

$$\theta = L \cdot \left( \sum_{m \in M} A_m \right) \cdot \alpha_{city} \cdot \alpha_{region} \quad (4)$$

We computed  $\theta$  for all eligible listener-artist pairs and recommended the (at most) twenty artists with the highest corresponding  $\theta$  for each listener. For the purposes of our study, we consciously avoid delving into exhaustive investigation of the recommendations created by the process described above. Certainly, this formulation is one of many options to operationalize the observations of Study I into a recommender system. Our aim was not, however, to find the best formulation but, rather, to adopt as literal an interpretation as possible to avoid unnecessarily complicating the results to follow.

Finally, we drew a uniform random sample of  $N=1,204,852$  US-based Spotify subscribers to be allocated across the experimental groups outlined in the sections that follow.

#### 4.1 Evaluating local’s impact on recommendation

The previous section details a simple approach for recommending artists to listeners in a way that directly services how both parties

<sup>3</sup>In practice, these upper bounds contributed very little to shaping the local recommendations that participants saw. Figure 3 shows that the upper bound on followers corresponds roughly to the maximum popularity of local artists surfaced by calculating localness. The upper bounds did, however, ensure that all artist comparisons (specifically “non-local” recommendations, to be described below) had comparable maximum levels of popularity.

<sup>4</sup>Minimum thresholds for localness as well as artist follower and listener counts were determined by attempting to maximize the accuracy of hand-gathered locations (Figure 2) and number of eligible artists.

tend to define “local” music. We now turn our focus to formulating key research questions that speak to whether and to what degree potential exists for incorporating this element of shared, “offline” context in online music streaming. In particular, we sought answers to the following:

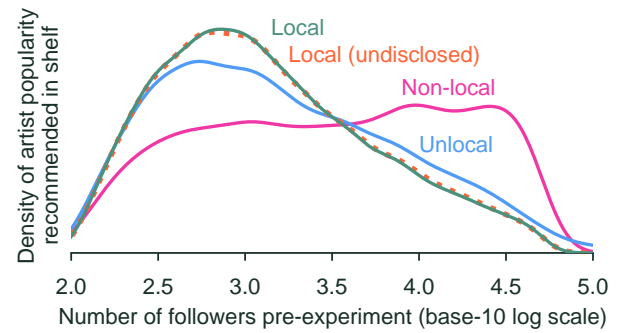
- **RQ1:** How do local artist recommendations perform in the broadest sense in an online, global music streaming platform?
- **RQ2:** Compared to similarly-constructed recommendations, do local recommendations seem to offer unique value? Does highlighting the shared context of “local” explicitly impact engagement with recommendations?
- **RQ3:** Are certain demographics of listeners more or less likely to engage with localized recommendations?
- **RQ4:** Beyond initial engagement, do “local” recommendations translate to longer-term impact?

These research questions imply a number of different comparisons to be made and control conditions to be constructed in order to enable those comparisons. For RQ1, the first comparison is a relatively straightforward one, analyzing the change in performance of the standard Home user experience compared to one featuring a shelf of local artist recommendations. We’ll refer to this experimental shelf and test case as simply the “local” shelf, which was shown to listeners under the title of “Local Artists For You.”

Similarly, we also wished to compare the performance of this local shelf to similar ones where the artists selected were specifically from regions *other than* where the listener resides. We constructed two controls for this purpose. The first, applied the same listener-artist matching procedure as the local shelf but selected from the set of artists from all non-local regions. We will refer to this control condition as “non-local” recommendations, which were presented to listeners as “Artists For You.” The second addresses a limitation of the first, which is that the number and composition of genres spanned by local artists may be narrower than the set of all non-region-local artists combined. As such, we constructed a similar control shelf by first generating listeners’ local shelves and then “un-localizing” them by replacing each artist with a non-local alternative having the same order of magnitude of monthly listeners and followers, and having overlapping microgenre characterizations. We will refer to this second baseline as the “unlocal” shelf. It, too, was presented to listeners as “Artists For You.”

RQ2 asks whether recommendation outcomes are impacted by listeners having explicit knowledge that the artists being recommended are local. This implies being able to contrast outcomes where the word “local” is and is not included in the contextualization. As such, we complemented the local shelf with a functionally equivalent set of recommendations, titled as “Artists For You,” which we will refer in our results as “local (undisclosed).”

**4.1.1 RQ1: General performance of the local recommendations.** Perhaps the most basic but essential measure of success for a recommendation system or strategy is whether or not people use it. That is, before diving into the details of our experiment and comparing across conditions, a crucial question to ground our interpretation is, how did the incorporation of local recommendation impact the overall usage of the streaming service. To answer this question, we looked to whether the inclusion of the local shelf in the Home



**Figure 3: Kernel density estimation of artist popularity surfaced by each experimental condition. “Unlocal” – formed by generating a local shelf and swapping artists for similar non-local ones – establishes a more suitable baseline for comparing artists where the primary difference is localness vs. not. “Non-local,” which considers recommendations from all non-local artists in the experiment, tends to skew more towards popular artists, optimizing for taste alignment with the listener.**

interface altered its overall “consumption share” (i.e., streaming from Home as a fraction of all streaming). In short, we found no statistically significant change in people’s overall usage of Home.

While non-inferiority may not signal obvious support of local’s overall potential, three pieces of context offer encouragement. First, the experimental setup used here, which affixed a shelf of local artists to listeners’ Home screen, entailed making a usually-dynamic interface static. One should expect that under most conditions, removing this dynamic element would deteriorate performance among listeners, who would see the same slate of recommendations over and over again. Second, the nature of this particular recommendation shelf is in service of discovery, displacing other shelves that might, for instance, service listening to familiar content, a relatively-speaking more frequent activity. Third, discovery comes here by way of surfacing very much lesser-known artists: approximately 1.2% of local artists surfaced experimentally had been streamed by *any* of the listeners prior to the experiment. All of these factors in view, non-inferiority signals strong encouragement for localized recommendations.<sup>5</sup> What’s more, anecdotally, the localized shelf’s performance equaled top-performing discovery-focused shelves in the US market on measures including the likelihood of a listener streaming the content when it was shown. While an exhaustive examination of localized recommendations compared to all other forms stretches well beyond the scope of the study at hand, in the broadest sense, we observed very positive indications of demand for local music on global services.

<sup>5</sup>In a separate, large-scale study spanning 15 countries, we conducted a nearly-identical experiment in which the local artists shelf was positioned dynamically on the Home screen, according to Spotify’s production algorithm. We omit the details of this experiment due to space limitations, however, the experiment confirmed that inclusion of localized recommendations significantly increased consumption share from the Home interface, if slightly.

Comparison	Streams	Clicks	Follows
Local vs. Unlocal	<i>ns</i>	+12.9%	+43.0%
Local vs. Non-local	+11.4%	+13.8%	+89.3%

**Table 1: Relative performance of local artist recommendations compared to baselines, unlocal and non-local, reported as percent changes in total number of listeners with streams, clicks (to view artist pages), and artist follows. Only statistically significant percent changes are reported following a  $\chi^2$  with Bonferroni correction ( $p < \frac{\alpha}{m} = \frac{0.05}{6}$ ).**

4.1.2 *RQ2: comparing “local” to similar recommendations.* Having evaluated localized recommendations in the broadest sense, we next sought to evaluate how they compare to similarly constructed recommendations where the local context was either missing or undisclosed. Together, these comparisons inform whether localized recommendations offer specific value over comparable, not-local recommendations, and to what extent that value potentially relies on explicitly highlighting the context to listeners.

Table 1 reports percent changes across the number of listeners who streamed (listeners sampling at least 30 seconds of a track), clicked (listeners clicking on an artist in the shelf to view the artist’s page), and followed (listeners subscribing to notifications and recommendations pertaining to the artist) one or more of the artists from the shelf. With the exception of just stream counts, local recommendations yielded significantly higher engagement with the recommended artists. Notably, the unlocal baseline performs somewhat better than the non-local baseline. The key difference between these shelves being that the non-local baseline skews towards artists with more followers (Figure 3) and a less genre-diverse collection of recommendations, due to the fact that the baseline optimizes solely for alignment with genre affinity, so listeners would see mostly artists from their most favorite genres.

From these results, we draw two insights. The first and most fundamental is that localizing these artist recommendations offered significant improvement over both baselines, perhaps most strikingly in terms of artist follows. This observation is encouraging for this form of recommendation in the sense that it signals specific interest in the artists themselves. The second insight speaks to how the local recommendations are limited to a smaller set of artists in ways that impart greater diversity and better outcomes. Embracing and recommending the full landscape of artists who are local to a place was emphasized in particular by the artists in our study, and our observations suggest that doing so is preferable for both artists and listeners.

Next, we investigated the extent to which the success of local recommendations hinges on explicitly highlighting or disclosing that context to listeners. To draw this comparison, we contrast the performance of the local shelf to its undisclosed version (i.e., comparing the performance of the same local recommendation strategy presented as “Local artists for you” versus simply “Artists for you”). Comparing the outcomes from the two local shelves, we find that they performed very similarly overall, however, contrasting one to the other, including “local” in the shelf title yielded 11.8%

Generation	Streams	Clicks	Follows
Baby Boomer	<i>ns</i>	<i>ns</i>	<i>ns</i>
Gen X	<i>ns</i>	<i>ns</i>	+38.4%
Millennial	<i>ns</i>	+10.0%	+46.2%
Gen Z	+8.1%	+23.2%	+39.8%

**Table 2: Relative performance of local artist recommendations by listener age, compared to “unlocal” baseline and reported as percent changes in total number of listeners with streams, clicks (to view artist pages), and artist follows. Only statistically significant percent changes are reported following a  $\chi^2$  with Bonferroni correction ( $p < \frac{\alpha}{m} = \frac{0.05}{12}$ ).**

fewer streams, similar performance for clicks, and 10.4% more artist follows ( $\chi^2$  with Bonferroni correction).

The observation that local recommendations offer significant improvement over unlocal and non-local baselines, both with *and crucially without* revealing the local context suggests that recommender systems can benefit from showcasing local artists and, also, that there is some flexibility with respect to how and whether the local context is presented explicitly. That these two presentations of local music recommendations vary somewhat in their outcomes, however, implies that this flexibility may elicit different forms of engagement, possibly varying across types of listeners.

**RQ3: do outcomes for local vary by demographics?** Our third research question asks whether the impact of localizing recommendations and explicitly disclosing that local context varies as a function of listener demographics. To answer this question, we looked specifically at listeners’ self-reported ages, bucketing each into broad generational categories of Baby Boomers (birth years between 1946 and 1965), Gen X (1966-1980), Millennial (1981-1996), and the over-18 portion of Gen Z (1997-2003) from when the experiment was ran.

Our focus on listener age draws motivation from a previous study [39], which observed that younger listeners tended to have somewhat higher propensity for local music, which was defined in that study as simply music where the performing artist is from the same country as the listener. The authors of that study hypothesized that this effect might stem from the social dimension of music and its special importance to younger listeners [9, 35]. A key driver of that social value, attending concerts locally, is indirectly serviced by surfacing local artist recommendations. As such, we looked for similar age effects in this experiment as a test of our earlier hypothesis.

Comparing the local shelf to the unlocal baseline (Table 2), we find that the impact of localized recommendations seems to resonate most strongly with younger listeners. The impact across different listener actions is relatively consistent across age groups and resembles that of the aggregated performance, which showed the strongest effect on driving artist follows.

Next, we analyze the results of the local shelf without explicitly disclosing the local context (reminder: recommendations were presented under the title “Artists for you”). In contrast to the explicitly localized recommendations, outcomes here (Table 3) tended to emphasize listener actions of streams and clicks, and without any clear



Generation	Streams	Clicks	Follows
Baby Boomer	+21.9%	+17.7%	<i>ns</i>
Gen X	+14.8%	+11.5%	<i>ns</i>
Millennial	+16.7%	+16.4%	+38.6%
Gen Z	+10.2%	+10.9%	<i>ns</i>

**Table 3: Relative performance of “undisclosed” local artist recommendations by listener age, compared to “unlocal” baseline and reported as percent changes in total number of listeners with streams, clicks (to view artist pages), and artist follows. Only statistically significant percent changes are reported following a  $\chi^2$  with Bonferroni correction ( $p < \frac{\alpha}{m} = \frac{0.05}{12}$ ).**

trend regarding age. These findings support our earlier observation that localized recommendations seem to yield positive outcomes under various presentations, but the framing does seem to have a sizable effect on which outcomes they impact and for whom they are most impacted.

#### RQ4: do local recommendations yield longer-term impact?

So far, our analyses have focused on outcomes related to listeners engaging directly with an interface of local artist recommendations. These outcomes speak to how engagement with those artists was elevated over the course of our experiment. Next, we look to longer-term impact of the recommendations, focusing on how outcomes progressed in the weeks after the experimental shelf was removed from listeners’ Home screens.

In the week and second week following the completion of our experiment, we observe significant sustained interaction with the local artists in the experiment, compared to those surfaced in the unlocal baseline condition (Table 4). Here, we consider both streams and clicks to view artists pages as actions signaling continued interaction, omitting new follows as the completion of the experiment removed the mechanism for driving that signal. Notably, outcomes reported here are qualitatively indistinguishable for both versions of the local experiment (i.e., with and without explicit contextualization). In sum, these results demonstrate lasting impact for local artist recommendations compared to similar recommendations that lack this shared context.

Period	Streams	Clicks
1st week post-experiment	+38.4%	+113.6%
2nd week post-experiment	+42.6%	+147.4%

**Table 4: Relative performance of local artist recommendations compared to the “unlocal” baseline and reported as percent changes in total number of listeners with streams and clicks (to view artist pages) in the two weeks following the completion of our experiment. Only statistically significant percent changes are reported following a  $\chi^2$  with Bonferroni correction ( $p < \frac{\alpha}{m} = \frac{0.05}{4}$ ).**

## 5 DISCUSSION

In this study, we gathered input from music listeners and artists to refine a working definition for how both currently conceptualize and define “local” music, drawing inspiration from existing literature. Participants expressed a clear focus on artists with geographically localized popularity, guiding and motivating a large-scale experiment to evaluate the impact of localized artist recommendations in an online, global music-streaming setting. Evaluating our experiment, the results show that, while digital distribution online streaming have enabled increasingly global access to music, local music clearly continues to play a crucial role in shaping music preferences. Further, we find there to be flexibility in how the context of local can be incorporated into online recommendations, that they hold special significance for younger listeners, and that they seem to drive lasting impact for bolstering artists’ followings beyond first impression.

With such a wide range of topics contributing to the intersection of attachment to place and to music, our study is necessarily limited in a variety of ways that should be noted. First, our qualitative study brought to light perhaps the largest and most important limitation of our study: a significant portion of what participants consider to be “local” music may in fact not be available on large music-streaming platforms like Spotify. Though technology has enabled more artists to record and distribute their music in recent years, having any amount of music recorded and available online remains a significant milestone in an artist’s career. And, because our approach in the quantitative study requires a certain degree of potentially localizing signal be present (in particular, artists having at least 100 followers on the platform), our quantitative study necessarily overlooks a fair amount of what we believe participants would consider to be local artists who have music on Spotify and, naturally, all of those who don’t.

Another limitation may become clearer in time and stems from the timing of our studies. All parts of this work took place as various stages of the COVID-19 pandemic, which imposed severe restrictions on live music in particular. Our qualitative study was conducted in the summer of 2020, during a particularly restrictive phase of the pandemic, which may have shaped participants’ reflections on local music, in ways that potentially emphasized differences in a world with and then without live local music, and potentially contributed to other differences being forgotten. Our quantitative study, on the other hand, took place in late 2021, when social life and live music specifically was much closer to resembling the pre-pandemic world. This important consideration in mind, we do not believe the context of the pandemic changed the takeaways from this study.

An important consideration for this study, people can and in many cases do develop attachment to more than one place [12], and some may not develop attachment to any [18]. Given the intentions of work — namely, to evaluate the effectiveness of integrating the local context to connect artists with the listeners who may find it most convenient and compelling to discover and ultimately support them — we consciously made the simplifying decision to focus on people’s potential attachments to the places where they currently reside. That said, we believe applications for localized recommendations might ideally afford consumers the ability to specify all (or

none) of the locations to which they are connected. Doing so in the context of music specifically might serve to expand the number of listener-place connections enriched, in addition to facilitating more creator-listener connections.

Similar questions about the potential absence of place attachment also extend to artists. First, as mentioned in the selection of locations for Study 1, places themselves must possess certain qualities, namely a level of population and interest necessary to sustain musical communities. Whether or not those qualities are satisfied and communities exist, though, artists may not necessarily attach to them. Under our formulation of localness, we allow for this possibility (i.e., artists not having ties to local) but did not study this in detail. We welcome future work to investigate the current state of virtual scenes [2], how they potentially intersect with scenes tied to place, and how music's composition is shaped by its connections to communities arising both virtually and geographically.

As referenced earlier, a core component of how study participants defined "local" music focused on signifiers of place being present in the music itself, including local slang or references in the lyrics, usage of local instruments or styling, etc. In other words, part of what contributes to an artist feeling local is encoded in their art, suggesting content-based analyses may be particularly useful for identifying and amplifying local artists' work. Such analyses pose significant challenges, however. First the technical challenge of detecting the presence of particular instruments or musical stylings or (perhaps intentionally coded) language is formidable. What's more, the subtleties of understanding which factors should be present, in what amounts, in which places varies noticeably by place and likely over time. Instead, we focused on a formulation that centered around distinctly localized popularity, in effect letting places themselves implicitly weigh these factors. We believe this offers an effective starting point but also one that we hope might inspire further research into, for example, how platforms might empower communities to take more explicit control over such definitions.

In this study we consider how place attachment and connection to the offline world mediates discovery in online environments. We note in particular how this mechanism for driving discovery contributes to the growing of audiences for relatively lesser-known artists on such platforms, using literal common ground to establish familiarity and connect listeners and creators. While some have been referenced already, past studies suggest a host of psychological benefits are afforded to individuals with strong connections to places [32]. We believe, therefore, that our findings here motivate that local recommendations and offline context generally can and should be an important part of online content platforms' strategies moving forward, provided they can be achieved in ways that are respectful of both the privacy of everyone involved, as well as of the manner in which artists and places collectively would want to be represented. With these considerations in mind, we welcome continued study in the pursuit of responsibly localized recommendations and hope that they may serve to strengthen local communities globally.

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## REFERENCES

- [1] Damian C Adams and Matthew J Salois. 2010. Local versus organic: A turn in consumer preferences and willingness-to-pay. *Renewable Agriculture and Food Systems* 25, 4 (2010), 331–341.
- [2] Andy Bennett and Richard A. Peterson. 2004. *Music scenes: local, translocal and virtual*. Vanderbilt University Press.
- [3] David Byrne. 2017. *How Music Works*. Crown.
- [4] Randy Capps, Michael Fix, and Chiamaka Nwosu. 2015. A profile of immigrants in Houston, the nation's most diverse metropolitan area. *Migration Policy Institute* (2015).
- [5] Derek Cheng, Thorsten Joachims, and Douglas Turnbull. 2020. Exploring Acoustic Similarity for Novel Music Recommendation.. In *Proceedings of the International Society for Music Information Retrieval*. 583–589.
- [6] Tyler Cowen. 2009. *Creative destruction*. Princeton University Press.
- [7] Kevin R Cox. 1997. *Spaces of globalization: reasserting the power of the local*. Guilford Press.
- [8] Kevin Dawe. 2003. The cultural study of musical instruments. *The cultural study of music: A critical introduction* (2003), 274–83.
- [9] Tia DeNora. 1999. Music as a technology of the self. *Poetics* 27, 1 (1999), 31–56.
- [10] Karlijn Dinnissen and Christine Bauer. 2023. Amplifying Artists' Voices: Item Provider Perspectives on Influence and Fairness of Music Streaming Platforms. In *Proceedings of the ACM Conference on User Modeling, Adaptation and Personalization*. 238–249.
- [11] Peter Donnelly. 1996. The local and the global: Globalization in the sociology of sport. *Journal of Sport and Social Issues* 20, 3 (1996), 239–257.
- [12] Eran Feitelson. 1991. Sharing the globe: the role of attachment to place. *Global Environmental Change* 1, 5 (1991), 396–406.
- [13] Andres Ferraro, Xavier Serra, and Christine Bauer. 2021. What is fair? Exploring the artists' perspective on the fairness of music streaming platforms. In *IFIP Conference on Human-Computer Interaction*. Springer, 562–584.
- [14] Fernando Ferreira and Joel Waldfogel. 2010. *Pop Internationalism: Has A Half Century of World Music Trade Displaced Local Culture?* Technical Report w15964. National Bureau of Economic Research.
- [15] Wes Flack. 1997. American microbreweries and neolocalism: "Ale-ing" for a sense of place. *Journal of Cultural Geography* 16, 2 (1997), 37–53.
- [16] Lisa M George and Joel Waldfogel. 2006. The New York Times and the market for local newspapers. *American Economic Review* 96, 1 (2006), 435–447.
- [17] Güliz Ger. 1999. Localizing in the global village: Local firms competing in global markets. *California Management Review* 41, 4 (1999), 64–83.
- [18] Maria Vittoria Giuliani, Fiorenza Ferrara, and Silvia Barabotti. 2000. One attachment or more?. In *People, Places, and Sustainability*. 111–122.
- [19] Estrella Gomez-Herrera, Bertin Martens, and Joel Waldfogel. 2014. What's Going On? Digitization and Global Music Trade Patterns Since 2006. *SSRN Electronic Journal* (2014). <http://www.ssrn.com/abstract=2535803>
- [20] Douglas Harper. 2002. Talking about pictures: A case for photo elicitation. *Visual Studies* 17, 1 (2002), 13–26.
- [21] Edmund M Harris. 2010. Eat local? Constructions of place in alternative food politics. *Geography Compass* 4, 4 (2010), 355–369.
- [22] Susan Jia. 2021. Local food campaign in a globalization context: A systematic review. *Sustainability* 13, 13 (2021), 7487.
- [23] Mark Katz. 2010. *Capturing sound: how technology has changed music*. University of California Press.
- [24] Anne Elisabeth Krueger, Kathrin Pollmann, Nora Fronemann, and Beatrice Foucault. 2020. Guided User Research Methods for Experience Design—A New Approach to Focus Groups and Cultural Probes. *Multimodal Technologies and Interaction* 4, 3 (2020). <https://www.mdpi.com/2414-4088/4/3/43>
- [25] Leslie S Laczko. 2005. National and local attachments in a changing world system: Evidence from an international survey. *International Review of Sociology—Revue Internationale de Sociologie* 15, 3 (2005), 517–528.
- [26] Maria Lewicka. 2010. What makes neighborhood different from home and city? Effects of place scale on place attachment. *Journal of Environmental Psychology* 30, 1 (2010), 35–51.
- [27] Setha M Low and Irwin Altman. 1992. *Place attachment: A conceptual inquiry*. Springer.

- [28] Sabine U O'Hara and Sigrid Stagl. 2001. Global food markets and their local alternatives: A socio-ecological economic perspective. *Population and Environment* 22, 6 (2001), 533–554.
- [29] Christopher Raymond and Sarah Gottwald. 2020. Beyond the “local”: Methods for examining place attachment across geographic scales. *Place Attachment; Routledge: London, UK* (2020), 143–158.
- [30] Maria Ryan. 2009. Mixed methodology approach to place attachment and consumption behaviour: A rural town perspective. *Electronic Journal of Business Research methods* 7, 1 (2009), pp107–116.
- [31] Leila Scannell and Robert Gifford. 2014. Comparing the theories of interpersonal and place attachment. *Place Attachment: Advances in Theory, Methods and Applications* (2014), 23–36.
- [32] Leila Scannell and Robert Gifford. 2017. The experienced psychological benefits of place attachment. *Journal of Environmental Psychology* 51 (2017), 256–269.
- [33] Steven M Schnell and Joseph F Reese. 2003. Microbreweries as tools of local identity. *Journal of Cultural Geography* 21, 1 (2003), 45–69.
- [34] Raymond Scupin. 1997. The KJ Method: A Technique for Analyzing Data Derived from Japanese Ethnology. *Human Organization* 56 (1997).
- [35] Maarten HW Selfhout, Susan JT Branje, Tom FM ter Bogt, and Wim HJ Meeus. 2009. The role of music preferences in early adolescents' friendship formation and stability. *Journal of Adolescence* 32, 1 (2009), 95–107.
- [36] Yi-Fu Tuan. 1977. *Space and place: The perspective of experience*. University of Minnesota Press.
- [37] Douglas R Turnbull, Justin A Zupnick, Kristofer B Stensland, Andrew R Horwitz, Alexander J Wolf, Alexander E Spigel, Stephen P Meyerhofer, and Thorsten Joachims. 2014. Using personalized radio to enhance local music discovery. In *CHI'14 Extended Abstracts on Human Factors in Computing Systems*. 2023–2028.
- [38] Marc Verboord and Amanda Brandellero. 2018. The Globalization of Popular Music, 1960-2010: A Multilevel Analysis of Music Flows. *Communication Research* 45, 4 (June 2018), 603–627.
- [39] Samuel F Way, Jean Garcia-Gathright, and Henriette Cramer. 2020. Local trends in global music streaming. In *Proceedings of the International AAAI Conference on Web and Social Media*, Vol. 14. 705–714.