

CAPOEIRA INTERACTION AS A MODEL OF EXPECTATION FORMULATION AND VIOLATION IN REAL-TIME IMPROVISED PERFORMANCE

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ABSTRACT

Capoeira is an Afro-Brazilian martial art uniquely driven by music. Paired bouts (called “games”) are characterized by continuous stepping, kicking, and sweeping movements performed to live music. Capoeira movements can be executed with the intention to maintain a cooperative, fluid interaction with the opponent, or as overt attacks (sweeps, strikes, or takedowns), and thus integrate patterns that generate high expectation with temporal surprise. We interpret the predictive aspect of the capoeira bout as a useful model for studying expectation formulation, realization, and violation in an improvisatory context analogous to musical engagement by music improvisers. In addition to the “performer interactions” of the paired opponents, we consider the connection between music and movement in the context of capoeira.

1. INTRODUCTION

One of the most dynamic manifestations of human physical ability is demonstrated in the Afro-Brazilian martial art of *capoeira* (ko’pweira). Capoeira is a “blurred genre”, combining elements of dance, folklore, martial arts, sport, ritual, and training for unarmed fighting (Downey, 2002). Originating in sixteenth-century Brazil as a consequence of the intercontinental slave trade between the South American and African continents, capoeira has evolved in various populations of Brazilian society (Taylor, 2005). Today, the rapidly growing community of capoeira practitioners, or *capoeiristas*, forms an international network of people who cultivate and spread Afro-Brazilian culture through practice of this art.

We consider capoeira as an ecologically relevant real-time model of improvisation, which can be used to study how expectation is formulated, then realized or violated. Furthermore, as a movement art, it is amenable to visual recordings and thus advantageous for studying gross body movements. Capoeira is unique in that it is performed and practiced in a specific, tradition-based musical context, yet it remains unclear how exactly the movements correlate with musical events. The main goal between two capoeira players is to interact fluently, as in a conversation, while maintaining an appropriate level of surprising moments (often in the form of attacks like sweeps, strikes, or takedowns). These interactions inspired the following questions: How is this ideal balance achieved between players? What types of movements help construct surprising moments? When, in time, do these moments occur, and how is the physical space utilized to this end? Does music play a role in the construction of surprising moments?

Jazz improvisation is currently regarded as a useful setting for studying creativity and interpersonal interactions. While we can

design theoretical models to predict improvisatory interactions within a jazz ensemble (Hudak & Berger, 1995) or study jazz improvisation in highly controlled brain-imaging experiments (Limb & Braun, 2008), there are immediate questions about the ecological validity of such contexts (McPherson & Limb, 2013). We propose that interactions between capoeira players as they improvise together can be quite analogous to improvisers in a jazz musical context. Furthermore, capoeira interactions are likely translatable to other musical contexts and even broader creative behaviors.

This paper will follow three stages of discussion to frame capoeira performance as a physical manifestation of musical expectation formation and violation. First, we introduce readers to the fundamentals of capoeira, which includes an overview of principal movements, musical elements, and their synthesis as *malícia*, the over-arching philosophy that characterizes the mindset of a capoeirista. Next, we explore the improvisatory features of capoeira, characterizing successful interactions and drawing analogies to jazz improvisation. Finally, we discuss the potential of capoeira as a novel model for studying performance interaction and manipulation of expectation in music.

2. ANATOMY OF CAPOEIRA

A typical capoeira event, called a *roda* (ho – da), comprises a circle of people singing in Portuguese and clapping as some members play percussion instruments, while two people in the center physically interact with fluid, combative, yet sportive earnestness. Though capoeira may be interpreted in many ways, it is ultimately play between people, containing the seeds of all forms of interaction (Downey, 2008). Understanding the process of capoeirista skill acquisition affords insight into the elements of the performance.

Capoeira is learned primarily by imitation in classes taught by either a *mestre* (master instructor) or an advanced student. The learning process is facilitated by a tight link between the perception of others’ actions and one’s own sense of self. Although movements are taught through mimicry, it is expected that the execution of the movements in a game context will be improvised. Moreover, so many factors (fatigue, speed, position relative to the opponent, etc.) influence the external condition that every time a specific “movement” is used, it will never be identical to one completed previously. There also exists a large link between the performance of movements and the musical environment – often the pace of the interaction between players follows the musicians’ tempo, though novices often move more rapidly than expected with the music (Downey, 2005).

2.1 Movements

Movements described here introduce only the very basic elements of the physical aspects of capoeira, and provide at most a starting point for further inquiry. Furthermore, different styles and variations on the same basic positions mean that no instructor has the same form, though essential movements would be identifiable.

The very first movement learned by students is the *ginga* (jin – ga), which is the distinct swaying motion that characterizes capoeira.¹ It is the “point of departure for all future acquisitions... ‘fundamental’ position of the Capoeirista... the key to his agility and evasiveness” or the “ultimate signature of the expert” (Downey, 2005). The *ginga* is the glue connecting all other movements, facilitating fluidity and allowing the player constant momentum for defenses or attacks, all while concealing one’s intentions. Moves are generally categorized as either a defense or attack, and a few will be described here.

Defensive movements. As avoiding injury is a priority in any capoeira interaction, one learns to escape harm using defensive movements while also keeping constant view of the opponent. The *negativa* (neh – ga – chee – vuh) is a quick squat to the floor with one leg bent and the other outstretched. This is an efficient way to avoid an opponent’s attack to the upper body. A basic cartwheel, called *aú*, is also used to escape attacks, and opens many possibilities for subsequent movements while translocating to an unexpected location. The handstand, or *bananeira*, can be used to rest one’s feet, while also maintaining a defensive position with feet ready to kick if necessary while maintaining view of the opponent.

Attack movements. One of the most characteristic offensive movements is the foot sweep, called the *rasteira* (ha – shtey – ra). The effectiveness of this movement strongly relies upon anticipating of the opponent’s position and correctly timing the release of the sweep. There are many variations of kicks that can be used, and will not be described here, though they all can exploit the opponent’s various vulnerable positions with proper timing. Another common attack is the head-butt, or *cabeçada* (ka – bay – sah – dah).

2.2 Music

In order to fully participate in the practice of capoeira, students also learn to play musical instruments and sing songs. The capoeira audience, also called the *roda*, stands around the two players as they engage in playful combat. The capoeira instrumental section, the *bateria*, comprises several instruments that are played by capoeiristas as part of the *roda*. There are three sizes of *berimbau*, a monochord with a gourd as resonator, which is moved away and towards the musician’s stomach as he strikes the steel wire, which changes the pitch and volume. The three different berimbaus played together often fulfill different roles in cuing particular events in the game through specific rhythmic phrases, particularly the lowest pitched berimbau. Each berimbau is used to play complementary rhythmic patterns that interlock and involve much improvisation. Most of the time, one of the berimbau players also leads the group in singing the songs. The *bateria* additionally includes the *atabaque*

(ah – tah – bah – key) (a tall hand drum), *pandeiro* (small frame drum with jingles), *agogô* (double bell), and *reco-reco* (heh – ku – heh – ku) (scraper). The musicians and capoeira players constantly exchange roles so that all participants usually fulfill all the roles of either playing capoeira or music.

Typical capoeira songs are sung in a set format, where the *roda* usually begins with a *ladainha* (la – da – EE – nya), a solo song that often has spiritual meaning for the group accompanied only by berimbaus, followed by the *chula*, which invites players in the first call-and-response verses. The percussion enters in the last type of song, the *corrido*, which allows the two players in the center to start their game. The call-and-response of the songs also invites all participants to sing and clap their hands during the performance, which encourages the two players in the middle (Talmon-Chvaicer, 2008).

2.3 Malícia in Game Dynamics

Malícia in capoeira is cunning – a savvy that can manifest as humor, technical virtuosity, deceptiveness, ability to anticipate another’s actions, superior command of space, and a sense of dramatic or malicious opportunism. Capoeiristas embody this attitude by anticipating an opponent’s rhythms in order to disrupt their flow, a goal that differs from many other dance contexts. To an unfamiliar observer, it may seem that advanced players “groove” together, but this interaction is one in which anticipation between players follows so closely in time that they appear to move with the same flow and with the music. Some masters of capoeira caution players to avoid depending too much on eyesight, as they can be deceived with feints and visual distractions by more experienced players; they advise that sound can reveal opportunities, where one may “listen” for the right moment to attack (Downey, 2002). This advice demonstrates the contradictory relationship that capoeiristas may have with music; to keep a balance between fluidity and avoiding becoming trapped, while also initiating attacks, requires a constant monitoring of both auditory and visual streams.

As previously mentioned, the dynamic stance of the *ginga* exemplifies this ambiguous relationship of a player’s movements with music – the footfalls of the *ginga* do not fall symmetrically with the pulse of the music, allowing the player to initiate subsequent movements from any position within the stance. This is an essential and unique characteristic of capoeira that enables players to conceal their movements or mislead the opponent to expect something else. This underlying attitude of opportunism and anticipation shapes capoeira players’ relationship with the musical environment.

3. TIMING, PREDICTION, AND IMPROVISATION

Capoeira is a unique, movement-based art form that fits in a category of its own, separate from both dance (where focus is on

¹ An example of the *ginga* being performed can be viewed on Wikipedia: http://upload.wikimedia.org/wikipedia/commons/9/9a/Ginga_de_dos.gif

feeling and evaluating one's movement, proprioception, kinesthesia, and visual image as aesthetic style) and martial arts (where the artist attends to opponents as objects, acting through the body to attack and defend oneself). In capoeira, there is a state of consciousness either divided between modes of awareness or in which one moves rapidly between modes (Lewis, 1995). This consciousness is also something developed through practice, as there is an implicit cultural expectation that capoeira players look good even when forced by chance events to improvise movements in unexpected ways in response to opponents, musicians, and the audience. These improvised movements rely on the ability of players to quickly and accurately anticipate events in their environment.

3.1 Grounding in Capoeira Interactions

The interactions between players during capoeira performance can be described using the same terms that describe interactions between jazz musicians while they improvise. The process of grounding that occurs in both of those contexts, or the continual monitoring of shared understanding, is fundamental to a successful capoeira interaction. Timing is a main feature of grounding in these collaborative social interactions, and it facilitates moments that can be anticipated and used to support coordinated behaviors. While musicians signify and display their understanding of each other's expressions, they manage the common ground and create a new common ground upon which to act (Gratier, 2008). Similarly, capoeira players communicate through facial and bodily gestures and overt movements to do this.

When capoeira players of varying experience are asked what they consider desirable attributes of a capoeira game, most will report the aspect of flow and conversation that they experience with the other player (personal interviews). This is understandable, as the emotional and aesthetic value of anticipation is known; the release of tension is emotionally gratifying and intrinsically meaningful (Huron, 2006). Conversations – whether verbal, musical, or physical – utilize grounding devices that can help individuals achieve the desired interaction, increasing fluency and rhythmic flow.

Acknowledging and displaying anticipation, repetition or mirroring, and synchronization all facilitate this flow experience. Capoeira players will “check” each other, showing that they have predicted their opponent's position. Often, less experienced players will mirror their opponents to achieve the experience of connecting – since it is safer than initiating attacks – without the ability to predict the more experienced player's position. The well-timed patterns of repetition and variation involve various degrees of predictability, and anticipation relies on awareness of this as well as implicit timing ability.

Meanwhile, similar to jazz improvisers who integrate personal expressivity while respecting the overall principles of a given piece and its style, capoeira players also learn to navigate the framework of their art as they gain experience. Additionally, “being in synch” is fundamentally necessary but not sufficient for improvisation that will be aesthetically or pragmatically successful; this fact applies to both jazz and capoeira improvisation. Due to the ambiguous and flexible nature of capoeira interactions, practitioners prepare during training to use these grounding devices (though not explicitly). The games can range from artistic cooperation to violent conflict, and

training must prepare a player to synchronize with both the opponent and the music while also being prepared to break synchrony in order to avoid being struck, or to initiate an attack before the opponent realizes it has occurred. Experienced capoeira players develop the ability to change direction in the middle of a movement, integrating feints and misleading their opponent, all of which is done by establishing a conversational flow using the aforementioned grounding devices. It is worth noting that when two capoeira mestres play each other, each has such a well-honed ability to anticipate the other's movements that truly intentional attacks are often subtler and more difficult to detect by an untrained observer.

3.2 Setting Up a Surprise

In terms that have previously been used to describe construction of surprise in musical compositions, expectation violations operate along two dimensions of the musical event (“what”) and when it occurs (“when”), while the dimension of “where” relates to the expectation of sequential ordering of particular events (for example, dominants resolve to tonics). We can also describe these events in capoeira interactions, where:

- a. “What” is the movement, (sweep, kick, or takedown).
- b. “When” indicates the timing of the movement and its place within a continuous sequence of movements.
- c. “Where” is the movement's spatial coordinates (for example “low” or “high” kick, etc.).

As we proceed in our research, we will explore the expectation-violation model in capoeira as analogous to music. A large corpus of capoeira attacks in real-world performances is available for analysis. By first characterizing the ginga and other flow-based movements in relation to the accompanying music, we hope to reach a detailed understanding of the contextual violations that successful capoeira attacks embody.

Overall, the game's intention is to exploit opportunities that the opponent's movements provide and avoid being caught oneself. The interactions are necessarily improvisatory and fluid, and as Charles Keil posits, an improvising group needs a framework in time, which music provides (Keil, 1966).

3.3 The Mysterious Role of Music

Many players report that the music during the roda gives them energy to play, as the lyrics of the songs often encourage them, advise them, or reflect events occurring between the players. The berimbau's complex rhythmic patterns over the steady and regular beat of the drum provide a temporal structure within which the players move. Interestingly, as the berimbau is rarely heard outside of the capoeira environment, it can become strongly associated with the act of playing capoeira and the arousal state that is required to perform it. Players also report that a disturbance in the musical stream can bring their physical interaction to a halt.

Furthermore, we may understand the tactical departures from synchronicity that occur in capoeira, also called “participatory discrepancies”, where players create tension and test each other's skill while also interacting with the musical environment (Keil, 1987). This interaction is what characterizes the relationship between players in capoeira, embodying the concept of *malícia*.

Ethnographic and anecdotal descriptions of performers' experience indicate that there exists a unique, indirect relationship between music and movement during capoeira performance. While the primary objective for two performers interacting is to maintain a fluid conversation while managing an ideal level of surprising events, the exact influence of the musical context remains elusive. Our preliminary research suggests that the movements executed during game play are the emergent result of numerous complex interactions that occur in the presence of music, though they need not be directly related to the music.

4. DISCUSSION

We have introduced the craft of capoeira, described a few of its fundamental movements, and characterized the musical setting in which capoeira games are performed. The temporal framework from the music provides the common ground necessary for successful improvisation, and it is the setting of musical expectations using this framework that allows for the deviations that constitute successful capoeira attacks. However, though the music plays a large role in providing this framework, some practitioners report that during particularly high-energy or aggressive interactions, they no longer are conscious of the music, rather allocating more attention toward anticipating their opponent's movements (personal interviews). Meanwhile, others hold that "playing capoeira without music amounts to doing pushups (deMoor, n.d.). These seemingly contradictory reports highlight the very reason capoeira should appeal to cognitive scientists.

The interaction between the capoeira players and their musical environment is an untapped experimental context that may help us to better understand the dynamical relationship between music and improvised movement in an ecologically valid setting. The cultural acquisition of bodily patterns of responsiveness and attentiveness are instilled through habituation and training, providing a potentially useful model to bridge the anthropological understanding of embodiment with a more biological and neuroscientific one (Csordas, 1993). While listening to capoeira music, practitioners feel the swaying movements in memory through the training, as outward movement or inward quickening, or readiness to move (Downey, 2002). However, players must reallocate their attention from the music to other elements in the environment in order to protect themselves while maintaining a fluid interaction, and this may not necessarily be synchronized with the music. To position the study of this art among existing studies on movement, dance, and instrumental performance would broaden the discussion and generalize results in a new way.

Our hope is that the analysis presented in this paper provides a foundation for future capoeira-based research. Capoeira has the potential to inform insights about a variety of fields, ranging from ethnographic analyses to movement studies to performance practice, and may be applied to areas as broad as video game design and military training. Currently underway is an ethnographic study specifically investigating how capoeira players from a variety of schools and pedagogical styles relate to their musical environment and their reported experiences of how it influences their movements in the roda. Furthermore, insights gained from first-hand reports of capoeira practitioners will inform our experimental design of

empirical studies aiming to investigate, for example, whether the relationship between ginga footfalls and musical pulse can be quantified or characterized.

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