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Network Dynamics and Culture Re-Use: The Growth of "Sampling" in the Music Market

Keywords: network dynamics, culture reuse, music market, REM, eventnet

Extended Abstract

According to the Oxford Dictionary of Music, sampling is *"the extraction of portions of sound from recorded media, and their reuse as material for new recordings"* [6]. Alternatively represented as a form of plagiarism or creativity, sampling has evolved from a practice restricted to few specific genres, such as *musique concrète* [3] and rap music [13], into a trait of popular 'popular music' [12]. What mechanisms sustained the diffusion of sampling and contributed to transforming it into a distinct structural feature of the field of music production?

To address this question, we examine the multi-relational network pictorially depicted in Figure 1. The upper layer of the figure illustrates the one-mode, directed network connecting songs via the 'sampling' relationship (note that the target nodes denote the songs whose music is sampled). The lower layer contains the artists affiliated with the songs via the relationship of 'production' (visually represented as the edges connecting the nodes included in different layers). Our analytical strategy involves identifying the network micro-mechanisms undergirding the evolving structure of the system that we observe.

The first network mechanism (see path 'A' in Figure 1) sits within the one-mode, directed 'sampling' network X and reflects the broadly investigated process of accumulative advantage [e.g., 1, 4]. We posit that new songs are more likely to sample the music contained in songs already sampled — up to the point where the few most central songs are disproportionally more connected than any other songs with positive in-degree. This prediction is consistent with the previous research showing that musicians adopt prototypical and well-known samples to claim their membership in their reference group [e.g., 14].

The second and third network mechanisms — analytically interrelated yet conceptually distinct — concern chains and triadic closure within X (see paths 'B,' and 'C' in Figure 1, respectively). According to the chain mechanism, a new song i is more likely to sample a target song j, which relies on a music sample from a third song k. The argument is that songs standing on samples have heritable characteristics that may help i get noticed in the market. For example, the novelty advantage emerging from sampling [11] may generate positive spillovers extending from j to j's alter songs. Further, 'longer' sampling chains such as $i \rightarrow j \rightarrow k \rightarrow z$ tend to produce an abstract yet highly recognizable cultural lineage [7, 10] that can become a valuable symbolic resource supporting i's position in the market. Triadic closure is the third mechanism we postulate. We expect i to sample both j and j's sample source, namely k. For example, it is common among music producers to re-use the vocal elements of j and the drums from the sample source of j.

Finally, we explore the role to social influence (see path 'D' reported in Figure 1). The intuition is that two collaborators $\{u, v\}$ can mutually socialize in each other's cultural references [2]. Thus, we expect that the sampling choices of artists u and v become more similar in the aftermath of collaboration (e.g., featuring). For example, in 2022, Post Malone sampled Mark Morrison's Return of the Mack, which was eventually sampled in 2021 by Post Malone's collaborator Chris Brown. It is worth noticing that direct interaction between u and v may not be a necessary condition for social influence to operate (unlike what Friedkin's model postulates [5]). Then, musicians with similar patterns of cultural production may make converging sampling choices.

The analyses concern a matched dataset encompassing five sources we collected between May 2022 and January 2023. We obtained the sampling data from WhoSampled, home to an online community that has generated and maintained a sampling network database with 870,602 unique songs. From Discogs, another community-driven initiative, we retrieved the production network linking 8,450,689 disambiguated artists with 146,225,062 songs and song meta-data (e.g., a song's release date). Using the Spotify API, we also collected the acoustic attributes and lyrics (where available) for 76,243,012 songs. To assess the consequences of network mechanisms A-D, we gathered songs' awards (1948-, source is Grammy Awards' website) and appearances in charts (1958-, source is Billboard's website).

We analyzed our data using an extension of `eventnet` to hypergraphs [8, 9], finding empirical support for all the proposed network mechanisms A-D.

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Exhibits

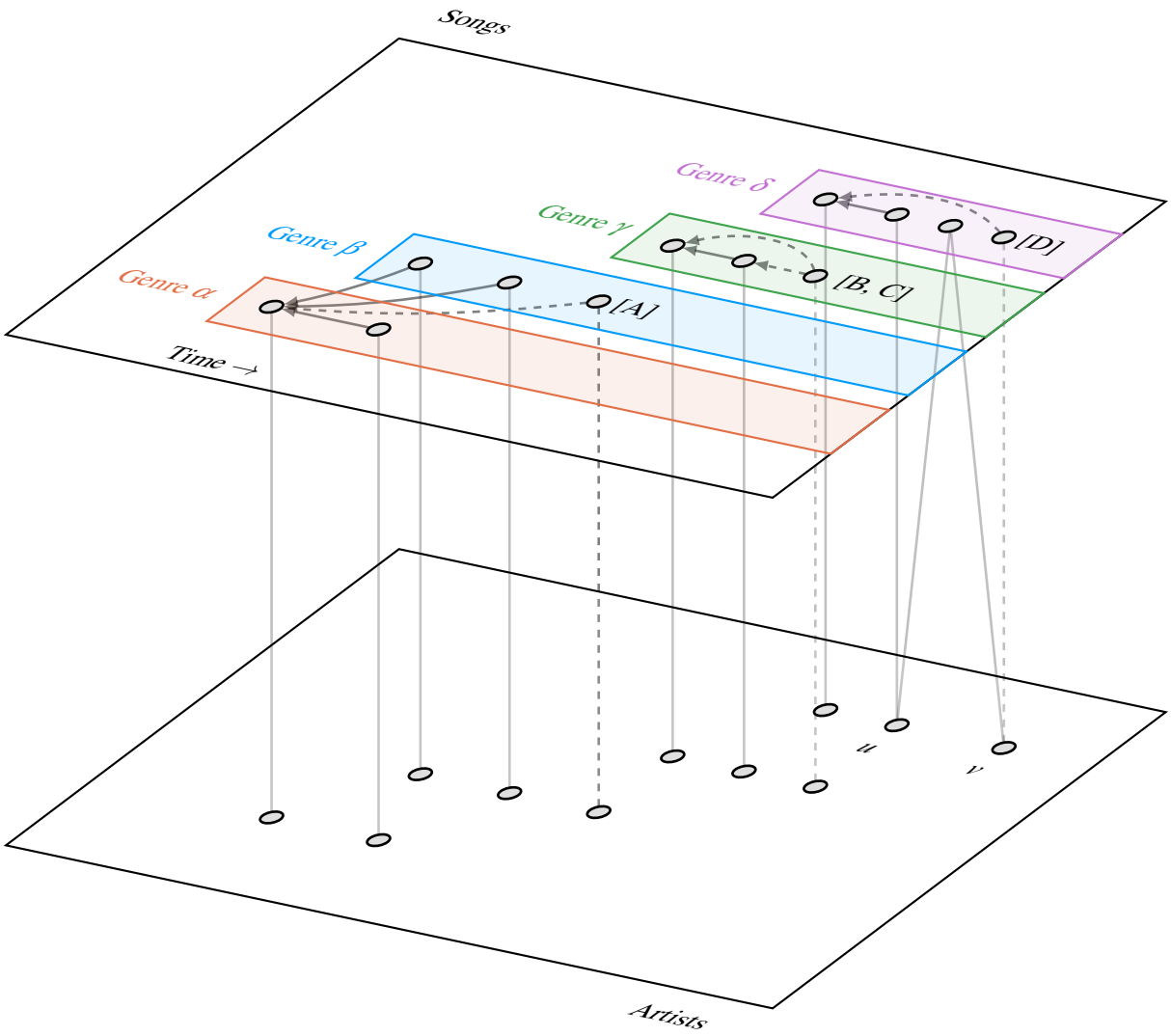

Figure 1: A stylized representation of sampling as a multiplex network connecting songs with artists. *Notes:* The upper layer includes the one-mode, directed 'sampling' network X, which connects ideal songs via the 'sampling' relationship (note arrows pointing to the song whose music is sampled); the lower layer contains the artists affiliated with the songs via the two-mode 'production' network Y (visually represented as an edge connecting two nodes in different layers); the ideal songs are arranged with respect to released time and 'genre' of affiliation (e.g., 'electronic,''R&B,' 'soul')