Changing Music's Constitution

Network Music and Radical Democratization

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ABSTRACT

A review of radical democratic theories influenced by technological developments and nonhierarchical network structures allows us to analyze factors influencing hierarchical structure in music ensembles. Network music ensembles are uniquely positioned to deploy heterarchical technologies that enable them to address radical democratic concerns relating to communication structures and power distribution. This essay provides examples of current politically tinged explorations in network music and examines the room left for maneuvering in developing systems that consider the implication of data structures on sociopolitical hierarchy.

Currently, the most exciting network music systems seek not to generate content within existing patterns of musical creation but to change the very processes of musical creation itself. Analogously, the most radical protest movements, such as #Occupy, focus not on working within preexisting government structures but on changing the very constitutional basis of government itself. Such "transformative creativity" [1] with a political edge is at the heart of the most advanced network music works.

Democracy theorists suggest that, rather than thinking of democracy as a discrete system, we consider the continuum of democratization as an ongoing process of populations striving for ever-greater equality and higher levels of self-governance [2]. New technological tools have inspired radical forms of democracy that seek to increase equality within political systems rather than offering ideal utopian solutions [3–6]. Such an interplay of utopian ideals and the pragmatics of citizen participation play out in novel musical interaction, too.

The development of new musical practices and the creation of the organizational structures required to support them go hand in hand. As a form that can deploy heterarchical technology, network music can replicate ongoing political struggles between grassroots, pro-democratic radical movements that use Internet structures to fight for equality and the network systems abused by authoritarian governments to gain ever-greater control over their citizens. Musicians' political allegiances are perhaps revealed in their system design choices—i.e. systems that can facilitate data flow in many directions versus systems that use a top-down approach to impose musical practices upon network music citizens.

This article explores the impact of freely designed data-flow structures on social interplay in network music ensembles by first surveying existing political theory and real-world radical democratic movements. The following section applies this theory to music ensemble structures, and the text then examines several emergent themes and practices in network music. The conclusion attempts to identify the "room for maneuver" that is left for network music to explore the great potential of politically engaged network music.

DEMOCRATIC THEORY AND TECHNOLOGICALLY MEDIATED SOCIAL ORDER IN THE AGE OF NETWORK MUSIC

As formal participation in political life (through elections) became almost universal over the course of the 20th century, theorists examined the relative freedoms of state citizens under democracy. Inglehart and Welzel, for example, distinguish between formal democracy (civil liberties as inscribed in law) and effective democracy (as those civil liberties are actually experienced by citizens) [7]. Others have proposed factors, and sought to develop theories of social organization, that contribute to the emancipation of citizens from oppressive societies, and have analyzed political systems that, though formally democratic, do not adequately represent voters' wishes [8,9]. Below I use some of these factors (see Table 1) to consider the democratic potential of music ensembles.

History provides us with ample evidence of technological development driving political change. The Industrial Revolution's need to reorganize society into hierarchical structures to facilitate the mass production of goods, which drove the

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move from feudalism to partial democracy, is one such example [10]. More recently, the emergence of knowledge-based economies has been facilitated by nonhierarchical, many-to-many networks that are efficient tools for the distribution and fast exchange of knowledge, and here collaboration has driven the production of new and profitable ideas [11,3].

Alongside these technological developments, political theorists have explored communication and power distribution in political systems. Jessop, for example, describes the formation of states as collectives of institutions defined by their communication channels, and politics as a social relation [12]. Radical democratic theorists have proposed various models of social organization that seek to modify power structures and to implement less hierarchical versions of representative democracy or otherwise to entirely reform political interaction into self-organizing networks. While new models of political organization inspired by "power-free" Internet structures offer utopian visions of society, and many see Internet-driven "biopolitical" production [11] as an opportunity to restructure societies, some governments perceive interconnected societies as a threat to political order and have abused their power to track Internet communications and encroach on their citizens' online liberties.

Alongside the Twitter-facilitated green movement in Iran and the Arab Spring movements that led to the ousting of several autocratic leaders, one of the most notable network-facilitated radical democratic movements is #Occupy. In addition to being a vital tool for organizing and distributing information to large numbers of geographically dispersed protestors, the Internet, in #Occupy's view, is a model for deconstructing societal hierarchies.

As the only "spaces" that are free of systematic hierarchical structure, the many-to-many communication networks of the Internet are, for #Occupy, the sole place that a radical revolution can be organized without pressure from real-world political systems. Furthermore, the movement views heterarchical communications as inherently stronger than hierarchical organization: "Working in a horizontal way and using network structures, it is difficult for the system to dismantle you, and it's the only real democratic way" [13]. Positioning the protest movement both in physical public space and online, #Occupy members have sought to use strength in numbers to construct a global revolutionary message that can resonate across diverse societies and pressure governments to address political and economic corruption, which the movement believes are inherent in hierarchical political systems.

One clearly politically oriented network music project, Crisis R Us, draws directly from #Occupy's organizational foundations as it seeks to unify diverse voices around a central issue—in this case, women's crisis. Crisis R Us borrows techniques used by radical democratic protest groups, including open assembly and deliberation, as it develops performance material around specific themes considered important by each performing group. Local performers are joined by audiovisual streams from remote contributors to position local issues within a global framework [14]. Although Crisis R Us is clearly directly informed by radical democratic practice, other, less transparent approaches to incorporating radical democratic theory and practice into music ensembles should now be considered.

COMPARATIVE ANALYSIS OF DEMOCRACY IN MUSIC ENSEMBLES

An earlier study analyzed the operating political structure of 160 network music ensembles [15], deducing structural features that can help to determine the relative agency of group members. Table 1 takes a broader look, generalizing some of the categorizations in the above study for different forms of musical ensembles and real-world organizations, and including descriptions of factors that have been described by political theorists as determinants in shaping the structure of a society. These include an organization's components, hierarchical structures, communication channels [12], decision-making processes and levels of power sharing and autonomy among its members [8].

While political systems structure the relationship between citizens and state, balancing individual autonomy against societal value, music ensembles have the rather simpler task of structuring the process of creative musical production. Just as in real-world societies, performers' autonomy in music ensembles may be a key indicator of relative democracy within those ensembles. Freely improvised music, in which almost all decision-making occurs during the performance, has been described variously as an antiauthoritarian practice and as an anarchistic form of musical organization. In free-improvisation ensembles, musicians are considered to be autonomous individual creatives who freely engage in collaborative processes; the socially driven decision-making offers them more autonomy than hierarchical structures can provide [16,17].

Although string quartets perform mostly notated music—which considerably reduces performer autonomy—they do employ a large amount of deliberation during rehearsal [18]. This immediate collaborative exchange is highly related to the radical democratic ideals of scholars such as Habermas, who posited participatory deliberation as integral to decision-making [19]. One can see the antithesis in clearly hierarchical structures such as the symphony orchestra, which was developed largely in order to accurately realize notated music. Orchestral musicians must interpret the composer's score with accuracy and according to the interpretive decisions of the conductor. Normally, performer innovation is not desirable, and performers with diverse playing styles may even be considered disruptive to group unity.

An obvious tension can be seen, then, in network music groups that use network technologies to instigate varying amounts of sideways data exchange and ask performers to engage in directed improvisation activities—yet still conform to orchestra-like organizational and decision-making structures (director > composer > conductor > performer)—often even using the moniker "laptop orchestra" [15].

Perhaps less problematically, the Grande Internationale Audio Streaming Orchestra utilizes orchestral hierarchy to manage improvisations by globally dispersed performers. Group members send audio streams from remote global

TABLE 1. The democratic potential of music ensembles. Titles in brackets indicate positions that are not always present; often an honorific role with little/no actual political power.

Type of Organization or Group	Hierarchy and Roles	Communication Channels	Decision-Making Processes	Level of Power Sharing	Level of Citizen Autonomy
Authoritarian states	Head of state Head of government Government State institutions Citizens	Law making Political rhetoric Propaganda	Directive	Low	Low
Democratic states	[Head of state] Head of government Government State institutions Citizens	Law/policy-making Political rhetoric Lobbying Elections Polling Petitioning	Directive Elements of deliberation to various degrees Referenda	Low [33]	High
#Occupy movement	Self-organizing group members-	Verbal Visual Textual	Discussion/ debate Voting Deliberative		
Social media	Service providers Software designers Users	Textual	Data		High
Open-source software production	Developers Users	Data Textual	Deliberative Multitude	Mid-high	High
Free-improvisation group (instrumental)	[Group leader] Group members	Aural (Visual) [34]	Multitude	High	High
Symphony orchestra	[Director] Composer Conductor Section leaders Section members	Visual Aural	Directive	Low	Low
String quartet	Composer Group leader (most often first violin) Group members	Aural Visual	Deliberative	Mid	Mid
Pop band	[Manager] Songwriter Frontman (singer or lead guitar) Band members	Aural (Visual) [35]	Deliberative or directive	Mid	Mid-high
Non-networked electronic music group	[Composer] [Instrument builder] [Group leader] Group members	Aural (Visual) [35]	Multitude Deliberative Directive	Mid-high	Mid-high
Network music group	[Composer] [Instrument builder] [Group leader] Group members	Aural Data Textual (e.g. chat screens) (Visual) [36]	Disputing Multitude Aggregate	Potentially high	Potentially high

locations to the location of the performance, and a performer there mixes the streams in real time. Although it conforms to the anarchistic spirit of free-improvisation ensembles, the performance has an obvious hierarchy: The performer mixing the streams freely chooses the context of the performers' audio contributions in relation to other streams. Dialogues among the largely autonomous performers, therefore, are mediated by the aggregation of the streams presented by the mixer [20].

HETERARCHICAL DATA EXCHANGE AND DEMOCRATIC MUSICAL INTERACTION

Weinberg proposes that network music ensembles are unique in that their use of networking technology makes data exchange possible and opens communication channels unavailable in other forms of music ensemble [21]. Information exchange in network music ensembles includes not only aural and visual information but also text (via chat room–style messaging systems) and musical and other data. Hugill's taxonomy of "Internet music" broadly categorizes network music projects by interaction and use of technology, implicitly acknowledging data organization's role in creative music processes [22].

As Boden proposes, computing and artificial intelligence can allow us to imagine new ways of thinking [1]. Network music borrows the data structure of Internet-based information exchange, which has typically led to a focus on communication structures, multiplayer instruments and the unique possibilities offered by network technology, such as geographically dispersed collaboration. Often the most interesting network music systems are those that offer the greatest novelty in interaction among players, although, of course, an interesting musical result is also desirable. Barbosa foregrounds collaboration as a defining element of network music [23].

In the 1970s, when the League of Automatic Music Composers (LAMC) began to experiment with routing data between microcomputers, they recognized the importance of data structures, data types and methods of data exchange to the collaborative process. Although technical hurdles limited LAMC's experiments, its members explored the democratic potential of the medium and sought to design systems that facilitate elements of group decision-making [24,25].

The democratic potential of data sharing was further foregrounded in later pieces by the Hub [26] as well as pieces by its individual members. In Chris Brown's *Wheelies* composition (1992), performers change their own timbral parameters but yield control of their rhythmic parameters to other performers in the group. In Scot Gresham-Lancaster's *Stucknote* piece (1994), each performer designs a sound that has just one control parameter, which is freely available for all the other players in the group to control, foregrounding the social interplay and group decision-making necessitated by opening up instruments to multiplayer control [27].

As sections below elucidate, contemporary network music systems continue to explore the potential that networked communication and data sharing offer to collaborative musical production. Yet, as an earlier study deduced [15], the possibility of freely designed data distribution alone does not necessarily lead to democratic interaction, echoing Inglehart and Welzel's theory of formal versus effective democracy [7].

Network-Facilitated Composer Autonomy

Although many artists insist that reciprocity is an essential component of democratic music-making, and although most network music systems are designed to facilitate real-time musical collaboration, Makelberge takes an anti-novelty stance, proposing that a critical aspect of musical development is the creation of new technologies that will facilitate greater composer autonomy. Describing the large-scale collection and distribution of samples as an artifact of the Internet age, he asserts that individual creativity, supported by collective gathering of resources, is "truly democratic" [28].

In light of the present investigation, however, valuing individual composers' autonomy without formally acknowledging the social structure that supports their creation conforms to traditional musical hierarchies and acts against technologically mediated reform of music creation processes. Using processes similar to those advocated by Makelberge, for example, SoundSon is a global network of composers who record sound files in their own geographical vicinity and add them to a shared pool of resources, with the aim of facilitating the creation of new electroacoustic works. SoundSon projects variously use individual and collective (sequential) editing processes, creating multiple dialogues around the recontextualization of material. However, facilitating dialogue among participants and enforcing collective decision-making do not appear to be integral to its project, and thus SoundSon misses the vital deliberative step that moves network-facilitated music-making toward its democratic potential [29].

Deliberative Communications in Network Music

Instantiating deliberative communications, collective decision-making and socially focused interactions has great impact on the way that ensembles communicate and collaborate. Network music ensembles regularly use textual and other opinion-gauging communications during performance, which allows us to rethink musical exchange and to position network music as having a unique potential to address radical democratic concerns about communication and power distribution.

In practice, sharing opinions in real time and designing performance-ready consensus-forming mechanisms mean that the hierarchy of decision-making seen in other ensemble structures is not vital to ensuring musical coherence. Performers can act autonomously but mediate their actions according to real-time feedback from their collaborators. Network music bands such as Glitch Lich have asserted that the important factors in group performance are the interactions facilitated by the technology rather than the technology itself [30], a position made visible through the band's decision to project their textual communications during performances, giving the audience insight into the performers' real-time deliberations about how best to proceed with the musical interaction.

Multiplayer Instruments

One final innovation made possible through data sharing is the multiplayer-control musical instrument. These instruments remove natural hierarchies formed around the acoustic and technical properties of particular instruments and tools and allow performers to act within the same possibility space. System outputs can be aggregated from a multiplicity of inputs. Player action, although autonomous, is modulated by group action. This process subverts the formation of natural social hierarchies, as when, for example, a performer in a free-improvisation group instantiates an effective hierarchy by excessive soloing.

The NOMADS system, designed by Burtner, Kemper and Topper, specifically intends to facilitate interaction among a large number of people, and the designers even coined the term *socio-synthesis* to describe the aggregation of a large number of data inputs into a predefined synthesis engine. Burtner describes both how the system facilitates collective action by giving many participants a small amount of control apiece and how that individual contribution is "minimized or lost" within the emergent dynamics of the collective action [31].

Analogously to the #Occupy movement, Burtner's system implements a collective action that prioritizes a unified message over supporting minority voices; however, the practicalities of managing up to 500 participant inputs means the system lacks the deliberation required to deduce which output would most adequately represent the collective voice of participants. Musical choices are largely predefined, and decision-making possibilities are limited and abstract. In the opera *Auksalaq*, participants control the number of raindrop sounds emanating from their mobile devices, within set limits, as one of a number of ways to interact with the performance. However, the illusion of participation is undermined by the inclusion of professional soloists, who generate the bulk of the musical material.

Even when specifically aimed at facilitating collective action, network music projects often miss the mark in terms of fulfilling their technological potential or dismantling musical hierarchies, instead favoring musical success over citizen equality.

CONCLUSION

Political models provide great stimulus to motivate musical action and interaction, and the playing out of political theory within the "safe" domain of music [32] even encompasses socially aware but deliberately autocratic structures. Uncomfortable, if not horrific, human political misadventure may still be the basis of an interesting musical piece, and satirical intent remains perfectly valid. Nonetheless, recent democratic theories arising from Internet-informed and -connected communities are perhaps the most inspiring influences on new network music work.

Musicians have used networks to acknowledge and subvert the power relationships of musical production, to attempt collective action and aggregation of inputs and to explore interdependency and collaborative decision-making. Network ensembles, more than any other genre of music, have actively ventured into structuring the social shape of creative musical activity.

Real-world politics has been unable to implement a full, radically democratic, nonhierarchical system against economic and populist pressures. Likewise, network music systems under the pressure of traditional musical values [23] have perhaps fallen short of developing systems that could fully engage with technologically facilitated radical democratic politics.

Introducing professional performers into participatory performances undermines attempts at collective action by installing a hierarchy in which participants are merely aggregated contributors without individual voices. Solo editing of pooled sound files limits the influence of the sample-selection act on the final product. Live-mixing multiple live streams elevates the mixer-performer into a position of power over subordinate performers, who must continuously jostle for a higher level in the mix.

The above examples elucidate attempts to shape the musical quality of multiple inputs into an output that possesses a unified voice, but in the process, these attempts restrict participants' autonomy, reducing their voices and contributions to merely the first step in an ultimately hierarchical process of musical production. Network music systems, in their current state, fall back on tried and tested means of organization due to system designers' mistrust of the capability of participant autonomy in self-organizing groups to create musical coherence.

We could argue that using "power-neutral" network technologies has enabled network music to make more attempts to democratize social processes of music production than other music forms allow, but we are not yet at the point of building systems that are fully nonhierarchical and capable of self-critically responding to power struggles in their internal structures. However, just as theorists have come to view democratization as an ongoing process rather than defining democracy as a definite state [2], at least we have started to demolish the musical autocracies of the past and begun to liberate network music citizens to shape their own musical realities.

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35 Visual communication channels are secondary for pop bands and non-networked electronic music groups.

36 Visual communication channels are secondary for music groups are not always present.

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