Dance and Music as Integrated Practices in Afro-Brazilian Performances: a technocultural study

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ABSTRACT – Dance and Music as Integrated Practices in Afro-Brazilian Performances: a technocultural study – This paper discusses the relationship between dance and music from a technocultural experiment about performative aspects of Bumba Meu Boi of Maranhão. The research mixes research mediated by technology and theoretical discussions on Musicology, Anthropology, Performing Arts as well as testimonials of masters from traditional communities. The study aims to describe and reflect on how Afro-Brazilian cultural performances entangle the phenomena of *multimodality*, *multi-coordination* and *neighborhood* as indispensable factors to conceive an integrated and complex embodied knowledge, indicating inseparability between body, dance and music.
Keywords: Dance. Music. Technoculture. Afro-Popular Brazilian Manifestations. Bumba Meu Boi of Maranhão.

RESUMÉ – Danse et Musique comme Pratiques Intégrées dans les Performances Afro-brésiliennes: une étude technoculturelle – Cet article aborde la relation entre la danse et la musique au moyen d'une expérience technoculturelle qui utilise des éléments performatifs du Bumba Meu Boi du Maranhão. La recherche associe la technologie à discussions dans les domaines de la musicologie, de l'anthropologie, des arts du spectacle et des paroles des artistes populaires qui vivent dans les communautés traditionnelles. L'étude a pour but décrire et comprendre comment les performances culturelles afro-brésiliennes réunissent les phénomènes de *multimodalité*, de *multi-coordination* et de *voisinage* comme facteurs indispensables à la construction d'un savoir corporel, intégré et complexe, indiquant l'indissociabilité entre le corps, la danse et la musique.
Mots-clés: Danse. Musique. La Technoculture. Manifestations Afro-Populaires Brésiliennes. Bumba Meu Boi du Maranhão.

RESUMO – Dança e Música como Práticas Integradas em Performances Afro-Brasileiras: um estudo tecnocultural – Este artigo aborda a relação entre dança e música a partir de um experimento tecnocultural que faz uso de elementos performativos do Bumba Meu Boi maranhense. A pesquisa cruza uma investigação mediada por tecnologia sobre discussões advindas dos campos da Musicologia, da Antropologia, das Artes Cênicas e de palavras de mestres de comunidades tradicionais. Busca-se descrever e compreender como performances culturais afro-brasileiras congregam fenômenos de *multimodalidade*, *multicoordenação* e *vizinhança* como fatores indispensáveis na construção de um saber corporificado, integrado e complexo, indicando inseparabilidade entre corpo, dança e música.
Palavras-chave: Dança. Música. Tecnocultura. Manifestações Afropopulares Brasileiras. Bumba Meu Boi Maranhense.

This research brings together dance, music and technology in order to generate reflections and discussions on the presence of *multimodality*, *multi-coordination* and *neighborhood* phenomena in Brazilian cultural manifestations of African *motrix*. In contrast to the idea of matrix, widely used to create links of origin and ancestry with African culture, the Brazilian researcher Zeca Ligiéro (2011, p. 111) employs the concept of *cultural motrix*, a quality "implicit of what moves and who moves". Such *motrices* go beyond the ethnic matricial invocation for a single origin, because, when present in performative practices, they materialize, corporally, the paradigms of tradition.

Taking as a case study a performative experiment based on the Bumba Meu Boi from Maranhão, mediated by technology, we investigate how the musical and kinesthetic dynamics constant in Afro-Brazilian popular *brincadeiras* [playing][1] compound an integrated knowledge, along the lines of the triad *drumming-singing-dancing*, used by the Congolese philosopher Bunseki K. Kia Fu-Kiau[2] (apud Ligiéro, 2011). By exploring and highlighting the complexity that governs the relationships between body and music in these manifestations, we try to identify the incongruity between the universalization of dance and music theories generated in European models and their applicability in *Afromotric* cultural expressions.

It is important to emphasize that the experiment in question was developed by me, a cisgender white woman, researcher-artist and teacher, who acted in the position of subject, but also of observer, from a method of metaperspective, facilitated by technologies of uptaking and analysis. The theoretical problematizations, concepts and information about the characteristics of Bumba Meu Boi from Maranhão, mobilized throughout the text, are legatees of a confrontation between theories from fields such as anthropology, biomusicology and ethnomusicology, and testimonies from masters and *brincantes* [players].

After a brief introduction about terms and expressions that are foundational of the discussions about Brazilian culture, the article will continue with the following structure: presentation of the concepts of *multimodality*, *multi-coordination* and *neighborhood*, applied to the fields of traditional dances, music and *brincadeiras* in Brazil; report, implications and analysis of a *technocultural* experiment[3] from the Bumba Meu Boi of Maranhão; problems and inaccuracies of the research; and final considerations.

Popular, traditional, Afro-Brazilian? Which cultures and artistic forms are we talking about?

There are numerous problems of generalization and epistemic erasure arising from the use and convention of certain ways of naming popular cultures in Brazil. The expression *popular culture* has a biased non-specificity that says more about who names than about the named object. In the article *Nomear é Dominar? universalização do teatro e o silenciamento epistêmico sobre manifestações cênicas afro-brasileiras* (2022), Alexandra Dumas, professor at the School of Theatre of the Universidade Federal da Bahia, discusses the colonial heritage that differentiates "[...] what is of the order of art and what is of the order of the popular, of the people" (Dumas, 2022, p. 9). The author gathers discussions from several thinkers of the counter-colonial and anti-racist struggle, among them Lélia González, to conclude that classifications such as *popular culture* and *national folklore* are tributaries of the whitening project that minimizes the African contribution in favor of the praise of a high culture of European lineage. Thus, Dumas proposes to use *Afropopular* art (Dumas, 2022), in order to name and validate the African vein that irrigates popular knowledge in Brazil:

> When highlighting the foundational reference in the use of the term Afropopular, there is an intention to manifest the aspects of cultural invisibility to which *quilombola* communities, peripheral communities, and small towns forgotten by the country's economic and governmental centers are subjected (Dumas, 2022, p. 10).

Although it designates the affirmation of Afro-diasporic knowledge, *Afro-popular* does not contain the indigenous contributions that are also strongly present in numerous Brazilian cultural manifestations. Therefore, other prefixes would be necessary to combat the conservation of the ideal of whiteness of the *popular* generic without producing other erasures.

In a class in the Performing Arts course at the Universidade de São Paulo[4], Bartira Menezes (2022), an artist and *brincante* from Maranhão, who continues the knowledge of the Menezes family[5], defended the use of the expression *traditional cultures and artistic forms* instead of popular culture, considering that: "These knowledges are produced by families, with name, surname and address. They are carriers of a tradition"[6].

Zeca Ligiéro (2011), using the Performance Studies[7], argues that Brazilian cultural manifestations, constituted by the knowledge of native peoples and the African diaspora, can be named as *Afro-Brazilian performances* and *Afro-Amerindian performances*. Characterized by a set of cultural dynamics used in the African diaspora (dance, chanting, music, clothing, space, among others), Afro-Brazilian performative practices would be marked by some fundamental elements, such as: the trio formed by the inseparable relationship between singing, dancing and drumming; the cult of ancestors; the ritual dimension and the game; the presence of masters and the importance of the *roda* [circle][8] (Ligiéro, 2011).

Although they do not encompass the complexity of the phenomena found within the realm of the popular, the expressions *afropopular* (Dumas, 2022), *traditional artistic forms* (Menezes, 2022), *Afro-Brazilian performances* and *Afro-Amerindian performances* (Ligiéro, 2011) help us to understand that such cultural manifestations are not produced by a monolithic mass called people, but by persons with different histories, traditions, specificities and ancestries. Therefore, to bring these ways of naming, in the light of their contexts, is also to confront the epistemic colonialism and universalism of folklorizing discourses that, by homogenizing the popular as an inferior other, subjugate their knowledge, technologies, sciences, methodologies and their most distinct and complex cultural manifestations.

Considering such notes, we will continue to use the expressions of Dumas (2022), Menezes (2022) and Ligiéro (2011) alternately, understanding that each nomination raises a web of times and contexts concerning the *motrices* they invoke.

Multimodality, multi-coordination and *neighborhood in* traditional Brazilian manifestations

The idea of *multimodality*, from the point of view of cognitive capacities, concerns the integration and codependence between different senses and actions, such as hearing, looking, touching, smelling, moving, facial expression, vocalizations, among others. Its study has been gaining ground in the field of linguistics, with national and international authors, but also in the field of musicology and visual arts (Fortuna; Nijs, 2020).

The *multimodality* present in *Afromotric* cultural performances has been discussed mostly from the relationships between movement, rhythm and voice in integrated performative practices. The Brazilian sociologist Muniz Sodré (1998), regarding traditional African cultures, emphasizes that the interdependence between dance and music affects the formal structures of each other, asserting that a musical form can be created in function of dance movements, while dance can be elaborated in relation to the musical form. For the author, this coupling denounces a primordial incompatibility between Afro-diasporic musical practices and the European musical conception: "The rhythm of dance adds space to time, consequently seeking symmetries to which the musical form in the West does not feel obliged" (Sodré, 1998, p. 22).

Thus, by associating body movement and musical creation, this type of cultural manifestation highlights an embodied approach, based on the kinesthetic process, as pointed out by ethnomusicologist James T. Koetting (1970, p. 119) about African cultural performances:

> Neither patterns nor pieces have, as in the West, been characteristically created by composers and choreographers in some predominantly mental process; they seem instead to have developed, performed, and passed on within the socio-cultural tradition through a combination of mental and kinesthetic processes.

This process of inseparability between dance and music refers, among other possibilities, to the phenomenon of synchronization between sound and movement in the body; a theme widely discussed by authors of *embodied musical interaction* and *embodied musical cognition*[9]. The musicologist Marc Leman (2008), in his book *Embodied Music Cognition and Mediation Technology*, defends that the pulse is the main agent of the synchronization of movement with music. In opposition to a passive following process, the activation of the motor system in synchronization can imply a prediction of musical sequences, capable of making a body move, spontaneously, in synchrony with a sonic pattern (Leman, 2008).

At the heart of the synchronization between dance and music is the *entrainment*, a term from biomusicology. Martin Clayton, Rebecca Sager and Udo Will (2004), in the publication *In Time with the Music: the concept of entrainment and its significance for ethnomusicology*[10], state that *entrain-*

ment is a phenomenon in which two or more independent oscillatory processes synchronize, in such a way that they adjust to a common periodicity. For the authors, there are two basic components for synchronization to occur: 1) there must be two or more autonomous rhythmic processes or oscillators; and 2) the oscillators must interact.

Although such a concept may recall the acoustic phenomenon of resonance – where a source emits a sound whose frequency is equal to the vibration frequency of a receiver – Clayton, Sager and Will (2006) defend that entrainment and resonance are not equivalent and cannot be confused. In entrainment, oscillations are active and autonomous processes that have an internal energy source, so that if there is no interaction, the oscillations will continue to exist. In resonance, on the other hand, if a source that produces sound waves in a resonance box ceases its emission, the oscillations in the box will also cease (Clayton; Sager; Will, 2004). However, for entrainment to occur there must be some degree of interaction between the oscillators.

Such an interaction implies a "consistent relationship" (Bluedorn, 2002 apud Clayton; Sager; Will, 2004, p. 10), that is, the rhythmic patterns need not coincide exactly, but maintain a definite relationship that may be evidenced by synchrony, anti-synchrony or other rhythmic connection between the oscillators.

Furthermore, synchronization patterns can occur in the oscillatory systems of the same body, generating, for example, different relationships between organic rhythmic patterns (breathing and heart rate) and movement. This process has been named by biomusicology as *self-entrainment*.

Ethnomusicologist Martin Clayton (2012) points out that coordination between body members is a very important and not yet widely studied aspect of *self-entrainment*. Understood here as a process of *multi-coordination*, it refers to the basic dynamics of coordination between several independent but coupled limbs through rhythmic patterns (Clayton, 2012), as with a drummer who moves different parts of the body to produce sounds in correlated rhythmic chains.

Both *multimodality* and *multi-coordination* are present in different examples of Afro- Brazilian and Afro-American performances, in which *brincantes* sing, dance and play musical instruments, attesting to the codependence between music and dance in their actions. Such processes are evidenced

when, on naming a manifestation such as *coco* (in its numerous geographical occurrences), for instance, it is not known specifically whether we are referring to dance or music, not to mention poetry or even the ritual, historical or social dimensions constitutive of its *motrices* (Ayala; Ayala, 2000).

The *motricial* perspective, based on Ligiéro's (2011) concept of cultural *motrix,* brings a fundamental triad that talks directly with the ideas of *multimodality* and *multi-coordination* above described. These are the three basic elements of African performance – *dancing-singing-drumming* – advocated by Ligiéro, based on the studies of the Congolese anthropologist Bunseki Fu-Kiau. They serve not only as indicators of a deep integration between dance and music, but also as invocators of ancestral forces and the transmission of knowledge conducted by masters in contexts of celebration, feasting and ritual:

> By considering the joining of the bodily arts to the musical ones and, above all, adding the use of singing as something simultaneous and perceived as a unity at the center of African performance, Fu-Kiau highlights a device that undoubtedly remains characteristic of African diasporic performances in the Americas – it is not possible to exist black African performance without this powerful trio, and the same is applicable in relation to Afro- Brazilian performances (Ligiéro, 2011, p. 108-109).

In Afro-Brazilian and Afro-Amerindian cultural performances, *multimodality, multi-coordination* and the powerful trio of *dancing-singing-drumming* are not solitary experiences, although they may exist in a single body. Always hosted by some ritualistic instance, dances, chants and rhythms are shared in *brincadeiras*, responsorial dynamics, religious festivals, in *roda*s or presentations, but never in an isolated and solitary way.

> It is the performer's bodily knowledge of the interplay between singing-dancing- drumming with the philosophy and cosmic vision of the tradition that ensures its true continuity. Its effectiveness depends on a strong oral tradition, informal training and a great sense of community identity (Ligiéro, 2011, p. 130).

For the South Korean philosopher Byung-Chul Han (2021), in his recent publication *O Desaparecimento dos Rituais: uma topologia do presente*, ritual acts are constituted of a resonant body, marked by shared feelings, never lived in isolation. Therefore, such acts embody and sediment the experience in community, since "[...] they create an embodied knowledge and

memory, an embodied identity, a bodily communion. The ritual community is a corporation. Inherent to the community as such is a bodily dimension" (Han, 2021, p. 24).

When looking at ritual practices, the anthropologist Victor Turner (2012) brings the concept of spontaneous *communitas* as a momentary celebration between individuals who share their identities in a unique, fluid and synchronized event. By dialectically colliding structure and anti-structure, Turner (2012) conceives the perspective of *communitas* as a kind of temporary anti-structure that, in ritualized moments, would remove subjects from their previous social positions, generating common bonds. Based on Turner, the researcher Petícia Carvalho de Moraes, in her master's dissertation, makes the following observation about the *coco de roda* feasts in Paraíba:

> The state of spontaneous *communitas* is something desired and expected by the participants, connoisseurs of the feast and, contradictorily, this state of communion is only experienced when the sound-body games performed in the center of the *roda* intensify. The *brincadeira* begins with the formation of the *roda*, with the bodies connecting through repetitive movements (Moraes, 2016, p. 111).

Mestra Graça Reis and Bartira Menezes, *brincantes* and continuers of traditional knowledge from Maranhão, in a meeting with students from the Universidade de São Paulo in 2022, pointed out that working in the community has always been a fundamental premise for their formative trajectories as artists and *brincantes*. Mestra Graça Reis (2022), when confronted with undergraduate students in performing arts present there, defended: "I'm going to talk a little about what I know. I didn't go the college, my school was my family. Our home is our great college"[11]. However, Bartira Menezes, when mentioning the recurrent discussion of academic researchers on the use of the word community to name the context of sharing traditional manifestations, points out:

> We have always been in a community, but we never called it that. Where I come from, from my neighborhood, in São Luís do Maranhão, what today they call community, we used to call vicinity. Because everything was done with neighbors, partners and family members, collectively and in solidarity[12] (Menezes, 2022).

Within the word *neighborhood*, belonging, bonding and the ritual dimension characterize learning and meeting relationships that seem to over-

flow the already sedimented definitions of Western philosophy and anthropology regarding the idea of constituting the common. The *neighborhood* implies a geographical relationship, in the sense of inhabiting a common space that houses different forms of conjuring. It also encompasses contradictions that go beyond the danger of romanticizing the community as a homogeneous unit. *Neighborhood* is diverse: while it can welcome the constitution of common shares, it can contain ethnic-racial and social differences, as well as religious, political, social and cultural divergences.

In her book *O Espírito da Intimidade: ensinamentos ancestrais africanos sobre maneiras de se relacionar*, the Burkinabe writer, Sobonfu Somé (2007, p. 46), underlines the importance of the foundations that govern the sense of community from which she comes:

> To create a functioning community, you need to look carefully at some of its fundamentals: spirit, children, elders, responsibility, generosity, trust, ancestors and ritual. These elements form the basis of a community.

In the context of traditional cultures in Brazil, we could say that the foundations of the *functioning community* (Somé, 2007) are nourished, among other aspects, by *motrices* activated by bodies that *dance-sing-drum* (Ligiéro, 2011) collectively. In this sense, the sense of neighborhood is strengthened, beyond divergences, at each feast, rite, game and *brincadeira*, deepening bonds of belonging, identity, communion, relationship with ancestors and continuity of tradition.

A *technocultural* experiment

Between 2020 and 2021, I developed a theoretical-practical research with the Department of Musicology at Ghent University, under the supervision of researcher Marc Leman, on the relationship between dance and music, based on the method of the *technology-enhanced mirror* (Caruso, 2018). This method has been developed by the Italian musician and researcher Giusy Caruso (among other researchers in the field of musicology) and consists of a metaperspective approach, in which the artist is also the researcher, but instead of producing reports, descriptions or subjective impressions, she uses objective data obtained through recordings (motion and audio captures, computer analysis, video recordings and other types of capture) of her own performance.

Based on the *technology-enhanced mirror* and the metaperspective, I conducted the study *A Descriptive Study about Self-Entrainment and Cross-Modality between Dance and Music through Examples of Brazilian Traditional Dances* at the Laboratory of Interaction between Art and Science of Ghent University[13]. This research consisted in describing the *multimodality* and the process of *multi-coordination* present in the interactions between dance and music from some examples of traditional Brazilian cultural manifestations, using motion capture and audio technologies for qualitative analysis.

The process involved the recording of *multimodal* activities performed by me (dancing, singing and playing percussion instruments), based on *toadas* [traditional songs], movements and rhythms of different Afro-Brazilian performances (*maracatu de baque virado*, *coco*, *samba de roda*, *cavalo-marinho* and Bumba Meu Boi)[14]. However, instead of producing an audiovisual record, the capture took place through the capture and transposition of the body in a digital model, with a view to undertaking an investigation centered on the sound and kinetic dimensions of the practices analyzed, to the detriment of other aspects that might prevail.
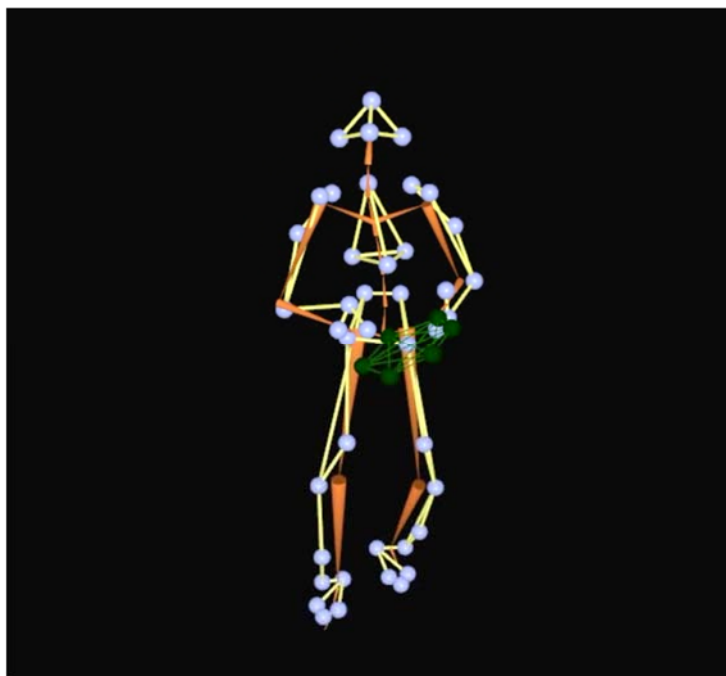

Figure 1 – Frame of the three-dimensional representation in video of pilot experiment, from the coco 'Parari' of Mestre Lúiz Paixão, by the Motion Capture-QTM program. Source: Available for viewing at: https://drive.google.com/file/d/10FWKY6ECUvtV35cA1qFxbgWBZZjeMLqV/view?usp=sharing. Accessed on: 01 Dec. 2022.

The experiments were produced from the following condition: I, the author of the present research, in an individual performance situation, sang, danced and played, based on different rhythmic, kinesthetic and melodic patterns, according to each cultural manifestation approached.

The movements were recorded by the motion capture technology (Qualysis system)[15]; and the audio (voice and percussion) was captured in synchrony with the movement by means of a universal clock, the SMPTE clock. The qualitative analyses verified the synchronization between dance gestures and musical gestures, contemplating coordination between body parts, voice and rhythmic construction from the Elan software, a tool that enabled transcription and annotation of synchronized audio and video. The process included exploratory meetings, rehearsals, preparation of experiments, recordings in pilot experiments, final recordings, data cleaning and processing, and transposition of captures to video files.

Although the study brings together different captures, in this article I will bring analyzes of only one of the studies carried out: the *dancing-singing-drumming of* the Bumba Meu Boi from Maranhão.

The Bumba Meu Boi of Maranhão: sound and kinesthetic aspects

As Soraia Saura (2008) attests in her PhD thesis, *festas de boi* [festivities that celebrates the ox] exist throughout Brazil, with those in the North and Northeast being linked to the June cycle, and those in Bahia, downwards, more linked to the Christmas cycle or Carnival.

According to the Dossier of the Instituto do Patrimônio Histórico e Artístico Nacional – IPHAN (2011) the Bumba Meu Boi is considered the most important manifestation of popular culture in Maranhão. Composed of a festive cycle that mixes dance, music, dramatic auto and ritual, the manifestation is divided into four moments: the rehearsals, the baptism, the public presentations or *brincadas* and the death of the *boi* [ox]. Held in different locations in the state of Maranhão, Bumba Meu Boi is marked by different styles, called accents. The five main accents are Ilha or Matraca; Guimarães or Zabumba; Cururupu or Costa-de-mão; Baixada and Orquestra (IPHAN, 2011).

Manifestation performed, maintained and ritualized by different cultural subjects, brings the African diasporic contribution as structuring in most of the state:

> Actors in this great spectacle include dockers, fishermen, rural workers and small traders and, more recently, depending on the style of Bumba-meu-boi, students and civil servants, among other professional categories, can be found as part of the ensemble. It should be noted the large participation of blacks in the groups of the accents of Guimarães, Cururupu, Ilha and Baixada (IPHAN, 2011, p. 10).

Despite representing identity aspects of Maranhão culture, its history was marked by resistance struggles and strategies to combat the persecution of the local white elite:

> Controlled very closely by the police and the bourgeois class, the Bumba-meu-Boi groups, using the same tactic as the religious theater of the Jesuits, add to the festivity religious legends; indigenous rituals; African dances; props, instruments and speeches of whites, in a fantastic experimental technical audacity. They take advantage of a specific syncretism mixing mystical and religious aspects to escape the police and gain their tolerance, while criticizing society and making their demands (Marques, 1999, p. 75 apud Saura, 2008, p. 89).

In the present study, I used movements, rhythms and *toadas*, having the Matraca accent as a beacon to compose the individual performance recorded by the motion capture system. In addition, known as the Ilha accent (characteristic of the island of São Luís), this accent brings the following percussion instruments in its formation: *pandeirão*, *tambor-onça*, *matracas*, whistle and a large *maracá* in the hands of the conductor of the *brincadeira*.

> According to what Adelino Araújo (2008) explains, in the Island accent, stand out: the *tambor-onça*, which takes precedence over the other instruments, as it controls the whole ensemble, including the *maraca* of the *cantador* [singer]; the *maracá*, which gives the signal for the start of the *toada* and controls the ox so that the *matracas* and *pandeiros* do not make mistakes; and the whistle, which helps to stop the *trupiada* and, before the *maracá*, announces that the *toada* will be pulled by the *cantador*. The *matracas* animate the Ilha's accent groups and the *pandeirões* give them vivacity (IPHAN, 2011, p. 158).

In the collective body of the Bumba Meu Boi, the *matracas* (small boards) percuss themselves in a strident way from a polyrhythmic structure

that could be exemplified, according to Western musical notation, by the combination of the following rhythmic cells:
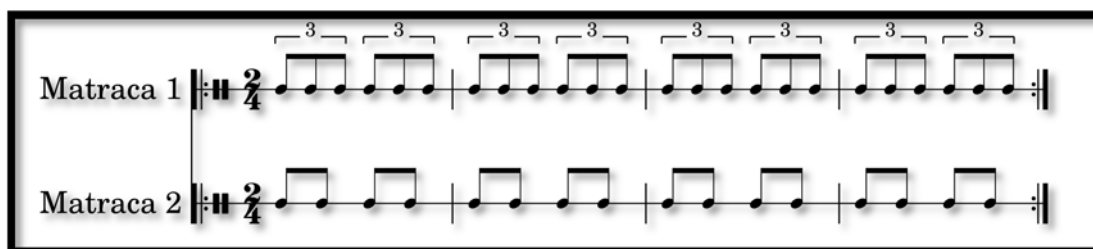

Figure 2 – Representation of the rhythmic structure of the matracas, through Western rhythmic notation. Source: Leitão (2022).

Although each *matraqueiro* plays one of the two patterns, the sound mass that is heard generates a mixture between what European musical notation calls binary metrics (represented by Matraca 1) and compound time (Matraca 2). In the compound time signature, each unit of time is divided into three; however, its metric is also binary, that is, there are two main beats that repeat, cyclically, dividing each one into three. In the Bumba Meu Boi with Matraca accent, this rhythmic pattern of the *matracas* is coupled with other rhythmic structures percussed in the other instruments used, whose sonority, tempo and cadence, despite maintaining a consistent relationship based on this binary structure, contemplate variations, contrametricity and syncopes[16].

As the musician and researcher Rogério Leitão (2022) reminds us, it is essential to emphasize that European musical notation can even help us map the polyrhythms imprinted on the Bumba Meu Boi from Maranhão; however, it is not capable of encompassing the rhythmic complexity that emerges from its logics and worldviews. By citing authors interested in other forms of musical notation, concerning African and Afro-diasporic musical matrices, Leitão takes up the discussion on syncope in Brazilian music, a theme dear to the field of ethnomusicology, led by the writer and composer Carlos Sandroni.

According to Sandroni (1996), contrametricity and syncope, for European musical culture, are exceptions and depend on complicated counting and spelling resources to be understood; conversely, for the music of Afro-Brazilian tradition, syncope and contrametricity are the rule and are part of everyday culture. Therefore, instead of being described by hegemonic musical notations, syncope and contrametricity, in the context of Afro-Brazilian

and Afro-Amerindian performances, are spontaneously understood in the body.

Given the rhythmic complexity of Bumba Meu Boi, there are several kinesthetic structures and choreographic evolutions used by the *brincantes* in close relation to the music and the characters that make up the *brincadeira*. Despite creating recurring movement patterns, these dances are not fixed, but updated in the bodies that perform their *motrices*:

> Despite the specific expressiveness of each *brincante* representing the characters of Bumba-meu-boi in Maranhão with their gestures and the resourcefulness of the movements, it is clear that there is a specific knowledge about how to dance Bumba-meu-boi that is passed down from generation to generation. It is a tradition that is expressed in the bodies of the *brincantes*, life stories expressed in moments of celebration (IPHAN, 2011, p. 181).

When observing the *brincadeira*, it is possible to describe different *motrices* that feed on the aforementioned polyrhythmic structure, creating distinct kinetic designs and chains, as is the case of the movement of the Brincantes de Cordão, who follow the marking sometimes binary, sometimes compound, with steps that are repeated. Unlike them, the Caboclos de Pena, wearing heavy clothing, jump, spin and make vigorous choreographic evolutions, in addition to the rhythmic marking synchronized to the music (IPHAN, 2011, p. 149).

A movement analysis, based on the four fundamental factors of movement forged by the Austrian Rudolf Laban (Rengel, 2003), could elaborate generalizations about the prevalence of jumps, turns and interlacing in the dance of the Caboclo de Pena (IPHAN, 2011, p. 149). We could say, for example, that some movement factors, such as *direct space*, *firm weight*, *fast tempo*, *controlled fluency*, alternating with *free fluency*, would be striking in the mobility of this figure. However, as can be identified in the short film *Caboclo de Pena*[17], 29 *Caboclos de Pena* evolve choreographically in distinct and markedly particular ways. Instead of confirming a choreographic trait that can be systematized and generalized, these caboclos show that, beyond the isomorphism between dance and movement – decoupaged into fundamental and universal factors –, this dance feeds on the most varied possibilities of relationship between body, clothing, gender, ancestry, spirituality, musicality, temporality and spatiality.

Moreover, in addition to the varied ways of dancing of each character, it is possible to say that the motor narratives also change according to the plot of the auto. For example: when the ox is bled by the cowherd, in the death ritual, the *miolo* [kernel] – the one that *rolls* the animal, the central object of the *brincadeira* – makes "the ox tremble, giving greater reality to the act" (IPHAN, 2011, p. 130).

Therefore, the sound and kinetic dynamics that appear in the *brincadeira* are many and varied, so that reducing them to rhythmic patterns and movement qualities stabilized by European musical notation or by a choreographic look based on an isolated analysis of movement would be to ignore the *multimodal*, *motricial* and collective perspective that characterize them.

One-body Bumba Meu Boi: a technocultural experiment

In the experiment developed from the technology of the augmented mirror, I used a pair of *matracas* to alternately mark the rhythmic structures exposed in Figure 2 while singing and moving my feet in a step commonly used by the Brincantes de Cordão who, in some cases, dance and sing playing matracas (IPHAN, 2011). The *toada* chosen for the recordings was *Santos do Morro*, composed by Ana Maria Carvalho[18] and recorded by Grupo Cupuaçu[19], on the album *Grupo Cupuaçu: todo canto dança*, in 2008:
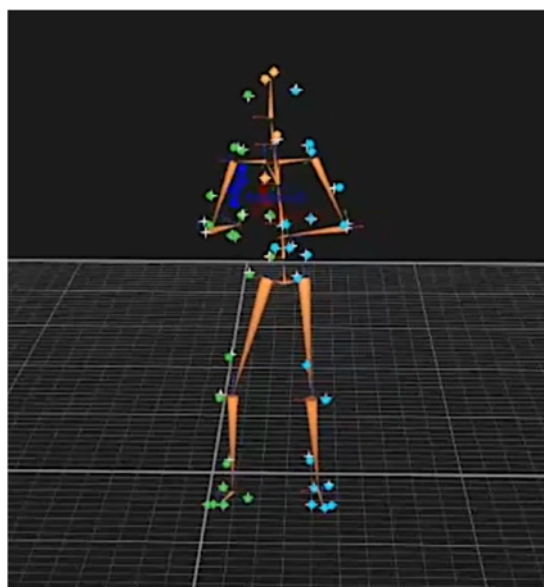

Figure 3 – Digital model in video of capture of the experiment from Bumba Meu Boi of Matraca. Source: Available for viewing at: https://drive.google.com/file/d/1gik1XAT1wHiyWtv3oEtt7ghSOpjv KR9h/view?usp=sharing. Accessed on: 01 Dec. 2022.

The images and audios captured, in synchrony, provide clues regarding the spatiality and temporality of the movements that could be objectively read by a computational analysis capable of verifying and comparing positions, precision and periodicity in the repetition of steps and gestures. To the same extent, software for visualization and analysis of sound waves could objectively verify aspects such as pulse maintenance, voice spectrography, among others. However, in the study presented here, what was prioritized was a qualitative and descriptive analysis from three processes that are integrated in the same performative task: dancing, singing and drumming.

By arranging the captured video file in Elan software, it was possible to visualize the moving image and the audio sound waves in the same space. In addition, it was possible to annotate different actions, according to each excerpt of the video and audio, allowing to understand how the rhythmic, melodic and kinesthetic patterns of this small performative exercise developed. Thus, three layers were created for multilevel annotation, the first layer with information on the rhythmic structure, the second on the dance, and the third on the *toada*, from the transcription of the song lyrics.

Figure 4 – Screenshot of the Elan software, with the files of the present research. Source: Author's file.

Regarding the description of rhythmic and kinetic aspects, the expressions *1+ 2+* were used to indicate the binary structure and *1+a 2+a* to indicate the compound time signature. Dialoguing with Figure 4, above, it is possible to understand that, after 15 seconds of recording, while the dance steps remained in binary time, the percussion of the *matracas* moved to the

compound structure, while the song followed the binary musical metric, extending the duration of the vowels. At 25 seconds of recording, while dance and percussion synchronized in binary metrics, the song was tied to the ternary subdivision of compound time.

Although the dance steps seem simple, because they are made up of basic gestures[20], the lateral displacement and the presence of a marking that involves backbeat for the execution of the movement can generate difficulties in the distribution of weight and in maintaining time when linked to the task of following a rhythmic pattern that mixes binary and ternary structures. However, the way in which the dance is coupled with the rhythmic structure percussed by the matracas or intoned by the song undoes the ambiguity of the perceived sound reference.

According to Marc Leman (2016), when listening to an ambiguous musical pattern, the dancing body affiliates itself with the internal structure of the rhythm, undoing the ambiguity and determining how the music will be perceived. This means that, in the midst of a *sea of matracas* percussed in polyrhythm during a Bumba Meu Boi feast, it is possible to synaesthetically tie oneself to one of the two patterns (binary or ternary) and remain in sync with the *brincadeira*.

In the experiment discussed here, the disambiguation power of dance is explicit when the metrics of the *matracas* become rhythmically dissonant[21] in relation to dance and singing, which remain in binary regularity. Operated by the same body that activates different actions and cognitive skills, we can say that it is a *multimodal* and *multi-coordinated* performance that constantly adjusts between the sounds produced, perceived and activated by movement and voice.

Imprecisions of a study without neighborhood

Although able to indicate visible assumptions about the role of *multimodality* and *multi-coordination* in the performative exercise presented, the objectivity of the records obtained by the technology of motion and audio capture holds two substantial inaccuracies: the absence of the collective and the absence of a subject in the experience.

Now, if a *brincante* of an *Afro-popular* artistic manifestation such as Bumba Meu Boi is never alone at a feast, presentation or rehearsal, what is

the validity of investigating the relationships between dance and music from the performativity of a single body? Would the arrangements between voice, percussion and movement be organized in the same way if there were other bodiesand sonorities moving and sounding together?

Such issues do not invalidate the discussions outlined so far, since the analysis of isolated sound and kinesthetic aspects showed dynamics intrinsic to polyrhythm and to the *dancing-singing-drumming* trio that would only be apprehended through a detailed and decoupaged analysis of these integrated performances. However, if a battalion – the denomination of the Bumba Meu Boi groups from Ilha – were analyzed under the same conditions of capturing, other aspects would be evidenced, considering that *dancing-singing-drumming* together demands understanding in space-time, conjuring not only the cognitive aspects involved in sharing attention, prediction and maintenance of the pulse, but also the social, ethnic-racial and hierarchical dynamics that comprisethe formation of the collective.

Martin Clayton (2017, p. 2015), in his research on the role of social interaction in embodied musical processes, ponders:

> Research on music and gesture is now well established, focusing on embodied processes in production of music, most commonly at the level of the individual. Other important strands focus on entrainment, interpersonal coordination and musical joint action, exploring the mechanisms by which groups of people coordinate their musical practices, as well as the impact of group performance on social relations and prosocial behavior [...]. How can previous work in ethnomusicology be extended to overlap and blend with cognitive and empirical approaches to embodied musical interaction?

Thus, the absence of the collective in the experiment brings up the dichotomization of the relationship between cognition and culture, reinciding in monocultural and hegemonic visions of knowledge as a place of schism between nature and culture, body and mind. However, as already mentioned, Afro-Brazilian and Afro-Amerindian performances – legatees of aggregating and holistic worldviews – move in the opposite direction, sharing ritualistic, identity, divergent and living pulsations within the *neighborhood* (Menezes, 2022).

In the *Guarnecer of* the Bumba Meu Boi – the moment when the collective gathers and prepares –, the cold *pandeirões*, with their leather asleep,

are awakened together in the warmth of the bonfire. This is also how it is with the *brincantes*: "The great teaching of the Guarnecer is the transformation operation it exercises, from the individual to the collective, from human to divine. It connects us to the feast, to the work, to the obligation" (Saura, 2008, p. 74).

Such collective communion permeates different moments of these performances, characterizing not only the transformative dimension of the rituals, but also the learning processes that invariably take place through the *neighborhood* relationship, as attested by the Maranhão master Tião Carvalho (2014) in a statement for the documentary *Uma Conversa sobre Bumba-Meu-Boi no Maranhão*[22]:

> Teaching and learning merge a lot. Often you learn without anyone teaching you. You learn by playing and watching, several times. There is even a Maranhão percussion class, but the most common thing is to learn there, to be born, to see someone playing, to watch [...] when the adult leaves, the children stay there, take the instruments and play (Carvalho, 2014).

Therefore, the complex *multimodal* and *multi-coordinated* actions that emerge from the *dancing-singing-drumming* in Bumba Meu Boi – and in other Afro-Brazilian and Afro-Amerindian performances – are not individual tasks, as preach the hegemonic educational models and governed by neoliberal individualistic meritocracy. On the contrary, in *Afro-popular* artistic practices, one learns, teaches and plays always together.

The second inaccuracy refers to the fact that the experiment transforms the researcher-performer into an object devoid of context and identity. If it were not for the timbral qualities of the voice (recorded without effects or modifications), the whole process would nullify the existence of a subject who performs, with its previous experiences and repertoires. Thus, the procedure, tributary to the method of the *technology-enhanced mirror* (Caruso, 2018), brings a dangerous neutrality, insofar as it is a particular body that, when transposed to a digital model, takes the place of a generic body. As already pointed out, the ways of dancing, playing and singing in Bumba Meu Boi cannot be generalized, as they vary according to the contexts and modes of operation of each group. Moreover, if there is no subject involved in the process, there is also no historical, social, political, cultural and ethnic-racial dimension.

However, the software makes visible the intersection between kinetic and rhythmic-musical potentialities, opening space for new forms of analysis and problematizations to emerge to the detriment of hegemonic theories of movement analysis and musical notation, whose methods separate dance and music as isolated areas of study.

Final considerations

Throughout this text, we problematized the term popular culture in Brazil and presented a *technocultural* experiment based on some sound and kinesthetic *motrices of* Bumba Meu Boi with Matraca accent in order to defend the concepts of *multimodality*, *multi-coordination* and *neighborhood* as agenciators of the coupling between dance and music in *Afropopular* artistic practices.

Bringing analysis and discussions from the fields of Performing Arts and Musicology, in an inter-theoretical embrace with Anthropology, Cultural Studies and Cognitive Sciences, we collated ideas conceived in the academic domain with words of masters of traditional Brazilian artistic manifestations.

Despite providing in-depth information and perspectives on the possible relationships between movement, sound and voice in *Afromotric* performances, it was concluded that the *technocultural* study, based on the method of the *technology-enhanced mirror*, brings contradictions and inaccuracies, since it does not consider the role of the collective and annuls the existence of a subject in the analyzed experience.

However, the circumstantial and critical look at the experiment could endorse the greater interest of this study: to affirm that *multimodality*, *multi-coordination* and *neighborhood* are inseparable aspects of *Afropopular* artistic practices and, therefore, call for other ways of reading beyond the hegemonic theories of European dance and music. By enunciating Fu-Kiau's (apud Ligiéro, 2011) powerful *dancing-singing-drumming* trio and its intrinsic community dimension, traditional Brazilian artistic manifestations attest to the *multimodal*, *multi-coordinated* and collective conditions that demarcate their complexity as an art form.

Against the erasure of Afro-diasporic knowledge by the colonizing project that builds Eurocentric knowledge as *art* and traditional cultural mani-

festations as "an exotic other" (Dumas, 2022, p. 11), this research aims to contribute to the creation of other narratives and ways of operating:

> The practices of Afro-Brazilian matrices were (and still are), for the most part, categorized as non-art, defined in intellectual circles with broad designations such as: folklore, primitive, popular culture, traditional knowledge, cultural practice or cultural performance. Even though it is composed of achievements based on recognizable artistic languages, Afro-diasporic expressions are seen as an exotic *other* by most of the institutions that promote the arts, whether intellectual (such as universities) or cultural (secretariats and representations of public power) and even by artists (Dumas, 2022, p. 11).

In this direction, the deepening of research on Afropopular artistic practices in a broad spectrum is affirmed, bringing, among other possibilities, the intersection between art, science and technology as a way of investigating, implementing and problematizing themes commonly bequeathed only to the humanities.

Although seminal, fallible and cluttered with pitfalls regarding the political, social and ethnic-racial dimensions timidly addressed here, it is hoped that this work will inspire future studies in popular culture governed by technological mediation, bringing other contributions and discoveries.

Notes

[1] The term '*brincadeira*' is used by popular artists in Brazil to name various cultural performances involving dance, music, feasting and ritual. Rather than showing or performing for a passive audience, such Brazilian popular manifestations are guided by playing together, that is, by playfulness and collective participation.

[2] Fu-Kiau forged the expression in a yet unpublished manuscript given to Ligiéro (2011), as he attests in his book *Corpo a Corpo: estudo das performances brasileiras*.

[3] Despite its broad meaning, the word *technoculture* comes to encompass the implementation of the digital phenomenon in different areas of human life. For Lúcia Santaella (2012), digital technologies characterize the era of *technoculture* and are built on an evolutionary process, consisting of several generations of technologies ranging from pre-digital technologies to technologies of availability, diffusion, access and connection. In this article, we use the term *technoculture* to name the type of experience carried out, whose process was mediated by digital technology, facilitated by capture and reading software.

4   This class integrated the teaching project *Cantar-Dançar-Batucar: encontro com mestres(as)*, coordinated by me, with support from the USP Dean of Under-graduate Studies, through the call for proposals of the Arts and Sports Incentive Program – PIAE/Santander. In this project, masters of different traditional Brazilian artistic manifestations were invited to teach classes to undergraduate students, with reference to the *Encontro de Saberes* project, an initiative of the Instituto Nacional de Ciência e Tecnologia de Inclusão no Ensino Superior e na Pesquisa (INCTI, 2015) in partnership with several Brazilian universities, with a view to incorporating masters of craft and traditional arts at various levels of education and cultural instruction.

5   The Menezes Family is the guardian of many manifestations of Maranhão culture, among them the tradition of the ringing of the Caixas do Divino Espírito Santo, maintained by Dindinha, Zezé, Graça and Bartira. Part of the family lives in São Paulo, spreading and recreating the traditions and festivities of Maranhão and thus promoting a cultural exchange between the two states (Oliveira, 2014).

6   Statement by Bartira Menezes in a class taught in partnership with Mestra Graça Reis to undergraduate students in Performing Arts at the Universidade de São Paulo, on November 24, 2022.

7   According to Ligiéro (2011), performance studies combine anthropology, per-formative arts and cultural studies in order to investigate a range of social acts, such as celebrations, festivals, theater, dance, sports and other events that are part of everyday life. Based on the work of anthropologist Victor Turner, Ligiéro understands performance as *expressive behavior*, capable of encompass-ing different phenomena of an intercultural, historical, aesthetic and ritual or-der. In this direction, he argues that the interdisciplinarity present in the con-cept of performance aggregates innumerable cultural practices, among them the Afro-diasporic and indigenous performances present in the Americas.

8   The '*roda*' in Afro-Brazilian and Afro-Amerindian performances designates not only a circular spatial organization, but a living dynamic, in which dance, mu-sic, ritual, *brincantes* and audience coexist, in constant movement.

9   The *embodied music interaction* and the *embodied music cognition* are expanded fields of study in musicology that communicate with different domains of knowledge, such as biomusicology, cognitive sciences, ethnomusicology, technol-ogy and systematic musicology, among others. Such fields are interested in the bodily dimension of sound and music, understanding that human musical action

and perception are reciprocal processes that depend on sensorimotor, cognitive, emotional and energetic capacities, regulating the processes of sound-music interaction between body and environment (Leman; Lesaffre; Maes, 2017).

[10] This publication was produced through a collaborative approach between ethnomusicologists Martin Clayton, Rebeca Sagger and Udo Will for the European Seminar on Ethnomusicology (2001-2002), with the aim of raising more detailed descriptions and methodological contributions about the concept of entrainment in ethnomusicology.

[11] Statement by Reis in a class given to undergraduate students in Performing Arts at the Universidade de São Paulo, on November 24, 2022.

[12] Statement by Menezes in a class given to undergraduate students in Performing Arts at the Universidade de São Paulo, on November 24, 2022.

[13] This research was developed with the support of the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Brazil (CAPES) – Funding Code 001 through the Junior Visiting Professor scholarship of the Institutional Internationalization Program.

[14] These *brincadeiras* were experienced by me with the Núcleo de Cultura Popular Leão da Vila, based in Sorocaba and linked to the Centro Cultural Quilombinho, especially between 2006 and 2014, in addition to composing a field of interest that has been structuring research and extension projects within the scope of undergraduate and graduate studies in Performing Arts at the Universidade de São Paulo.

[15] *Motion capture* is a technology that allows the recording and transposition of movement into a digital model. In the research developed at the Ghent University Art and Science Laboratory, we use the Qualysis system, specialized in optical motion capture, through cameras, sensors and software that enable the capture of full body movements of humans, animals and inanimate objects.

[16] For the European musical perspective, contrametricity would be a contradiction of the constant metric background of a music; syncope would be any deliberate change in a stable pulse (Pauli; Paiva, 2016).

[17] The documentary is a film production of the Centro Cultural Vale Maranhão, part of the program Coreografias Maranhenses, and is available at https://www.youtube.com/watch?v=bWntnwq6UHo. Accessed on: Dec. 22, 2022.

[18] Ana Maria Carvalho was born in Cururupu, Maranhão. Singer, songwriter, actress and costume designer, she is the sister of the artist, master and researcher from Maranhão Tião Carvalho, with whom she shares the references of the popular traditions of Maranhão and the co-founding of the Cupuaçu Group (1986). In 2017, she released her first album, *Por Mim e pelo Meu Povo* (Encontroteca, 2016).

[19] Grupo Cupuaçu was founded in 1986, when some participants of the Acting Training Course at Teatro Vento Forte (São Paulo), in a workshop taught by Tião Carvalho, joined together to form a permanent group of studies in dances of Brazil. Over the years, the group has grown and, today, is composed of popular artists from Maranhão based in São Paulo, students, educators and researchers, who meet weekly to dance, research, organize rehearsals, feasts and the annual cycle of Bumba Meu Boi. Held in Morro do Querosene, in Butantã, the Bumba Meu Boi of the Grupo Cupuaçu has become one of the most traditional popular feasts in São Paulo. In addition to Bumba Meu Boi, the group is also a diffuser of other manifestations from Maranhão, such as Tambor de Crioula, Lelê, Cacuriá, Caroço, Baralho, Quadrilha, Ciranda, among others (Saura, 2008).

[20] From the study of dances such as the Samba and the Charleston, the music teacher and researcher Luiz Naveda uses the term basic gestures as a synonym for repetitive movement patterns (Leman; Naveda, 2010).

[21] In the scope of Western music, some studies attest to the presence of the term dissonance to designate rhythmic and metric changes that extrapolate the notion of rhythm as a stable structure supporting melody and harmony. In a text published in the 19th century, the French composer Hector Berlioz spoke of dissonances, consonances and rhythmic modulations, referring to structures of contrametricity, syncope, polyrhythm and alternation that, although present in the history of Western music, were not read as compositional possibilities (Berlioz, 2015).

[22] The full documentary is available on the Territórios do Brincar website: https://territoriodobrincar.com.br/videos/uma-conversa-sobre-bumba-meu-boi-no-maranhao/. Accessed on: 22 Dec., 2022.

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