

Social Music Curation That Works: Insights from Successful Collaborative Playlists

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Social interactions, such as sharing songs and listening together, are fundamental to the experience of music. Yet our understanding of these interactions and how they influence social dynamics with today's streaming platforms is lacking. To better understand successful instances of social music practice, we conducted a two-part study to investigate real-world usage of collaborative playlists (CPs). Using an exploratory survey, we queried CP users on characteristics—Who, What, When, Where, Why, and How—and practices around favorite CPs, which serve as concrete examples of successful social music curation on streaming platforms. We found these playlists to vary in group sizes, purposes, listening contexts, engagement behaviors, and content attributes. We also observed significant cross-category interactions; for one, group size led to differences in perceived roles and frequency of actions within users' favorite CPs. Subsequent interviews confirmed favorite CPs as being exemplary of success, and users further elucidated factors that engender and hinder CP success. Together, our results underscore the importance of social motivations for engaging in CPs and of building greater understanding around these experiences. To these point we derived six design implications to inform development of CP platforms and online music platforms at large.

CCS Concepts: • **Human-centered computing** → **Collaborative interaction**; **Empirical studies in collaborative and social computing**.

Additional Key Words and Phrases: Online collaboration, Collaborative playlist, Music playlist, Music streaming, User behavior, Social music, Successful curation, Spotify, Mixed methods, Survey, Interview

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1 INTRODUCTION

Collective engagement through performance and group listening is a central aspect of music [15]. The social role of music extends to the joy of shared discovery, the recommendation amongst friends [11, 47, 54], and the formation of social networks around shared tastes [3, 61]. These social aspects underlie many of the psychological functions of music [36], and the collective aesthetic and affective experiences reciprocally create or enhance a sense of community.

Technological innovation radically impacts the way in which music is consumed and shared [10]. Today, millions of listeners worldwide consume music on streaming platforms such as Spotify [111]. Alongside massive song catalogs, platforms have placed great import on music recommendation systems which suggest content tailored to individual users' tastes [98]. With this emphasis, a successful music recommendation system can lead to user engagement and satisfaction in *personal*

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listening contexts. The ease of access and catalog size offered by music streaming platforms have the potential to revolutionize *social* practices around music consumption as well; yet platforms have paid relatively little attention to supporting the social aspects of music listening and sharing.

The *collaborative playlist* (CP) is one example of technologies' capacity to augment the social role of music [81]. First introduced by Spotify in 2008,¹ CPs increase *socialness* in streaming music by enabling multiple users to create and edit a playlist together on a digital platform. Recent work has shown that CP usage is significantly and positively correlated with social connections through music as CPs facilitate music sharing, discovery of others' tastes, and bonding over common music preferences [81]. Such collective engagement, if done well, can enhance the social experience and lead to more successful social connections through music. These potential benefits of digitally mediated social musical interactions are especially important today, when pandemic-related social distancing precludes many in-person activities that have connected us. Therefore, understanding effective instances of CPs, to increase their overall success, is increasingly more important.

Toward this goal of fostering more fruitful social music interactions, we conduct an exploratory study on *successful* instances of CP usage. Our study aims to elucidate successful social music practice as evidenced by CP co-curation, which has been found to be socially beneficial but also come with challenges [80]. Furthermore, as CPs function similarly to collaborative editing platforms, we identify how current functionalities reflect or could be improved by findings from existing computer-supported cooperative work (CSCW) literature. Success of online collaborations is documented for platforms such as Wikipedia [24, 50] and Google Docs [99]. Yet, while CPs are also digital artifacts that can be shared and co-edited on commercial platforms, they are critically distinct from other CSCW technologies in that the collective artifact is for the enjoyment of the collaborators and can reflect individual and collective identity. Therefore, we aim to provide an understanding of how users interact with successful artifacts specifically in the context of music.

Garnering insights from real-world CP users, our exploratory study combines a survey focusing on favorite CPs with semi-structured interviews. We chose to consider favorite CPs as concrete examples of successful CPs (confirmed by our interviews) without defining "success"—as measures and outcomes of success differ for each participant—to address four research questions:

- RQ1: What characterizes successful CPs?
- RQ2: How do these characteristics interrelate?
- RQ3: How do CPs become and remain successful?
- RQ4: What are the social aspects and implications of successful CPs?

Through the survey, we contribute a better understanding of success in social music practice by analyzing CP characteristics, presented using the Who, What, When, Where, Why, and How (5W1H) framework, as suggested by Gutwin and Greenberg [30]. From interviews we provide further insights into relationships between the 5W1H of favorite CPs, as well as nuanced understanding of the important factors for CP success. Based on our results, we propose six design implications through which future technologies can better support CP engagement. These implications have further potential to inform social aspects of music practices beyond co-curation [17].

2 RELATED WORKS

CPs have existed on commercial music streaming platforms for over a decade. However, there is relatively little literature on their usage and roles. Here we review current music consumption practices, social music practices, and how those social practices are enacted on digital platforms. We conclude by framing the current study in relation to music literature, as well as literature from CSCW and social platforms, to better understand CPs.

¹<http://bit.ly/2tgITmm>, Accessed April 8, 2019.

2.1 The personal playlist in the age of streaming

Today, most listeners consume music on digital streaming platforms such as Spotify and Apple Music.² These platforms bring individualization, control, and access to new levels with catalogs in excess of 50 million tracks.³ Collections of songs called *playlists* are a common means of interacting with streaming platforms [18]. Playlists can be user-curated [33], editorially curated, or algorithmically compiled around specific themes or the user's personal taste [42]. Music recommendation systems are now a major research topic in multimedia and music information retrieval, and are a main focus of development for commercial platforms [98]. Concurrently, user research on playlists investigates such topics as search [37], playlist characteristics and listening contexts [1], and user personas [26, 57]. Importantly, streaming platforms—and consequently playlist research—focus primarily on *personal* playlists and *individual* patterns of consumption [98, 104].

2.2 Social functions of music

This emphasis on personal listening, however, belies longstanding social practices surrounding music. For many, music is an important and ubiquitous element of everyday life and serves multiple functions. Music can serve as entertainment, fulfill specific functions such as regulating emotion [36, 69, 89], or support other activities such as driving [22, 107], focused work [31, 100], and exercise [45]. Music also serves important social functions. Music sharing is known to “foster social relatedness” [97] and is “richly linked with other social activities” [11]. Group performance and listening are hypothesized to be rooted in human evolution of music [39] and continue to this day. In addition, numerous studies have investigated the use of musical tastes to express one's identity and beliefs, particularly by adolescents and young adults [64, 91]. Music is perceived to reveal more of one's own personality—and personalities of others—than movie, book, magazine, or television preferences [92]. Adolescents form psychological and demographic stereotypes of others on the basis of musical tastes [71], which generalize across countries [93]. Finally, music can be used to affirm group belonging [74]. In all, musical activities and tastes play a role in impression management, social interactions, and the formation of relationships [3, 11, 22, 62, 64, 73].

2.3 Impact of technology on social music behaviors

Social music practices evolve alongside technological advances [73] and have changed perceptions of social connectedness [81]. The advent of the cassette gave rise to mixtapes—songs often curated for a specific recipient [11, 109]—and later mix CDs [20]. Social music selection and consumption have also been investigated at parties [21], in cars [22], and at home [61]. The “social context” is often framed as purely physical [98]. But it can also be virtual or psychological, making music “a link, a reference that can be shared with others with even greater versatility” [61]. Jukeboxes have migrated to online platforms, resulting in new social interactions around song selection and conflict resolution [108]. Social recommendations—which before streaming could come from informal interactions [54], browsing others' online collections [10, 11], and other social networks [25]—contribute to social bonding [61] and continue in the age of streaming and social media [33, 47].

One angle through which digitally mediated social music behaviors have been examined is prototypes. Some encouraged social interactions with others in close proximity [3, 4], while others aimed to accommodate collective tastes of a co-located group in an automated fashion [14, 16, 67, 83]. Social interactions in Push!Music were so crucial that users found the service “less interesting when used alone” [34]; Social Playlist focused on “how music can work as a mediator to support ongoing relationships among listeners, and how to resolve the tensions ... when listening together” [62].

²<https://www.ifpi.org/downloads/Music-Consumer-Insight-Report-2018.pdf>, Accessed April 8, 2019.

³<https://www.cnet.com/how-to/best-music-streaming-service-for-2020-spotify-apple-music-amazon-tidal-and-youtube/>, Accessed May 30, 2020.

Recent works have reported positive outcomes from social interactions (e.g., following) on streaming platforms [101], categorized social practices on commercial platforms [102], and investigated specific behaviors around sharing music [33] and exchanging recommendations [58]. Exploratory studies specifically on CPs [80, 81] have culminated in the CP Framework, which provides three categories of CP purposes: (1) *Practical*, relating to a CP’s content (e.g., party music) and (enjoyment of) the process of playlist creation; (2) *Cognitive*, relating to discovery and information (e.g., new music, collaborators’ tastes); and (3) *Social*, relating to sharing (e.g., music, tastes) and bonding. CP users most often reported Practical and Social purposes (each noted in 66% of free-text responses). Compared to non-users, CP users also reported greater social connection through music [81]. These findings underscore known social functions of music and highlight social aspects of CPs. Importantly, such insights into long-term CP usage on real-world commercial platforms cannot be attained from prototypes that probe particular aspects of technology-mediated social music interactions. Still, there is much to be understood about CPs and their usage—e.g., why they are used, what they contain, with whom they are made, and what roles collaborators take.

Moreover, technological affordances do not always imply heightened social interactions. For example, while interactions were still reported in iTunes subnetwork sharing and peer-to-peer (P2P) services, these settings decoupled sharing from the social aspect [11, 109]. As early as 2001, Brown et al. noted that while all such technologies provide an environment in which “sharing music is a natural activity ... much of this social context is removed” [11]; and, in a later study of pre-iPod social music, expressed that “while conventional music sharing occurs with friends in social environments, with online sharing much of this sociality is stripped away” [10]. Similarly, while a shared playlist might be viewed as a modern-day mixtape, in a Spotify playlist “the social component of listening and discussing music together is omitted” [1]. In fact, engagement with others’ music collections can be motivated purely by content seeking, with no socially oriented intentions [81, 109]. The individualized listening afforded by portability, too, has brought about “alone together” group listening [106], whereby co-located listeners each consume their own content on their own device [12]. Finally, digital streaming platforms do not afford certain long-standing social music activities that are effortless in person, such as conversations while browsing for music [17] or sparked by music being played [22, 61, 62].

The extent to which social interactions are carried out—or not—over music streaming platforms remains an open question. Few studies, such as that which found indication of shared mutual experiences through user comments in SoundCloud [38], have explored platform designs for social interactions on commercial music platforms. When technologies change, so too do user behaviors and social practices. As a result, technologies create gaps in our understanding of current practices of music consumption [109]. Given the personal and social benefits of music listening, and the continued departure from in-person social music interactions—due both to streaming platforms’ emphasis on personalization and to COVID-19-induced changes to our social interactions⁴—it is therefore important to gain a better understanding of current social music tools and their usage.

2.4 Understanding CPs through prior work in collaborative systems and playlists

CSCW literature elucidates various factors for successful collaborations [24, 99, 110]. Olsson’s seminal work on collective content [78] frames the extent of collectivity along dimensions of *contribution*, *relevance*, and nature of *sharing*. We will assess the first two factors, and posit that (1) greater contribution among collaborators enhances perception of CP success, and (2) songs in a successful CP will be relevant, insofar as they align with users’ tastes or the stated theme or purpose of the playlist. Moreover, we draw from the following established findings—from collaborative

⁴<https://www.nytimes.com/2020/03/17/technology/coronavirus-how-to-live-online.html>, Accessed May 31, 2020.

system, team, and music literature—to formulate hypotheses for our investigation within the CP context.

2.4.1 Impact of initiation. In teams, including virtual ones, it is commonly found that initiators are team leads [51, 114]. Therefore, we expect that those who initiate the CP will take more lead or primary roles in CP music management and actions, and conversely, those who have not initiated the CP will take on more minimal roles. We also hypothesize that participants' perceived roles match their frequencies of actions. We are not aware of any work that explicitly shows this to be true, although this is a common way of thinking. Therefore, we take this opportunity of researching, in the context of CPs, the relationship between frequency of involvement with initiation.

2.4.2 Impact of group size. Social loafing and free-rider problems [41, 46, 55, 76, 77, 113], which lead to decreasing individual contributions with increasing group size, are prevalent in research on teams [96] and online communities [52, 86, 87]. Such issues of decreased individual performance are more often found in groups with six members or more [94]. Therefore, we predict that with larger group size, there will be less contribution reflected in lower frequency of actions. Consequently, we expect lower management roles with more collaborators on a CP. Friendship, upon which many CPs may be based, supports collaboration when there is partner visibility [9]. Since Spotify's CPs provide low usage visibility while song additions are visible, we expect to find a marginal relationship between contributions (i.e., frequency of actions, management roles) and group size.

Furthermore, we expect to see a relationship between group size and consumption contexts. Previous works have found that even in social group settings (e.g., in a car or at a party), the number of individuals tasked with choosing the playlist content is small [1, 21, 22]. However, group sizes and curation roles may change when the co-location constraint is lifted. Therefore, we predict that more social listening contexts will correspond to larger collaborator groups.

2.4.3 Impact of CP purpose. Playlists can be static (remain the same) or dynamic (be updated continuously) over the lifespan of their usage, and may transition from "active" to "archival" status and back again [32]. Personal playlists can also be re-used over time in different contexts, which may incentivize users to invest more time in their creation [19]. As time dependence is embedded in our investigation of favorite CP purposes, we correlate reported purposes with current status and frequency of actions (e.g., a CP created for a specific event might stagnate and not be updated or interacted with later, whereas one reflecting music shared continuously over time might be constantly attended to—analogue to users' consistent checking of Discover Weekly playlists [66]).

2.4.4 Impact of CP content. The music contained in a playlist is known to vary according to the intended context or purpose surrounding its consumption [19, 98]. Whether a playlist continues to be edited may also vary according to the music contained therein—for instance, a collection of hit songs from a specific year may not be updated after year's end [32]. Thus, in our investigation of CP usage, we expected to observe significant relationships between characteristics of music in the playlist and (1) ongoing engagement (e.g., listening, saving) and (2) frequency of CP interactions (e.g., checking, contributing).

2.4.5 CPs merit special consideration. Past studies have investigated online collaboration for specific communities centered around special interests [78, 79], gaming [48], and sports [75]. While we have identified analogies between CPs and established collaborative platforms, we argue that music co-curation similarly warrants separate consideration. First, music is consumed differently from productivity- or information-oriented collaborative artifacts: Curated items in music playlists (songs) are consumed for enjoyment and often consumed repeatedly [90, 105]. Songs may be curated around specific themes or for specific purposes, or consumed as background to other

tasks [11]. This consumption in turn forms part of the engagement with a playlist [49], and may delineate unique usage patterns and metrics of success. The significance of music in projecting and assessing self-image and identity, too, may engender usage patterns and social implications that differ from other online collaborations. Furthermore, the purposes in CP engagement are largely twofold—for *production* [44] of an artifact (e.g., to create the CP for the Practical purpose of playing at parties) and for the *process* of collaboration itself (e.g., creating the CP for its enjoyable process, and Cognitive and Social reasons). In many scenarios, the collaboration is a means to an end for the users (e.g., co-writing papers [65, 103]), and the resulting artifact is often the primary focus [88]; whereas CP engagement can also be solely for the benefits of the collaborative process [81].

3 METHOD

We conducted a survey study to understand CP users and characterize interactions around successful CPs. Following the survey, respondents were invited to participate in semi-structured interviews, which provided more nuanced insights into what makes and keeps CPs successful.

3.1 Survey

3.1.1 Design. Our survey assessed various aspects of CP usage and music consumption. To understand concrete examples of successful social music practice, we asked questions related to usage of *favorite* CPs and the role of the user therein. These questions were designed to enable CPs to be characterized by probing the Who, What, When, Where, Why, and How (5W1H) of favorite CPs. We utilized this 5W1H framework due to the lack of existing research on CPs and the proven value of 5W1H in helping researchers form the “basic set” of the “kinds of information that should be considered first by designers” as stated by Gutwin and Greenberg [30]. We also posed the same question of engaging in CPs in general, as well as the CP attributes, per recent work by Park et al. [81]. An overview of the questions analyzed is shown in Fig. 1 (full text and response options in Supplementary Material). These questions were part of a larger survey for both users and non-users of CPs, but for the present analyses we consider responses from CP users only.

3.1.2 Participants. Eligible survey participants were 18 years or older, fluent in English, current United States residents, and music streaming service users. We recruited through mailing lists, social media, and flyers. After confirming eligibility, participants were presented with an information sheet in order to deliver informed consent prior to starting the survey. Ethics approval was obtained from the Institutional Review Board of Stanford University. Survey participants were either not

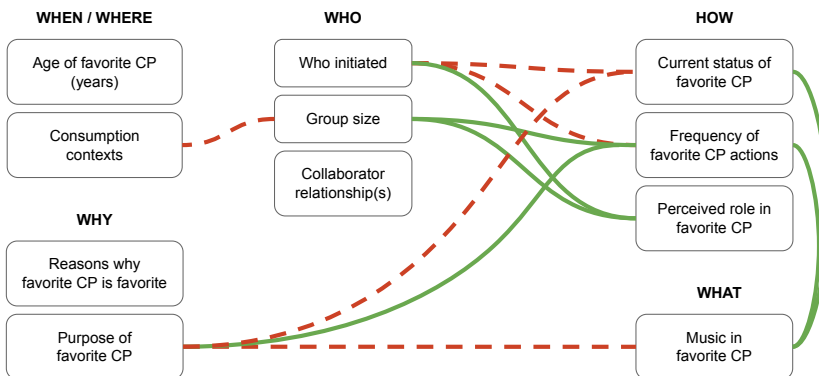


Fig. 1. Questions in the survey grouped into relevant categories of 5W1H. Lines denote inter-question connections we analyzed (significant: green solid; not significant: red dashed).

compensated or entered a raffle through a separate form to win a \$10 Amazon gift card (10% chance of winning). We collected a total of $N = 72$ survey responses from CP users; all responses were collected prior to any pandemic-related shutdowns. Seeking authentic examples of successful CPs, we excluded responses from 3 users for whom the favorite CP was their only CP. Consequently, responses from $N = 69$ participants were analyzed. Participants ranged in age from 18 to 59 years (mean 25 years), and 49% were female. All reported using Spotify to engage in CP activities.

3.1.3 Analyses. Survey responses were given as free-text, single-choice, and multiple-choice answers (see Supplementary Material). We excluded incomplete and duplicate responses from analysis. For text responses regarding CP purpose, we applied the CP Framework categorizations [81]. While we used an exploratory survey to inductively formulate understanding of CPs, we also utilized this established framework to understand inter-relationships between CP characteristics, as our questions similarly probed the purpose (Why) of favorite CPs. Through consensus coding, two raters categorized responses into Practical, Cognitive, and Social purposes with an inter-rater reliability of 97% (remaining 3% was resolved through discussion). Text-based responses to other questions were separated into distinct ideas, and then grouped and labeled using the affinity diagram method [35]. Quotations from text responses are presented with participant numbers (e.g., “P9”).

Numeric and ordinal responses were analyzed using parametric two-tailed independent samples t -tests and linear models, based on Likert approximation to continuous response data [70]. We used Fisher’s Exact Test (FET) to analyze categorical single-choice responses to account for low response counts in contingency tables. For multiple-option multiple-choice questions, we computed the degree of overlap between pairs of response options using the Jaccard similarity coefficient. For multiple comparisons (e.g., for questions comprising multiple sub-questions), we adjusted p values using False Discovery Rate (FDR) and report p_{FDR} values [5].

3.2 Interview study

3.2.1 Design. CP users who completed the survey were invited to take part in subsequent interviews for us to better understand their favorite CPs. We chose to conduct semi-structured interviews as this approach is a powerful qualitative method that enables researchers to benefit from being able to ask consistent questions while providing flexibility for further exploration in directions that participants raise [2]. Interviews revolved around three formalized questions: (1) What constitutes a successful collaborative playlist? (2) How different is the music and your feelings with regard to a music recommendation from your friend vs. the system? (3) How has the CP affected your relationship with the collaborators? Interviews were conducted over video conferencing due to the geographic distribution of participants, and while COVID-19 shelter-in-place orders were in place.

3.2.2 Participants. Any participant who completed the survey was eligible for the interview study. $N = 6$ participated in the interview portion of the study; they ranged from 18 to 59 years old, $N = 4$ were female, and all used Spotify though one user’s favorite CP was through YouTube. The interviews took an average of 38 minutes including confirmation of consent information (e.g., audio recording). The same ethics approval obtained from the Institutional Review Board of Stanford University for the survey study also applied to the interview study. All interview participants were compensated with a \$10 Amazon gift card. Quotations from interviews are presented with fabricated initials (AK, BL, CM, DN, EO, and FP), so that these quotes can be differentiated easily from survey text responses.

4 RESULTS

From survey responses, we analyzed the various characteristics of favorite CPs (RQ1) and structured the results using the 5W1H framework. We also investigated effects of initiation, group size, purpose,

and content on role in, and usage of, these CPs (RQ2); topics of analysis are summarized in Fig. 1. From qualitative reports from semi-structured interviews, we confirmed interview participants' favorite CPs as being exemplary successful CPs, and also gained context for how CP users achieve and maintain this CP success (RQ3) as well as their social implications (RQ4).

4.1 Survey: 5W1H characteristics of favorite CPs (RQ1)

4.1.1 Who. We first examined Who initiated the favorite CP, and with Whom—in terms of group size and relationship to collaborator(s)—the CP was used and created. As indicated by single-option multiple choice answers of “Me” or “Me and my collaborator(s)”, 55% of respondents initiated or took part in initiating the CP. The remaining 45%—non-initiators—selected “My collaborators”. Participants varied in group size: Using distinctions in group sizes from group-work literature [112], we report 33.3% in dyads, 43.3% in small groups (3–6 people), and 23.3% in large groups (7 or more). These reported group sizes were confirmed from free-text responses on collaborator roles.

Participants reported their relationship with CP collaborators via multiple-option selection from the following list: “Acquaintance(s)”, “Friend(s)”, “Family”, “Stranger(s)”, “Other”. Friends were the most-reported group overall, involved with 86% of favorite CPs and 91% of participants' first CPs. In a separate question, participants ranked with whom they shared and discussed music the most. Consistent with favorite CP relationships, friends received highest rankings; this was followed by family, acquaintances, and then strangers. “Other” (e.g., “*significant other*”) was rarely chosen.

4.1.2 What. Participants reported the extent to which music in the favorite CP corresponded to established content descriptors [81]. Responses spanned the full range from “None” to “All” (Fig. 2). Music suggested by strangers and recommended by AI—attributes we would not expect to be emphasized in a CP—received lowest ratings. Highest ratings were given for music that feels collaboratively curated and music that the participant enjoys. Overall, we see the CP Framework's Practical and Social purposes reflected here, with mean values exceeding “About half” for attributes such as fulfills a function, suggested by friend/family/acquaintance, and evokes memories.

4.1.3 Why. We inquired Why the favorite CP was a participant's favorite and found inclusion or mention of others, implying a Social purpose, to be most represented (52%): E.g., “*It connected me and my best friend*” (P5). For distanced relationships, favorite CPs could even create fertile grounds for sociality: “*It lets me stay in touch with friends*” (P70). Next most frequent (42%) were expressions of type, classification, or genre of music contained in the favorite CP (Practical purpose)—for example, “*Songs that really get you to dance*” (P44), “*It's music that helps to keep your mind off of the long drives to work every day.*” (P61). Last but not least, there were aspects of music discovery, both similar to and diverse from one's own music taste, reflecting Cognitive purpose (25%), e.g., “*Great music I*

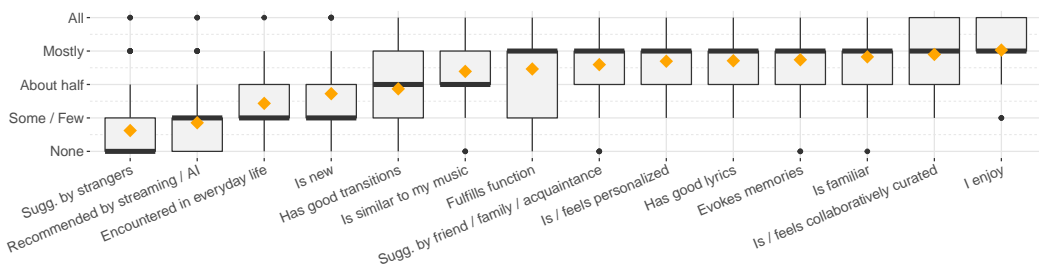


Fig. 2. Boxplot showing to what extent music content descriptors are represented in favorite CP (“sugg.” is short for “suggested”).

When	Where
Task (53%)	Residence (49%)
Social event (31%)	Vehicle (32%)
Mood (13%)	Social event (28%)
Time frame (10%)	Place of work (17%)
Anytime (3%)	Named location (13%)
	Anywhere (6%)

Table 1. When and Where categories with percentages of participants who reported these categories in their text-based answers (categories are not mutually exclusive).

Role	Manage CP music	Add music	Delete music	Reorder music
Lead / Primary	9	12	7	4
Equal to others	33	40	17	16
Supporting	9	8	5	5
Minimal	10	8	10	10
None	8	1	30	34

Table 2. Counts of role taken in general CP music management as well as actions taken on favorite CPs (add, delete, and reorder music). Highest counts for each column have been bolded.

haven't heard before" (P55). For broader context, we inquired about purposes that CPs in general serve for participants. Coded using the CP Framework, these responses coincided with reported characteristics of favorite CPs. Practical (58%) and Social (57%) motivations were most reported, followed by Cognitive purposes (32%).

Practical and Social purposes of favorite CPs were studied further with a question from which users selected multiple options of time dependence for starting the favorite CP: "To share music over a fixed period of time", "To keep a record of music shared continuously over time", "For a specific event (e.g., party)", "For a specific function (e.g., exercising, studying)", or "Other". These response options were informed by prior work by Park et al. [81]. Specific events (42%)—e.g., "high school dance" (P9), "Halloween Party" (P15), and "car ride to Tahoe" (P20)—were reported most, followed by starting the CP to "share music over a fixed period of time" (39%) and to "keep a record of music shared continuously over time" (36%). As shown in Fig. 3A, there were varying degrees of overlap in initial purposes. As to whether the purpose of favorite CP evolved, most (83%) were not reported to evolve from their initial purposes. An FET analysis of CP evolution according to these four response options showed that only playlists initiated "for a specific function" evolved over time (FET, $p_{FDR} < 0.05$).

4.1.4 When and Where. The creation date of favorite CPs ranged from less than one year ago (54%) to ten years ago. Using affinity diagramming, we identified five Where and six When categories to exhaustively characterize users' consumption of favorite CPs from free-text responses (Table 1). For When, the most popular time for listening to the favorite CP was during specific tasks (53%)—e.g., doing laundry, working, driving—followed by during social events, e.g., parties (31%). For Where, we found favorite CPs to be consumed in many places, with residence reported most often (49%).

4.1.5 How. We investigated How users interact with their favorite CPs in three aspects: Status, frequency, and role. For *status* of favorite CPs, we found that 78% of respondents continued to listen to their favorite CP, while 30% still updated it. Many respondents were less aware of collaborators' actions: 35% and 16% were unsure of whether other collaborators were still listening to or updating the favorite CP, respectively. However, 38% of respondents reported that others were updating the CP. Based on *t*-tests, the mean age of a favorite playlist did not vary significantly between participants who still listened to or updated the playlist, or not.

Considering saving behaviors as another form of CP status, we found that most CP users saved the favorite CP in some form or another; only two participants saved neither the CP nor songs from it. Most participants saved songs from the favorite CP to personal playlists (87%), and to lesser extents saved the CP onto their devices (51%) or as a separate personal playlist (35%). Jaccard similarity coefficients for saving (Fig. 3B) show that many users engaged in multiple saving activities.

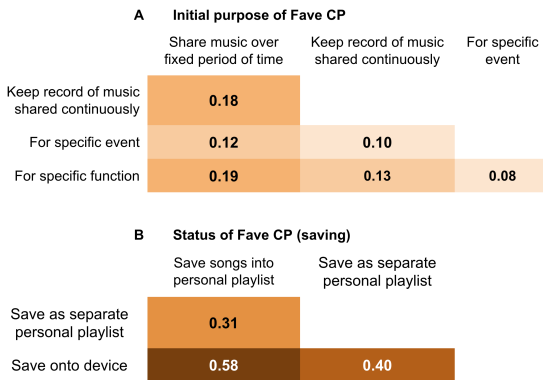


Fig. 3. Jaccard similarity coefficient calculations for favorite CP (A) initial purposes and (B) status of saving. Darker shades indicate higher coefficients.

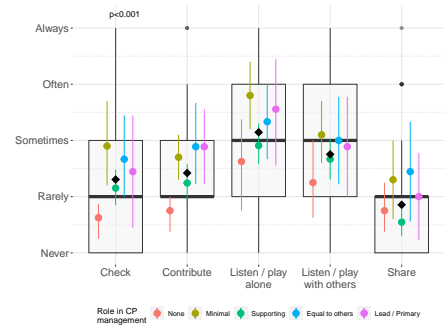


Fig. 4. Boxplot of frequency of actions on favorite CP with the black diamond indicating favorite overall means. Means (with confidence limits) of CP action frequencies by roles in CP music management are also shown.

We next analyzed responses relating to *frequency* of favorite CP actions. As shown in Fig. 4, mean frequencies for favorite CP actions did not exceed “sometimes” by much, ranging from 1.86/5.00 for “Share CP with others” to only 3.14/5.00 for “Listen/play alone”. Notably, those who were minimally involved in managing the music in their favorite CP most often checked and listened to the playlist. Those who took on the lead or primary role performed only slightly higher than the overall means, except in the cases of contributing—here they were tied with those managing the music equally as others—and listening or playing the CP alone, where they performed moderately higher than average.

Finally, we investigated the How of favorite CPs through perceived *roles*. Table 2 contains counts of reported roles pertaining to favorite CPs.⁵ We found that for both general management and adding of CP music, most participants reported being “equal to others”; while for deleting and reordering, most reported not taking any role (i.e., did not engage). FET tests revealed—as expected based on findings from personal playlist usage [32]—no statistical significance between CP management and adding songs (FET, $p_{FDR} = 0.19$), or between deleting and reordering songs (FET, $p_{FDR} = 0.90$). There was however a significant difference between CP management and deleting, and with reordering, songs (FET, $p_{FDR} < 0.01$ for both). We interpret these findings as evidence that CP music management is centered primarily around adding music.

4.2 Survey: Interconnected themes (RQ2)

To answer RQ2, we analyzed across 5W1H categories with a focus on initiation, group size, purpose, and content of the favorite CPs. 5W1H questions and interconnections are visualized in Fig. 1.

4.2.1 Impact of initiation. We analyzed the relationship between favorite CP initiation and frequency of actions. For each action shown in Fig. 5A, we compared responses between users who did and did not initiate the favorite CP. Frequency of actions did not vary according to initiation (t -tests, all $p_{FDR} > 0.1$). Users’ reported roles, however, did vary according to initiation. As shown in Fig. 5B, initiators were consistently more represented in taking roles as “lead / primary” and “equal to others”, whereas non-initiators were more represented in “minimal” and “supporting” roles. We

⁵“Manage CP music” was accompanied by additional sub-questions regarding favorite CP contributions including CP image selection and description. However, these were excluded from our analyses because all participants used Spotify for CPs, and such functionalities are available only to initial creators of CPs.

conducted FETs on participants' roles for each of the four CP actions by whether they initiated or not. All four actions—adding (FET, $p_{\text{FDR}} < 0.001$), deleting (FET, $p_{\text{FDR}} < 0.05$), reordering songs (FET, $p_{\text{FDR}} < 0.01$), and CP music management (FET, $p_{\text{FDR}} < 0.01$)—were statistically significant.

4.2.2 Impact of group size. Similar to initiation, we investigated possible relationships between group size and engagement with the favorite CP. We expected CPs with larger group sizes to correspond to more social When and Where listening contexts. However, there were no significant relationships between a favorite CP implicating a particular When and Where category and the CP group size (t -tests, all $p_{\text{FDR}} > 0.1$).

In understanding the impact of group size on frequency of CP actions (How), we constructed five linear models to predict each action frequency from group size (Fig. 5C; in this figure, we visualize the data in three group-size categories for ease of understanding, but the model used exact group sizes). Group size was a significant positive predictor of frequency of checking ($F(1, 67) = 4.28$, $p < 0.05$) and sharing ($F(1, 67) = 14.72$, $p < 0.05$) the favorite CP; this meant that in larger groups, users tended to check and share the CP more frequently. However, group size did not predict frequency of listening alone, listening with others, or contributing (all $p > 0.1$).

Finally, we investigated group size with perceived roles (also How). Building upon our examination of CP roles across the full sample of participants (§ 4.1.5) with the added dimension of group size, Fig. 5D indicates that most collaborators in dyads and small groups oriented toward a role “equal to others” in CP music management and adding music, but more toward “none” in deleting and reordering music. Notably, for adding songs, no users in dyads took “none” and “minimal” roles, whereas 13.33% ($N = 4$) in small groups took “minimal” roles, and greater proportions of users in large groups took on these roles (6.25% in “none” and 25% in “minimal”). While similar patterns exist for those in large groups, we observed comparable proportions of participants taking “minimal” and “equal to others” roles for CP music management and adding music. We conducted FETs on the participant's role for each of these four actions by CP group size. Only the relationship between roles in adding music and group size was significant (FET, $p_{\text{FDR}} = 0.01$).

4.2.3 Impact of CP purpose. Looking first at initial purposes (Why) with What, we found that no characteristics (shown in Fig. 2) were significant with respect to initial purpose of the favorite CP. We next looked at initial purpose (described in Fig. 3A) in relation to How, performing FETs on contingency tables summarizing membership in each initial purpose and how the favorite CP was currently consumed. However, there were no significant relationships between initial purpose and continued listening or updating (all $p_{\text{FDR}} > 0.1$). In terms of frequency of actions (Fig. 4), t -tests indicated that favorite CPs with initial purpose of being shared continuously over time also received higher ratings for listening alone ($t = 3.51$, $p_{\text{FDR}} < 0.05$) and contributing ($t = 4.08$, $p_{\text{FDR}} < 0.05$). When a favorite CP was initiated for a specific event, it was contributed to less ($t = -2.69$, $p_{\text{FDR}} < 0.05$); when not for a specific event, the CP was listened to alone significantly less ($t = -4.12$, $p_{\text{FDR}} < 0.05$). There was no significant difference in frequency of actions for initial purposes of fixed time and specific function.

4.2.4 Impact of CP content. We investigated impacts of favorite CP content characteristics (Fig. 2) on CP status and user actions. We surmised What is in a favorite CP could dictate How a user interacts with it. When the favorite CP was still listened to by the participant, it contained a significantly greater amount of songs recommended by an AI/streaming service (t -tests, $t = 3.85$, $p_{\text{FDR}} < 0.05$). Furthermore, favorite CPs that were still updated by the participant contained significantly more songs that felt personalized ($t = 3.10$, $p_{\text{FDR}} < 0.05$) and enjoyed ($t = 2.99$, $p_{\text{FDR}} < 0.05$) by the user, and marginally more music recommended by an AI/streaming service ($t = 2.68$, $p_{\text{FDR}} < 0.1$) and music with good transitions ($t = 2.49$, $p_{\text{FDR}} < 0.1$).

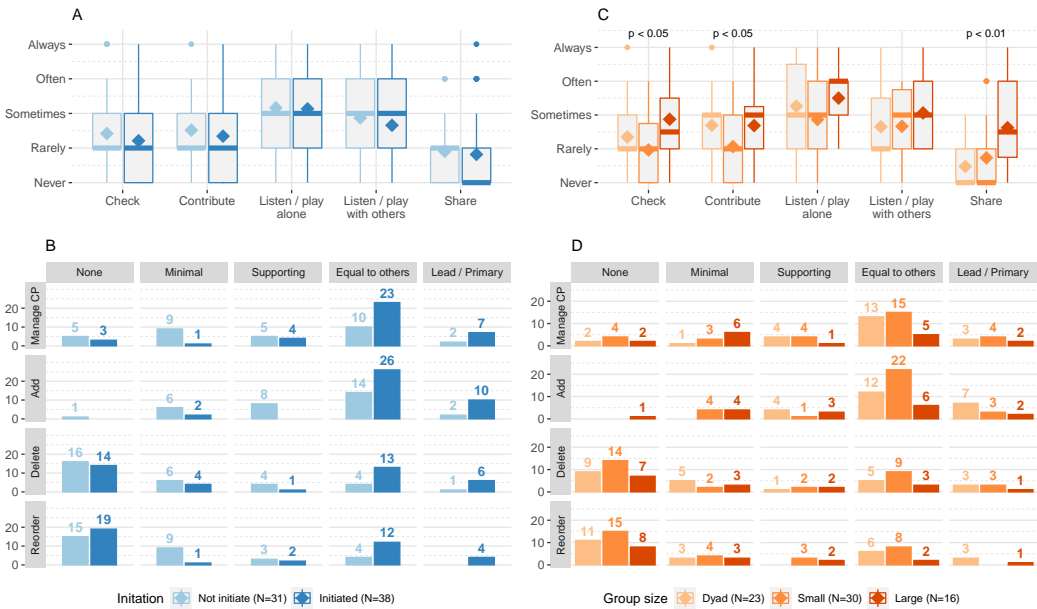


Fig. 5. Boxplots with means (indicated as diamonds) for frequency of actions (top two), and bar charts for perceived roles (bottom two) in favorite CP. Panels A and B are distinguished by whether the participant initiated the favorite CP. Panels C and D are distinguished by the group sizes with linear regression p-values indicated comparing the three group sizes for C.

As to whether characteristics of the music in the favorite CP varied according to saving status (to a participant’s personal playlist, separate playlist, or device), only the amount of music suggested by strangers was found to be significantly higher for participants who saved favorite CP music to a personal playlist than for those who did not (t -tests, $t = 4.89$, $p_{FDR} < 0.05$).

Lastly, we conducted linear regressions predicting frequency of actions (Fig. 4) from content characteristics (Fig. 2). The linear model for checking frequency was significant ($F(14, 54) = 3.33$, $p < 0.05$) with significant positive predictors “is recommended by AI” and “is new” ($p < 0.05$). “Is recommended by AI” was also a significant positive predictor ($p < 0.05$) when modeling frequency of listening alone ($F(14, 54) = 2.05$, $p < 0.05$). Sharing frequency produced a significant model ($F(14, 54) = 3.93$, $p < 0.05$), with significant positive predictors of “enjoy listening to”, “is suggested by friend/family/acquaintance”, and “is recommended by AI” ($p < 0.05$) and marginally significant negative predictors of “has good lyrics” and “feels personalized” ($p < 0.1$). Frequencies for listening with others and contributing had no significant predictors.

4.3 Interview: Becoming and remaining a successful CP (RQ3)

Reports from semi-structured interviews supported findings from the survey regarding mixed consumption patterns, and *multiple users* listening to the CP and *repeated usage* being important indicators of success for some. The broader scale of CP success probed in the interviews also revealed additional success factors—the active process of creation, distinction of the artifact itself and its contents, and role in expanding musical tastes—as well as challenges of CP usage. Finally, we gained insights into the role of social connections through CPs, and how social recommendations are generally perceived in contrast to platform-generated recommendations.

4.3.1 Successful CPs reflect active collaborations. CPs are distinct from personal playlists in that they have a social nature and are edited collaboratively. Some CP users evaluated a successful playlist in terms of their collaborators' active curation, e.g., contributions of songs, time, and effort. For songs, BL stated that successful CPs "[need balanced involvement] because otherwise it's just mine". AK similarly stated the importance of the other's contribution to a CP they initiate: "It would be nice if whoever I'm making a playlist for would also add to it" and that this "would be the ultimate collaborative playlist" for them. For DN this could enable the CP to "give a little bit of everybody".

Time and effort were both of great import as well: "You know so much time and effort went into it and reminds me of better times" (EO). They went on to say, "I think there's a lot of effort that goes into it: What's the theme, what's the purpose of this playlist, is this particular lyric going to help in—say, exercise—or making me feel better" and that there was "a lot of back and forth in the whole decision making" for the favorite CP. This mindfulness in the process of curating a CP spoke volumes for EO in terms of the success of the CP.

4.3.2 Successful CPs reflect quality of the playlist as a whole and in its content. Relating to the What of our survey results, the quality of the CP content was also important to participants, particularly in terms of *theme coherency* as well as *distinction* from an AI-generated playlist.

In discussing their favorite CP, CM stated that there was a "very specific [theme] on [the favorite CP, which] made that sort of valuable [and] interesting for us". For FP, "having some common theme behind it" and "knowing what you're looking for in the playlist" was important and could be brought about by asking "can you help me add these kinds of songs" or stating "we're going to use this playlist for this [purpose]". Due to the fact that FP's favorite CP was "made for a specific kind of purpose", they reported that "when I'm listening to it, I'm already in the mood of wanting to hear [music in the favorite CP]". Conversely, a failed CP was characterized as one having "lack of organization [and] follow through" (FP). EO echoed a similar sentiment: "I also like it to be productive in some way ... being able to use it more than once on a regular basis and for the purpose of exercising".

Most interviewees also expressed that a successful CP should offer something more than a platform-generated playlist. According to BL, if a playlist lacks variety or adequate contributions, "you might as well just open up lo-fi on Spotify and just shuffle play on that". In the same vein, a playlist reflecting a specific period of time might lack utility retrospectively, compared to a playlist generated by a streaming platform: In relating to a CP that did not become a favorite, BL described that "it was mostly just bops of the 2010s ... I never think to go back to that playlist and look at it. I just would open up hits of the 2010 [in Spotify] ... if I was in the music mood to listen to that kind of music". On this exact point of platform-generated playlists, however, EO felt differently: "For example, a [Spotify-generated playlist of] 90s R&B or something, it doesn't always resonate with me because ... it's maybe ... a wide variety of songs I might never know, I have never heard of, or I might not even like". Further on this note, EO stated that the same kind of music forwarded or added to the CP from "a friend, somebody who knows my personality ... or somebody who I've experienced a lot of events with" would feel "very, very different". In both cases, BL and EO agreed that even the songs in their favorite CP would be different from platform-generated playlists.

4.3.3 Barriers to CP success. While users reported concrete aspects of successful CPs and interactions, they also noted challenges in achieving and maintaining CP success: Inertia in beginning and maintaining the collaboration, social dynamics of platform advocacy, and lack of visibility and follow-through on CPs. Getting a collaboration to even begin was one challenge. CM described overcoming *inertia*: It "requires a certain amount of energy for any of those collaborative stuff to happen". To CM, starting music co-curation was much more difficult than photo co-curation and that Google Photos' "removal of the hurdles and the friction is huge". CM further stated the discomfort in also suggesting to start a CP for its social implication. It could be interpreted as advocating for

a particular platform that provides the CP service and the “social awkwardness” that comes with “expending your social capital on getting others to adopt the tool that you’re suggesting”. This social implication of CP usage encouragement was a consequence of lack of ubiquity, as evidenced by EO stating “I don’t think [music collaboration] is quite there yet, in terms of use” and therefore “wouldn’t necessarily initiate and create the playlist on my own [and] share with somebody else”.

Lack of visibility also posed a challenge, as users had no way of knowing whether others were engaging with the content. For this same reason, CP success was difficult to maintain. BL stated “feeling kind of weird about [the lack of communication about the CPs]” because the collaborators might not be enjoying the CP or rather “they just might not really care [about communicating] because they actually like it ... [my collaborator] could totally be listening to it, but I don’t know why I never asked”—in essence expressing that feedthrough, when “the feedback produced when artifacts are manipulated provides others with clues about that manipulation” [28], could be improved in the CP context. To address this shortfall, some users kept each other informed via external channels, as with EO: “When we’re together we’ll talk about it, or when we’re on the phone we’ll talk about it”. With podcasts, BL reported that “we usually text each other and to that text, [my collaborator will] be like, ‘Oh, I added one you should listen to it’”. Having more active communication around the CP can spur greater engagement, e.g., “seeing what someone else has added and then being like, ‘Oh, that reminds me of this’ and then ... kind of riffing off what someone else is adding to the playlist” (FP).

Follow-through with a CP was also a challenge. In describing a failed CP, FP pointed to a lack of both contribution and consumption: “We would never really listen to [the CP] because whoever set it up wasn’t following through on my playing it. So no one was really motivated to add to it”. For FP, not having a means for accountability [23], in contrast to offline environments, was a cause for not engaging in the CP as much as they desired. Even so, playlists not listened to could still have value: For a playlist of song recommendations from their father, AK stated that they “don’t really listen to it, but I want the [back and forth of music recommendations]”.

4.4 Interview: Social aspects of successful CPs (RQ4)

4.4.1 Successful CPs support social connections. Successful CPs led to building social connections. For some, this was due to being able to learn about and understand each other better, especially regarding what music they liked or didn’t like. For others, it was rather the social implications behind the CP leading to nostalgia.

Learning about the other collaborator was important to EO: “I think it’s a really good way of understanding another person ... you better understand a person’s motivations or their mood by talking about a song or hearing a song that they like. So I think it’s a great way of peeling an onion”. DN also echoed this sentiment: “One of the things was we found out about [music] that we didn’t like”.

Successful CPs could also bring about emotional connections among the collaborators. A main reason for the favorite CP being a favorite for EO was “because it’s created between us, it was created by someone I care about, and it brings back good memories ... it reminds me of really positive times we’ve had together”. DN also noted this social implication behind CP interactions and nostalgia, stating that the collaborators’ relationship “definitely [evolved] ... it might not be because of the music [itself]”, and attributed gravitating toward the favorite CP to “missing them [(the collaborators)]”. The nostalgia aspect was also noted for BL, who “usually [got] tired of [CPs] after a couple months” but felt that “it’s fun to go back and be like, ‘Oh, my sophomore spring songs’ ... and it just takes you right back”. Finally, such relational aspects of the CP led CM to state that there was “something that was like an emotional connection to the content”.

4.4.2 Social music recommendations are received differently from platform-generated recommendations. Platform-generated music recommendations often play a major role in personal listening.

These AI recommendations find their way into favorite CPs to some extent as well, as evidenced by our survey results. Our interview participants, however, indicated that they were more likely to engage with social recommendations. The aforementioned social connections played a role: FP reported that *“the people that I’m hanging out with at a certain time [are] so influential on the kind of music I listen to”*, while CM noted that *“you’re much more likely to give something that benefit of the doubt if it comes from, from somebody you know and that you’ll be much more inclined to suspend disbelief, or give it ... a second look and you’re like, ‘Ah maybe there’s something to it’”*. In fact, musical content can be secondary to the social element: *“So there’ll be a personal connection. It’s mostly interesting, because of that; it’s less because that’s the kind of music”* (CM).

The social element at times implied a desire to enjoy the recommended songs. For example, FP stated that *“I want to like stuff more if my friend recommends it”* and that they feel *“more curated”*. Further along this point, FP stated that in trying to like the friend-recommended music asks themselves *“why don’t I think this is good?” if I don’t [like it]*. Participants also noted that they were more likely to listen to the songs whether or not the songs matched their tastes: *“I knew that I was gonna listen to all of them, whether or not I personally liked them very much”* (BL). One even stated they would share their distaste for the recommendation: *“I’ll give them feedback like, ‘this is complete garbage’. But I will go through the motions of listening to it”* (EO). Finally, BL noted a renewed willingness to engage with platform recommendations when they are delivered in the CP: *“... I think because it was coming from a new place besides Discover Weekly,⁶ I was more willing to lean in ... and I literally just sat down right there and made a playlist [with] all the recommendations that they were giving me”*.

Compared to the platform, the social recommendations involve *“someone like a friend sending me a song—you know it’s clearly different than the robot, because there’s ... like layers of messages behind it ... somebody who I’ve experienced a lot of events with is forwarding on ... adding to this collaborative playlist. I think it’s very, very different”* (EO). According to DN, *“if [the country (genre) song] was from Spotify, I wouldn’t even bother with it. The only reason that I am bothering with it on this [collaborative] playlist is because it was uploaded by somebody that I know”*. In contrast, the streaming platform has *“obviously ... no social or friend aspect in that at all”* (CM). EO expressed that *“there’s also no ... reciprocity with the machine”*, while FP stated that *“I think Spotify is trying so hard to make sure that you like it, that they’re not really pushing the boundaries that much and so listening to [songs shared by] a different person that you know that you have some overlap [with], like your Venn diagram of tastes, maybe exposes you to more”*.

As noted above, social recommendations may compel CP users to engage with the content. However, this also has the potential for unpleasant feelings of social pressure and obligation to listen to the content, as reported by AK: *“It’s overwhelming because it feels like ... an obligation ... that makes it tougher for me to listen to it, because it feels like a to-do list of obligations”*.

4.4.3 Successful CPs can expand musical tastes. Echoing Cognitive purposes relating to music discovery, all interview participants spoke about the CP’s effect of expanding their tastes in music. This can be attributed in part to the diversity of tastes from different collaborators. For one, DN stated that *“it had introduced me to a lot of new music that I wouldn’t have listened to otherwise”*. This was particularly true for DN with the genre of country music: *“I gave a couple of country songs a chance ... I used to hate it completely, but now there are a couple of good songs that I like that are country”*. Key to this expansion of taste is the privileged status of social music recommendations. Because of the social connection, CP users would listen to music they would not normally have

⁶A Spotify AI-generated playlist with the following description: “Your weekly mixtape of fresh music. Enjoy new discoveries and deep cuts chosen just for you. Updated every Monday, so save your favorites!” <https://www.spotify.com/us/discoverweekly/>, Accessed May 31, 2020.

engaged with. BL described encountering music outside of their realm, which ultimately expanded their taste in music: “*The playlist also has a mix of songs that are popular there that I would have never listened to ... there are songs in there that I like a lot now, even though I obviously never would have listened to them before, and I probably would have skipped through them on a Discover Weekly and never have added them to my playlist.*” CPs can facilitate expansion of musical taste even when unintended: “*I definitely feel myself liking it more, you know, but I think it’s probably not something that I would seek out on my own, but because it’s on the recommendation of a friend*” (FP).

5 DISCUSSION

We have contributed exploratory results on successful CPs and their usage, as well as interrelations between CP characteristics. We tie our findings to established literature on collaborative systems and personal playlist usage that provides analogous insights and can therefore help improve CPs. With insights specific to CPs, we derive key design implications for music service platforms to support social practices around music sharing and co-consumption.

5.1 CPs can be improved from insights on other collaborative systems

Articulated barriers to CP success highlight commonalities between CPs and other collaborative systems. Difficulty in starting the CP and lacking follow-through both allude to *collaborative inertia*, which accounts for frequent negligible or slow collaborative output [40]. While streaming platforms may reduce this barrier by providing song recommendations—thereby making it easier for collaborators to add songs to the CP—it is not quite what the users need to overcome inertia. Instead, transparency of collaborators’ music consumption, as well as aiding recall for music saved in personal playlists or enjoyed in the past (collaborators more often than not share or add songs they know to CPs, as interviewees indicated), may lower the barrier for collaboration more effectively.

The issue of platform differences hindering CP engagement reflects known challenges around disparities in technologies used for collaborative writing [84]. Another hinderance to active collaboration was lack of visibility as expressed by our interviewees. This highlights the importance of workspace awareness [29], which is missing from the current CP interface and would enable users to better understand how collaborators engage with the CP. Given the desire for synchronous co-listening,⁷ social presence indicators could also bring greater visibility for synchronous CP consumption. Users also underscored the importance of communication, seeking other channels to discuss CPs—behavior analogous to that displayed by co-writers, who communicated even in the absence of a designated chat box [6].

Such insights from existing collaborative systems have not been incorporated into current CPs, despite design’s role in improving social systems [95]. This suggests that perhaps the CP is one instance of “many socially-oriented designs [disregarding] collective scientific knowledge” [68]; implementing lessons learned in collaborative systems in CP function design will be beneficial. There are, however, other considerations to note given CP’s unique role—of connecting users together through music and as an artifact that is consumed during and due to collaboration.

From our investigation of interconnections among 5W1H categories in relation to past work on collaborative writing, team performance, and music consumption (§ 2.4, Fig. 1), some—but not all—of our findings coincided with past literature, revealing subtleties of CP engagement. Group size, which we expected to correlate negatively with collaborators’ CP interactions and perceived

⁷Spotify added a new function Group Session in July 2020 that “allows Spotify Premium users around the world to tune into the same playlist or podcast simultaneously”. <https://newsroom.spotify.com/2020-07-28/your-squad-can-now-stream-simultaneously-using-spotifys-group-session-beta/>, Accessed September 27, 2020.

roles due to free-rider issues [76, 96], exemplify this. Collaborators' perceived roles in adding songs were significant with group size, yet were not significant in any other CP actions. Frequencies of CP interactions were also mixed: While checking and sharing of songs were linearly correlated with group size, listening and contribution frequencies were not (further discussed in § 5.2.2). Such results show that CP dynamics cannot be assumed to be the same as working team dynamics, and reasons may be attributed to the social implications of and the hybrid purpose for engaging in CPs.

5.2 CP designs should consider group size, initiation, and playlist purpose

Co-curation fundamentally differentiates CPs from personal playlists. However, our work has revealed that successful CP usage looks different from engagement with personal playlists as well as not-so-successful CPs. Playlist designs need to account for different group sizes, roles, and purposes that distinguish CPs—both from personal playlists and from each other.

5.2.1 CP initiation. Initiating a shared playlist can bring about a sense of engagement and ownership [59]. For CPs, initiators reported higher roles as “lead / primary” or “equal to others” in CP music management (§ 4.2.1), which may suggest a feeling of obligation or inspiration to do more for the CP as they have started it, especially for those comprising fewer contributors (i.e., dyads and small groups). Furthermore, there was a significant relationship between those who initiated and did not initiate in deleting, as shown in Fig. 5A. This could be a reflection of the differences in perceived CP “ownership”, which greatly influence collaborators' contributions [80, 82]. Therefore, more balanced engagement across collaborators could be achieved by addressing the lack of transparency of engagement noted in the interviews, or prompting other collaborators to engage more frequently in various ways. Encouraging further engagement from all participants will help to bring about active collaboration, which is a key success factor for CPs.

5.2.2 Group size. Prior literature has found individual performance to decrease with group size, particularly for groups of six people or more [94]. We find that this is not as straightforward in the case of CPs; action frequencies are similar or higher for these larger groups (Fig. 5C). Here, we observed that CP contributions within large groups (7 or more) were greater than those of small groups (3-6 people) and instead similar to those of dyads. Therefore, this suggests that *social loafing* [46] does not always vary in a linear fashion with the number of collaborators involved. However, in observing Fig. 5D, we find that those in the large groups had lower perceived roles. While many of those in dyads and small groups perceived themselves as equals or leads in CP management (69.56% and 63.33% respectively), half of those in large groups felt they took this role (43.75%); this was also the case for adding songs (dyads: 82.60%, small groups: 83.33%, and large groups: 50%). This might be attributed to the fact that even with frequent interactions with the CP, roles are more relative, and therefore one's perceived role is highly dependent upon others' contribution frequencies. Future research on group dynamics is needed to better understand, for example, whether small groups need more encouragement and mediation for engagement from collaborators—and for which actions—than dyads and large groups.

5.2.3 CP purpose. Playlists are created for different purposes or to fulfill different functions [42, 81]—some for creation of the artifact (akin to peer-production collaboration [44]), and some for the process of the collaboration (e.g., sharing, discovering). Surprisingly, there was no influence of purpose on the kind of music contained in favorite CPs (§ 4.2.3). However, frequency of interaction varied according to Why it was created. This highlights an important distinction between CPs and other collaborative systems, whose artifacts are not necessarily for self-consumption. For example, CPs made to continuously share music over time were listened and contributed to more. Therefore, suggestions to convert or repurpose one-off CPs into those that are for extended interactions (e.g.,

music compilation of shared moments) may lengthen the “life” of the CP and enhance the platform’s sociability.

Personal playlists are also known to be re-used and re-purposed over time, and users invest more effort into curating playlists that they intend to re-use [19]. Our results echo this finding in the significant relationship between having an initial purpose of sharing music continuously over time and the evolution of the favorite CP. However, many of the favorite CPs did not evolve much in purpose (§ 4.1.3), and from this we can deduce that the initial purpose highly dictates future interactions with the CP. The significance of updating (i.e., contributing to) CPs created to continuously share music (§ 4.2.3) reflects that collaborators stay true to this purpose set from the start. Or, the lack of evolution may indicate the difficulty in changing the CP purpose, and platforms may need to learn to identify these changes and better support evolving CPs.

Furthermore, we find that a CP may have a different purpose for each contributor. Social music curation has been shown to reflect intended purposes—e.g., to promote driving safety or sing-alongs during shared car rides [22]—and collaborative music curation for a specific event, such as a party or road trip, often implies *co-consumption* of the music [21, 22]. These past findings relate mainly to one-off purposes; however, we found that some participants continued to check and contribute to favorite CPs even after the event. This indicates a change in the original purpose of the CP.

One reason for continued consumption of CPs created for a specific event was nostalgic motivation expressed in interviews and survey responses: “*The memory of the party, it was one of my last nights living with my roommate*” (P22). Here, music acts as a “souvenir”, whereby the event or experience surrounding the music supersedes the content [60]. P16 also speaks of nostalgia: “*It’s not the playlist itself, but rather the party that the playlist was played at that makes it my favorite*”. However, as evidenced by P16 being “*unsure*” of other collaborators listening to or updating the favorite CP, there is room for more discussion—and sharing—of this nostalgia embodied by the CP. Varying sentiments toward the same artifact can also cause collaborative strains. Hence platform designs can be sensitive to each user to enhance their music experience. For instance, if one collaborator is listening to a CP, the platform could facilitate more music sharing amongst others in that playlist, or bring that nostalgia to the other collaborators by encouraging them to listen as well.

5.3 Platforms should support social music functions to enhance user experience

Our survey and interview results highlight social reasons for users engaging with and distinguishing their favorite CP, thereby underscoring and extending the social value of music identified in numerous works [21, 22, 34, 62, 81]. Successful CPs supported greater awareness of others and deepened emotional connections (e.g., “*motivations*” (EO), “*mood*” (FP)); the CP also acted as a portal for feeling a connection and nostalgia toward the collaborators. Furthermore, despite known negative social outcomes of technology-mediated music sharing [11] (e.g., feeling the pressure for impression management [109] and the need to listen to the music as expressed by AK), social benefits provided by successful CPs were found to encourage continued engagement with them.

However, few commercially available platforms currently support CPs. Standalone apps for social music curation (e.g., Turntable.fm) have come and gone; and other streaming services provide CP functionality (e.g., Deezer,⁸ YouTube), but not with longevity or wide adoption. This is evident in our own sample, in which all users created CPs on Spotify. Most platforms tailor music consumption to individuals, not even permitting social interaction. Even among Spotify users, awareness of the CP functionality is relatively low,⁹ which may explain recent informational blogs on how to make a

⁸No one in our study used Deezer’s CP and therefore is outside of our scope of analysis. <https://support.deezer.com/hc/en-gb/articles/115003743809-Playlist-settings>, Accessed June 10, 2020.

⁹This may have changed with the pandemic.

CP.¹⁰ Furthermore, while music personalization algorithms are a popular research topic (e.g., [85]), CP functionalities have neither received as much attention and support,¹¹ nor evolved at the same pace. As such, we find today’s music services lack support for social aspects of music listening.

That at least half of favorite CPs have been created for social events and environments informs us that CPs can support *sociality* not only in their curation but also through social consumption. Such responses corroborate sociality findings from Hakansson et al. [34]. Other research has highlighted the potential for social music platforms to support the formation of new friendships [3, 10]; while we have not seen explicit evidence of favorite CPs facilitating social connections with strangers, evidence of users’ desire for this can be witnessed in various calls for contributions to existing CPs through Reddit posts such as “I made a collaborative Spotify playlist that anyone can add their favorite music to trip to. Feel free to add your own songs to it”¹² or “Please add [your favorite song] to this collaborative playlist so we can all play it ’til we hate it”¹³.

The COVID-19 pandemic and ensuing isolation invite social interaction—particularly virtual—through music. The CP provides a context to foster community and social engagement in these times. Importantly, the reported social benefits of CPs are drawn from their real-world usage as already implemented on commercial platforms. Hence, music platforms at large need to be developed further to enable greater social connectedness through music to enhance their users’ experiences.

5.4 CPs facilitate social recommendations and music “personal-ization”

Personalization on streaming platforms manifests as algorithmic recommendations informed by user consumption. Yet, while songs “recommended by streaming/AI” were underrepresented in favorite CPs, participants’ survey responses indicated that half or more of the content in the CPs “is/feels personal”. This suggests two forms of personalization: One that is algorithmically derived solely from users’ consumption data, and one that is based upon or brings greater social intimacy, which we indicate as *personal-ization*. Personal-ization is what mixtapes were imbued with and what “personalization” referred to before automated recommendations. Platforms striving to provide user-centered recommendations can supplement algorithmic recommendations with “personal-ized” suggestions directly from other users.

Our interview results are aligned with recent research reporting that reception of recommendations are impacted by “whether [it] came from an automated service or from another human being” [58]. Perhaps it is due to this that recommendations from friends, as compared with algorithmic recommendations from platforms, were perceived more positively—as being more diverse, novel, and serendipitous [47]. In our case, CP users indicated that social connections imbue music recommendations from CP collaborators with special meaning—e.g., songs from friends had more “layers” (EO). Furthermore, it was made clear that to users, personal-ization is not about how well the music fits their current music taste (which music personalization often aims for), but also how much it *challenges* their tastes and ways of thinking, as all of our interviewee participants expressed. Text responses also emphasized personal-ization by alluding to the intimate, experiential nature of the relationship one has with the songs in the playlist and/or the collaborators. The response “*Me and my collaborator know all the words and the songs [in my favorite CP] by heart*” (P13) is indicative of the social experience with and around the personal-ized favorite CP. Personal-ization working

¹⁰<https://www.digitaltrends.com/home-theater/collaborative-playlist-spotify/>, Accessed January 30, 2020.

¹¹For one, Spotify eliminated its messaging function that aided social interaction around music just a few years ago. <https://musically.com/2017/02/28/spotify-is-removing-its-inbox-and-messaging-feature/>, Accessed June 1, 2020.

¹²https://www.reddit.com/r/LSD/comments/coyf05/i_made_a_collaborative_spotify_playlist_that/, Accessed June 1, 2020.

¹³https://www.reddit.com/r/spotify/comments/3a5vqe/you_have_a_favorite_song_right_now_you_are/, Accessed June 1, 2020.

better than personalization is made even more clear by P23's text response: "*It's specifically song recommendations for me from my friends, which means it's curated for my tastes but also much more genre-diverse (and with better songs in general) than ones automatically generated by Spotify*".

In addition to social connectedness and thoughtfulness in the songs, self-effort may also influence the perception of personal-ization. As Cunningham et al. note, Spotify's automatically generated playlists reduce the effort of finding and following new artists, and consequently the effort of expanding users' music collections [18]. The ease in expanding one's music collection applies to CPs as well, especially as Spotify recommends songs to add based on the content of the playlist. However, this ease—or reduction of effort—can decrease actions taken by individuals and therefore the "personal mark" disappears. In CPs, perhaps for impression management [109], users may use less of the automated system, leading to more user footprint or mark—which makes the CPs feel more personal. Evidence for this personal-ized feeling is also supported by the significant relationship between whether a favorite CP "is/feels personalized" and the user updating the playlist. While causality is unclear (i.e., whether CPs feel more personalized as users contribute more, or vice versa), the important insight is that higher levels of engagement correlate with greater personal-ization, and that one begets the other. This is not to say, however, personal-ization supersedes personalization. Rather, our finding that favorite CPs do contain some AI recommended songs show that the two can be synergistic; thus, the degree to which users feel their CP music is personalized with respect to the amount of AI-recommended songs is future work to be considered.

5.5 Both homophily and heterophily should be supported

Current music platform algorithms are heavily influenced by and geared toward *music homophily* [7, 8], which is defined as and implies being "motivated by perceived music fellowship or recognition" [33]. Some text responses regarding why the favorite CP was a user's favorite support this bias toward homophily, or "likes attract", as a compelling reason [13]: "*Has music that goes along with my tastes*" (P46) and "*it incorporates my favorite style of energetic and aggressive rap*" (P29).

However, we also found evidence for the contrary: *Music heterophily*. Expanding upon the definition of music homophily, we term music heterophily to mean *the tendency to seek fellowship of and/or be attracted by perceived differences in music fellowship or preference*. That an average of about half the content of favorite CPs was not "similar to my music" is somewhat indicative of music heterophily and suggests that contributions from collaborators are both similar yet different from what users are accustomed to. Similar to findings from prior work by Volda et al. [109], we observed music heterophily as a goal of collaborative curation. Written responses such as "*International, diverse participants help me discover unique, often unknown music and artists*" (P32), point to a divergence in musical content that brings collaborators together in a CP. Benefits of music heterophily were evidenced in our interviews as well, with diverse contributions—and an openness to receiving them—bringing about an expansion of musical tastes and greater fulfillment.

Both music homophily and heterophily speak to the Cognitive purpose of why one engages in CPs and particularly in favorite CPs—that discovering and becoming acquainted with music similar to and different from a user's taste and familiarity are among the reasons for liking a CP the most. Moreover, our results validate the finding that friends, even in the age of AI recommendations, are important for music discovery and exploration [53]. Therefore, platforms ought to also support users seeking music heterophily, not only music homophily.

5.6 Diverse engagement metrics are necessary

Engagement with online music streaming platforms has been measured through direct interactions with content, such as play counts and add/save behaviors [27, 43]. However, such measures may belie fondness for participants' favorite CPs, as was confirmed through our interview responses.

In our current analysis of favorite CPs, all of the frequencies of actions (Fig. 4) were shown to be “Sometimes” or lower. This lack of interaction with the favorite CP can be misleading in light of the value that users associate with the CP. We often associate greater interest with more frequent engagement; this was not the case here. Moreover, while interview responses pointed to active collaboration and listening as benchmarks of success, these factors were not always necessary for a CP to be viewed as successful. Rather, musical taste expansion and emotional connection were the topmost reasons for considering a CP as their favorite. While we lack similar engagement metrics from our participants’ personal playlists for direct comparison, our results point to the importance of social factors that are not captured by traditional engagement metrics, suggesting that they do not fully characterize the fondness some users reported in their descriptions of favorite CPs.

Nostalgia and reminiscence (discussed in § 5.2.3), also reported by previous works [72, 74], could be one aspect through which to begin better understanding the fondness of CPs and their music. Measuring the intensity of emotions and sense of connection felt through successful CPs is a first step toward recreating these nostalgic moments: “*It reminds me of the time when my friend and I created [the favorite CP] ... Listening to that playlist brings back a lot of good memories of those few weeks with her*” (P52). Furthermore, understanding fondness in terms of how much—whether in frequency or periodicity (i.e., how regularly)—a user is revisiting the music ought to be considered in measuring such fondness.

Last but not least, current metrics set in place to measure users’ subjective assessments ought to be reconsidered. As personal-ization is felt differently from personalization, measuring how personal the CP and music within feels to the user is critical to understanding CP success. Furthermore, rather than relying only on formulaic metrics derived from musical characteristics in relation to the recommended list [98], direct user sentiments of the music must be considered. This can be facilitated through CPs as users may feel greater ease in sharing subjective assessments of the music with people more than with the system. Measures that more accurately assess both CP success, and the hurdles in bringing CPs to success, will enable platforms to better understand CPs and create fertile grounds for positive user experiences.

5.7 Limitations & Future work

We recognize that our sample, while exceeding that of CP users in a recent study [81], is lower than those reported in recent work on (personal) music streaming behaviors [26, 58]. This was due to a number of factors: Most music streaming platforms do not provide the CP functionality, not all Spotify users use CPs, and users needed to have engaged with multiple CPs (in order to have a favorite) to be eligible for our study. Also, we did not specifically recruit Spotify users—found to embody a persona distinct from users of other platforms [26]—but all participants used Spotify to engage in CPs. Hence, our results and interpretations are highly specific to this platform. Future work with a larger sample may surface small effects and nuanced differences more clearly (e.g., CP group size), as well as additional qualitatively derived insights.

Our findings suggest additional avenues for future work. First, as our current investigation focused on *successful* CP usage, we have not captured aspects of editing conflicts, diverging purposes or goals, and platform-related obstacles. Further investigation of sharing—within and beyond the collaborator group [78]—could provide insights into user behaviors and preferences around how contributions and consumption are displayed [49]. An *audio* perspective on the music in CPs, such as duration, genre, mood, timbre, or variability of tempo, may also play key roles in characterizing CP usage. Moreover, understanding cultural factors of music sharing and co-curation is critical, given noted cultural differences in music perceptions [56] and listening behaviors [63].

Finally, COVID-19 has likely impacted CP usage.¹⁴ Building upon our insights into long-term usage of CPs to understand impacts of social distancing promises interesting future results.

6 CONCLUSION

Social behaviors are central to the experience of music, and continue to evolve alongside technological advances. However, investigations of social practices on commercial music streaming platforms have been lacking. In this study we contributed important insights into collaborative playlists (CPs), a real-world practice of social music curation. Through a combined survey and interview study involving CP users, we characterized the Who, What, When, Where, Why, and How of favorite CPs; how these characterizations are interconnected; and more general practices and characteristics surrounding successful CPs. From survey responses, we found that favorite CPs were most often made with friends, were motivated largely by Social and Practical purposes, and were contributed to perhaps less than expected. We also found connections between favorite CP characteristics in relation to initiation, group size, purpose, and content; for example, that initiation of a CP mattered in taking CP action, and that CP engagement does vary with group size but not linearly. During follow-up interviews, favorite CPs were confirmed to be exemplary of successful social music curation and were found to achieve success not only through repeated use, but also due to active collaborations and support of social connections. Finally, CPs were shown to be an effective means of expanding musical tastes, due to users' heightened willingness to engage with social music recommendations compared to those generated by the streaming platform.

From our findings we derived key design implications, emphasizing the need for diverse platform designs supporting social music engagement through CPs. By designing for a variety of usage patterns, supporting social functions, accommodating diverse content selection, and also characterizing user engagement specifically for social curation contexts, platforms can continue to support users' music listening needs—not only as individuals but as members of social groups.

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