

Dance Syntax in Practice: The *San Felipe* Dance Group Performs the *Cumbia Cienaguera*

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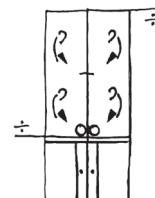
ABSTRACT

This study builds upon the theoretical proposal of *dance syntax* introduced by Miranda and his colleagues (2023), which defines syntax as the set of principles governing the spatio-temporal sequencing and the variability of dance movements. Central to this approach is the application of Finite-State Automata (FSA), a computational model adapted from computer science, used to formalise the structural and combinatorial possibilities of movement sequences within a choreographic practice. In the present work, we extend this method by integrating FSA with Motif Notation—a symbolic system derived from Labanotation—to systematically document and compare motif variants within a traditional Colombian folk dance.

Drawing on ethnographic fieldwork with the *San Felipe* dance group in Cali, Colombia—an intergenerational community ensemble of older adults—we examined 23 instances of the choreography of *Cumbia Cienaguera* across rehearsals and performances. Five participants with diverse mobility profiles served as case studies. We classified motifs into three categories according to their function: traveling, staying in place, and turning. Movement analysis of the video recordings revealed that each of the participants performed the same kind of motif consistently. Therefore, we transcribed a total of 15 motif variants into Labanotation (five participants and three kinds of motif) and subsequently abstracted them into Motif Notation. We then constructed FSA models to represent the structure and permissible transitions among the three categories of motifs. This methodological integration enables a formal representation of movement variants as an inherent and systematic component of dance syntax. Our findings demonstrate that combining symbolic documentation (Motif Notation) with computational modelling (FSA) offers a robust framework for capturing the adaptability, inclusivity, and creative potential embedded in community-based dance practices. This approach contributes to ethnochoreology and dance anthropology by providing a novel analytical lens to foreground the syntactic richness of embodied movement.

KEYWORDS

Cumbia Cienaguera; dance syntax; finite-state automata; Motif Notation; ethnographic dance analysis; dance grammar.



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1. Introduction

The first author of this work, Marisol Limón Silicéo, spent the summer of 2023 conducting field research for her Master's degree in Choreomundus, International Master in Dance, Knowledge, Practice, and Heritage. She conducted her research in the Floralia neighbourhood in Cali, Colombia, with the dance group of the Artistic and Cultural Foundation *San Felipe Apóstol*.¹ This group of older adults forms the core of a community organization dedicated to developing programs for seniors in one of Cali's districts. While we initially believed the group followed the format of national folk ballet companies, this assumption later proved incorrect.²

The researcher accompanied the group during their performances, rehearsals, and daily activities, gradually becoming part of their community. During these sessions, the enthusiasm for the performance of the musical piece *Cumbia Cienaguera* was undeniable. As the most exhilarating piece for both dancers and audience, it was consistently chosen to open the group's performances and rehearsals.

In the first two rehearsals Marisol attended, she carefully observed the steps, sequences, and choreographic designs of the piece, transcribing them using her expertise in movement notation and analysis. She identified basic movement motifs that, when combined, formed the larger sequences used by the dancers to perform the piece. These sequences aligned closely with specific musical phrases, establishing a structured choreographic design. However, notable changes compared to rehearsals were observed during the first public performance:

- The performance space was significantly larger than the rehearsal space;
- A greater number of group members participated, including individuals whose physical abilities might have been perceived as limiting for dancing. Nonetheless, adjustments to the choreography facilitated their participation;
- The music track ended before the rehearsed choreography was complete, and the group director restarted the music from a mobile device, allowing the ensemble to continue seamlessly.

With increased attention to the *Cumbia Cienaguera* during subsequent rehearsals, it became clear that this piece held a special value for the ensemble due to its versatility, adaptability, and inclusiveness. Although the group director was responsible for teaching specific movements and choreographic motifs, in this piece the dancers were allowed to mix, match, alter, and reformulate these elements in response to variables such as individual physical abilities and autonomous decision-making. This adaptability reflected the inclusive atmosphere of the ensemble and positioned the group at the intersection of national folk ballet and traditional dance practices as experienced in their original cultural contexts.

After completing her fieldwork and while organizing the collected data, Marisol sought a method to effectively capture and convey the movement possibilities that the group had accepted and encouraged.

This work is the result of a collaborative effort between the two authors, Marisol Limón Silicéo and Juan Felipe Miranda Medina. It combines the Finite-State Automata (FSA) method—originally developed by Juan in collaboration with Miranda and others (Miranda et al. 2023)—with Marisol's fieldwork and her analytical insights into dance movement. Together, these contributions enabled a structured exploration of the possible movement patterns during dance, or more precisely, the *dance syntax*. This paper applies the method of FSA to study the *Cumbia Cienaguera* as practiced by the *San Felipe* dance group.





Figure 1. The *San Felipe* dance group in the *Cumbia Cienaguera*'s starting position during a rehearsal in the Caseta. 19 July 2023. Photo by: M. Limón Silicéo.



Figure 2. The *San Felipe* dance group in the *Cumbia Cienaguera*'s starting position during a performance in Sevilla, Colombia. 15 July 2023. Photo taken by M. Limón Silicéo.

An advancement presented in this work is the integration of Motif Notation with FSA to describe with greater precision both the movements performed by the dancers and their possible concatenations in time. We show that the method we propose is different from Laban kinetograms that can only provide individual notations for each realisation³ of the same dance. In addition, Labanotation as a method does not systematically compare notations of different dance realisations. In contrast, the combination of Motif Notation with FSA proves very effective in developing such comparison, as it can express a range of *possibilities* that accounts for the variety of realisations of every dance.

This paper is organised as follows. Section 2 describes the context of the fieldwork, describing the background of the *San Felipe* dance group and their rendition of *Cumbia Cienaguera*. Section 3 presents the key methods employed in this work, namely Motif Notation and FSA for the representation of dance syntax. Section 4, examines the movement structures of *Cumbia Cienaguera*, offering first-hand Labanotation transcriptions that express the different syntactic structures that integrate Motif Notation and FSA. The FSA method is explained using examples of increased complexity. Section 5 discusses our key findings. Finally, Section 6 concludes by reflecting on the implications of our research and the extension of the method to other traditional dances.



2. The context

2.1. A dance group of elderly adults in the capital of Valle del Cauca

The community studied in this research lives in the Floralia neighbourhood, a warm and tropical area in the Andean region of Colombia, located in Santiago de Cali, the region's third most important city and the capital of Valle del Cauca department.

According to data provided by the Cali Mayor's Office (AC 2020_1 and AC 2020_2), Floralia emerged on the banks of the Cauca River in the 1960s as part of a housing project for low-income families. In its early years, the neighbourhood was characterised by rudimentary infrastructure and a lack of essential services. However, community organization and the collective effort of its residents have been crucial in its transformation.

The community regularly organises events and festivities that not only celebrate local traditions but also promote social integration and a sense of belonging. Cultural life in Floralia encompasses a variety of artistic and cultural expressions. Community organizations play an essential role in managing cultural projects and promoting initiatives that enrich the social life of the neighbourhood. The Artistic and Cultural Foundation *San Felipe* is one such community-based organizations, whose main objective, in the words of its president, is "to create safe environments and spaces for coexistence, exchange, care, and recreation for the older adult population of the Floralia neighbourhood in Cali" (Orlando 2023).

The group's history began in 2010, when a group of friends came together to form a dance ensemble. The dance group is the heart of the *San Felipe* Artistic and Cultural Foundation. It is the centre around which many of the organization's activities and decisions are made.

2.2. The favourite dance of the *San Felipe* dance group

Among the group's repertoire, the *Cumbia Cienaguera* stands out as a favourite. It is cherished by the dancers and consistently elicits strong reactions from audiences. Known for its

vibrant energy and choreographic richness, it features the largest number of performers on stage and sustains visual interest through a dynamic variety of movements. This piece is widely performed by ensembles dedicated to Colombian music and dance and has become a hallmark piece in both national and international contexts.

Musically, *Cumbia Cienaguera* belongs to the tradition of accordion-based cumbias within Colombian folk music. Adolfo Pacheco, a celebrated Colombian composer and folklorist, describes its style as a fusion of vallenato and cumbia, and maintains that “it stems from the meetings and exchanges between musicians from the banana-growing zone in the department of Magdalena, the epicentre of musical activity in the Colombian Caribbean, around the beginning of the 20th century” (CumbiaPoderPorro 2014 [original in Spanish, translated by the authors]).

As part of the fieldwork conducted for this research, 23 performances of the *Cumbia Cienaguera* by the *San Felipe* dance group were observed and documented through video recordings and field notes. Of these, 16 took place during rehearsals, and the remaining seven were public performances.⁴

The rehearsal realisations had essentially the same characteristics: about 20 dancers would perform in the main hall of the *Caseta* (the group’s meeting place), wearing everyday clothes and following a musical track that had been shared with them beforehand, as shown in Figure 1.

For the performances, the realisations were performed in different ways. Most performances were in open-air spaces. Sometimes, the stage was clearly defined, like in an Italian-style theatre. Other times, the space was not well defined, like in the case of public squares or parks, where the audience could gather around the stage in an arena-like setup. As depicted in Figure 2, these performances involved at least 30 dancers wearing specific costumes for their public appearance. Women wore two-piece outfits: a blouse with a ruffle on the chest and long skirts, typically in black or white and adorned with colourful ribbons that alluded to the colours of the Colombian flag—red, blue, and yellow. Women wore flower ornaments on their heads. Men wore white shirts and pants and two yellow linen cloths—one as a sash around the waist and the other around the neck. Men also wore a hat and sometimes a backpack. Both men and women wore a specific type of footwear the group calls *cotizas*.



3. The theoretical methods

As stated in the Introduction, our aim is to understand the different movement possibilities that stem from the various bodily abilities of the dancers of the *San Felipe* dance group. To do this, we rely on three theoretical methods: analysis of the dance into motifs, Motif Notation (which requires Labanotation of several realisations of the dance) and Finite-State Automata. This section explains the fundamentals of each of these concepts and methods.

3.1. Motifs, motif variants and Motif Notation

3.1.1. Motif

In this work, the *motif* is the fundamental unit of analysis used to compare different realisations of the same piece. We adopt the definition proposed by two pioneers in movement analysis, Martin and Pesovár, who describe a motif as “the smallest unit whose rhythm and kinetic pattern forms a relatively closed and recurring structure” (Martin and Pesovár 2020, 357). Moreover, motifs “exist in the consciousness of the dancer, can be remembered

by the dancer, and recur in his dance, mostly in sequences” and are “the smallest organic units of dance” (idem). We adopt this definition both for its formal clarity—that emphasises the motif as a repeatable kinetic-rhythmic pattern—and its focus on the dancer’s subjective perception. This latter aspect aligns with our field observations, as the dancers in the *San Felipe* dance group regularly rehearsed and recognised motifs as identifiable segments within their performance of *La Cumbia Cienaguera*.

It is not within the scope of this work, however, to analyse the internal complexity of motifs—as Martin does, for example, with his concept of roots (Fügedi 2020)—or to distinguish motifs based on their structural function (predominant, subordinate, or sporadic), as Martin and Pesovár propose (2020). Since our aim is to understand the movement possibilities that arise from the dancers’ own abilities, our categorization is based on their use of space: traveling, in place, and turning, as detailed in Section 4. Moreover, even though the *Cumbia Cienaguera* is danced to a musical piece, we do not study the relation between music and dance for each motif, as the main purpose of the music is to set the meter (2/4) and tempo of the dance movements.

3.1.2. *Motif variation vs motif variant*

It is important to distinguish between a *motif variation* and a *motif variant*. We define both terms using the work of Martin, Fügedi and Pesovár (2020) presented in the compilation edited by Fügedi et al. (2020), the research of what was the Folk Dance Dance Study Group (1974) and later became the International Council for Traditional Music and Dance, as well as the work of other scholars (Nahachewsky 1992, Kaeppler and Dunin 2007). As explained in the opening of this section, motifs are recurrent meaningful structural units composed of other smaller structural units (e.g. kinetic elements). A motif can be modified according to factors such as rhythm, structural composition (the order of its elements), dynamics (intensity of movements), and spatial use of the body (movement amplitude or operations such as twisting, spinning, and directional changes). These modifications may yield a new motif, a variant of the original, or reflect degrees of variability—collectively referred to hereafter as *variation*. Whether the variation of the motif is regarded as a new motif or not, depends largely on the dancing community. The community may consider a variation a new motif if it differs significantly from the original motif in its objective features (e.g., rhythm or bodily use of space) or if it serves a different function within the dance (e.g., the original motif was used to open the dance whereas the variation closes the dance). Hence, we define a *motif variant* as a variation of a motif that the community does not recognise as a new, distinct motif.

In Section 4, we examine how the physical abilities and individual intent of five dancers lead each to perform distinct variants of the motifs proposed by the group director. Even when the original motif is significantly altered, both the dancers and the director perceive each version as the same motif—provided its core purpose remains unchanged (e.g., to travel, to stay in place, or to turn).

3.1.3. *Motif Notation*

The primary goal of movement notation is to understand movement. Experts in movement research (Ruiz 2014, Van Zile 1999) value the practical uses of notation as a recording tool to document and preserve choreography and to assist in the transmission of knowledge and technique. They also emphasise how movement notation supports the analysis and understanding of movement through the use of abstractions in symbolic systems. In this context, Motif Notation, also known as Motif Writing or Motif Description, is a system for

graphically recording movement concepts using symbols derived from Labanotation. Ann Hutchinson Guest and Valerie Preston-Dunlop were pioneers of this system. Both developed symbols in addition to Labanotation in response to the need to “allow freedom in the performance of a movement concept, for instance, the choice of any direction, any part of the body, any kind of transference of weight, etc.” (Hutchinson Guest 2016). This notation system includes a series of symbols representing the body and body parts, as well as symbols for common movement actions (e.g., jumping, turning, or changing support). The purpose of Motif Notation is “to offer a graphic depiction of the essence of a single movement or a group of movements, without the specificity required with Labanotation” (UM no date). This graphic depiction allows the symbols to be used “out of context”⁵ (Hutchinson Guest 2016), for it “pinpoints the motivation of a movement, its idea, aim or intention” (Hutchinson Guest 2005, 9).

Responding to the needs of this research, we chose to use Motif Notation as an integral part of our method. Although we first produced a Labanotation score with movement variants corresponding to different realisations performed by different dancers, we then took the signs out of that context and integrated them into FSA diagrams to express the freedom in the dancers’ choices when performing the *Cumbia Cienaguera* and to highlight the different movement possibilities that arise. In this work, our main reference for Motif Notation is the book *Your Move – The Language of Dance Approach to the Study of Movement and Dance*, written by two of its pioneers, namely Ann Hutchinson Guest and Tina Curran (2008).

3.2. Dance Syntax

We understand *dance syntax* as the set of principles underlying possible combinations and variations of movement sequences over time. Drawing on the work of Asano and Boeckx (2015), Miranda et al. (2023, 284) identify five key points concerning dance and movement syntax more generally:

1. Syntax requires the existence of a set of discrete elements (derived from structural analysis);
2. Some combinations of these elements are possible, while others are not;
3. Syntax itself is defined as the set of principles that determine which combinations are possible or impossible;
4. The combination of discrete elements produces new elements, which in turn can be combined with each other;
5. This series of combinations results in a hierarchy of levels of combination (this hierarchy is well studied in movement analysis, e.g., from motif element to the *totus* of the dance).

Miranda and his colleagues argue that dance syntax aligns with the structural analysis of movement proposed by several scholars, particularly during the 1970s (Miranda et al 2023, 284). For example, Adrienne Kaeppler (1972) draws an analogy between dance and the components of language (phonemes and morphemes), identifying morphemes and kinemes as minimal movement units. A similar approach is described in the book on structural analysis edited by Giurchescu and Kröschlová (2007). The authors propose a method for movement segmentation alongside a formulaic notation (that had been developed since the 1970s) to specify the composition of a dance piece after identifying the main constituent units.

Nevertheless, while structural analysis is a useful tool for understanding the movement units that compose a movement system (e.g., motifs and phrases), Miranda et al. (2023) convincingly argue that movement analysis alone is not enough to understand the richness

of *possibilities* arising from the various allowed combinations of movement units and the restrictions from movement combinations that are not used by dancers. Therefore, the researcher should aim to understand the principles that guide these combinations, that is, the syntax of the dance. This process of understanding calls for an appropriate method. In the case of the *San Felipe* dance group, possibility, and hence diversity in movement, stem from the different bodily abilities of each dancer. This leads different dancers to perform choreographic motifs in different ways.

3.3. Finite-State Automata

Following Miranda et al. (2023), in this work we apply the method of Finite-State Automata (FSA), borrowed from computer science, to characterise the syntax of a dance, as it allows for a flexible representation of different possible combinations of movement sequences.

Let us illustrate the FSA method with a simple example. Imagine performing a dance that consists only of the following movements:

- Step with left foot (L)
- Step with right foot (R)
- Jump on both feet (J)

These three movements are, in technical terms, the *alphabet* of the automaton. In the context of dance, they represent all the movement sequences available to the agent in a given dance. However, we also need to define the possible *transitions* between movements. Suppose that in this dance the following principles apply:

1. You have to start the dance with the right foot (R)
2. Once the dance starts, you must always alternate steps (e.g., R, L, R, L, ...), but you cannot repeat a step (e.g., you cannot perform R, R, or L, L)
3. You can only jump after performing an R
4. After a jump, you must resume the dance with R
5. The dance must end with R.

This set of principles constitute the transitions of the automaton. Moreover, the requirement to begin the dance with R (Principle 1) corresponds to the *initial state* of the dance. On the other hand, the requirement to end the dance with R (Principle 5) corresponds to the *final state* of the dance. The entire system composed of alphabet, states, transitions, initial state, and final state fully determines the finite-state automaton or FSA. Figure 3 illustrates the FSA encoding the possible and impossible combinations of movement elements in this simple dance. Examples of possible sequences consistent with the five principles and represented in the FSA include {R}, or {R, L, R, L, R, J, R}, or even {R, J, R, J, R, L, R, J, R}. (Fig 3.)

This example helps us understand that a state simply represents all the movement possibilities

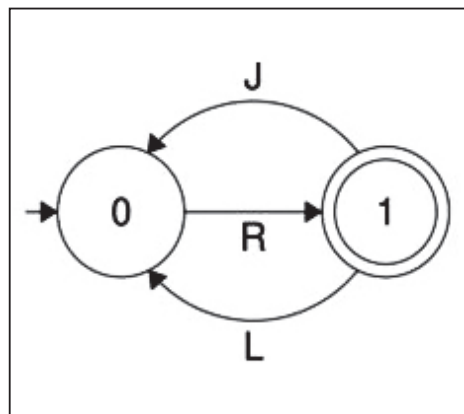


Figure 3. FSA diagram for a simple dance. There are two states (0 and 1). State 0 is the *initial state*, that is, the dance starts necessarily with R. After performing R, the dance may end, or the dancer may take a jump (J) or perform a left step (L). Both L and J must be followed by R. State 1 is the *final state*, as the dance must end with R.

available to the dancer or agent at a given moment. For example, in State 0 the dancer can only take a right step (R), whereas in State 1 the dancer has two possibilities: either a jump (J), or a left step (L).

It is important to point out that the FSA method must address a specific structural level of the dance. That is, the FSA that represents how the *motifs* of a dance can be sequenced one after the other will differ from the FSA that represents how *motif elements* are sequenced to form motif cells.

In what follows the FSA method will be applied to the *Cumbia Cienaguera* at the level of motifs. For a more detailed discussion of dance syntax and its application to dance research, see Miranda et al. (2023).



4. *Cumbia Cienaguera*: analysis and syntax

The empirical foundation of this study stems from fieldwork conducted by Marisol Limón with the *San Felipe* dance group in Cali, Colombia, during the summer of 2023. Focusing on the *Cumbia Cienaguera*, a dynamic folk dance performed by older adults, the research combined ethnographic observation, movement notation, and computational modelling to analyse the dance's syntactic structure and adaptability.

Fieldwork encompassed 23 performances (16 rehearsals and seven public performances), documented through video recordings and detailed field notes. From these, 12 recordings (including both live performances and rehearsals) were selected for systematic analysis, with 10 providing sufficient clarity for in-depth movement study. From all the participants in the dance company we focused on five dancers with different bodily abilities to conduct movement analysis from the video recordings. This analysis yielded two key findings. First, each of the five dancers adapted the motifs they were taught by the choreographer to their own bodies, yet they performed these motif variants with remarkable consistency across performances, exhibiting only minor variations in execution (such as subtle differences in step length or degree of knee flexion). Second, all the observed movements could be classified into three distinct types:

- *Motifs for traveling/moving (mM)*: motifs through which the dancers move from one point to another on the stage.
- *Motifs to remain in place (mP)*: motifs performed while the dancers remain in place.
- *Motifs for turning (mT)*: motifs performed while the dancers remain in place but execute a turn.

The discovery of this consistent patterning directly informed the notation process. Because each dancer reliably reproduced their distinctive version of these motifs, it became possible to create precise Labanotation transcriptions of each individual's variants. With five dancers and three motif categories, this process yielded 15 distinct Labanotation scores that collectively captured the full spectrum of movement variants within the group's practice.

These notated scores were further abstracted using Motif Notation, which emphasised the essential qualities of movement rather than prescribing rigid forms. This dual-notation approach proved particularly valuable in documenting how dancers adapted movements to accommodate physical differences (such as hip prostheses or reduced mobility) while maintaining the dance's core structure. Analysis and notation, complemented by individual interviews with each of the five participants, identified both physical constraints and

personal intent as factors shaping motif variants. This study, however, deliberately avoids quantifying their relative influence, as doing so would require a different methodological approach. Performance variability also relied on contextual factors, such as stage size, audience engagement, and group coordination. Front-row dancers played a pivotal role in cueing motif transitions and ensuring synchronization despite individual movement differences. This dynamic highlighted the dance's inclusive ethos, in which adaptability fostered collective cohesion.

Next, FSA were paired with Motif Notation, the study's main contribution. FSA diagrams were developed by comparing the motifs with one another, which allowed the authors to map permissible movement sequences. In other words, FSA capture variants and possibilities within the *San Felipe* dance group, illustrating how motifs can be combined, varied, or repeated. This approach provides a visual and systematic means to compare different variants of the same motif within the same dance, demonstrating its inclusivity and adaptability. Together, these methods—ethnographic documentation, movement notation, and syntactic modelling—provide a comprehensive framework for analyzing dance as a living, flexible practice rather than a fixed form.

In what follows, we present the analysis and Labanotation score of a sample motif from each of the three categories (traveling/moving, remaining in place, and turning) as performed by the five dancers. The remainder of this section focuses exclusively on the syntactic structure of traveling or moving motifs. We then introduce FSA diagrams for all five variants in this category, using Motif Notation to represent the alphabet symbols (Figures 5–9), followed by combined FSA diagrams that illustrate the full range of movement possibilities emerging from all five variants (Figures 10–12). This progression moves systematically from empirical observation to notation to syntactic modelling, culminating in comparative insights into movement variability. For equivalent FSA diagrams of the other two motif categories, please refer to Limón Silicéo (2024).

4.1. Movement abilities and notation scores

After identifying the three motif categories mentioned above, we conducted the movement notation of five case studies, considering that the difference in physical abilities and life histories of each of the subjects involved lead to the spontaneous creation of variations in movement. These variations yield specific motif variants for each dancer. In the following table, these characteristics are presented in general terms.

Carmen	elderly woman with reduced mobility
Isabel	woman with hip prosthesis
Guillermo	man who adds movement variants
Luis	man executing the movements as they were taught at the rehearsals by the group director
Élida	woman with occasional low back pain

Table 1. Case studies and main physical traits that cause individual mobility particularities.⁶

For example, Mrs Carmen, one of the oldest members of the group, has reduced mobility compared to the other members. In her daily movement, her actions (such as walking) cover shorter distances and take longer to execute. Mrs Isabel's movements are conditioned by her hip prosthesis. She carries her weight more often on the side without the prosthesis and makes momentary weight shifts to the operated side, where she feels less secure. Mr Guillermo usually adds more actions to the main motifs of the movement: he turns his body a little more than the others, takes longer steps, and adds secondary gestures. On the other hand, Mr. Luis, one of the founding members who has followed the group's entire trajectory, is very careful to follow the exact instructions for performing the motifs, sequences, and choreographies. Mrs Elida introduces variations involving greater hip movement, which she says helps to release the pain she constantly experiences in her lower back.

Movement notation scores were created based on the motif variants arising from the participants' different physical traits and abilities, as listed in Table 1. For each type of motif described at the beginning of Section 4, eight bars were notated (i.e., one musical phrase).⁷ In this section, we compare five different realisations of each of these motifs, which were observed to be predominant in the participants' performances. Although other variants exist, the notated forms were generally the most frequent and repeated. The use of an eight-bar format aims to make motifs visually clear.

In the scores created, and for this study, we have considered only the recording of movement motifs performed by dancers when supporting their bodies on their lower limbs. The symbols and conceptual framework adopted here are drawn from *Your Move* (Hutchinson and Curran 2008), specifically the section addressing changes in support, with particular attention to the transfer of weight from one foot to the other. Our notation combines the foot-support symbol with directional and level indicators.

It should be noted that the performance of this dance piece is not limited to a single motif, sequence, or movement pattern. These examples show that, for the same piece, the *San Felipe* dance group admits/ accommodates movement variations while retaining the idea of a communal dance.

4.1.1. *The movement score for the Motifs for traveling (mM_s')* (Figure 4)

These scores record the traveling or movement motifs that five members of the *San Felipe* dance group perform (i.e., movements from one place to another) in the choreography of *Cumbia Cienaguera*.

The mM_4 motif in Figure 4 is the one most people performed in this section of the *Cumbia Cienaguera*. The motif is performed by Mr. Luis, one of the group founders, who pays attention to reproducing the movements as taught by those responsible for teaching the dances. It consists of three alternating forward steps, followed by a leg flexion on the foot that completes the last step, after which the alternating pattern is repeated. Each action occurs on one of the quarter-note beats of the 4/4 measure.

In this same section, Isabel, the woman who has a hip prosthesis, performs a variant consisting of a step forward, bringing both feet together in place, and bending both legs. Motif mM_2 in Figure 4 is continuously repeated. Isabel explains the reason for moving her body only to one side: "The thing I have here on my hip sometimes hurts me and I cannot move it [the hip] in that way [she gestures to the left with her hand], so I better move forward with this one [she points to her right leg] so it does not get out of place." This is an example of how someone adapts the movement to their abilities and how having a different bodily ability does not exempt them from participating in the dance group.

Carmen, a lady with reduced mobility, offers another example. She sometimes arrived

at rehearsals using a cane for support, but during this dance she did not. “I want it to look nice and I want to look like the group, like the others [...] I want to move well,” Carmen says. The motif she performed, notated in mM_1 (Figure 4), consists of alternating forward steps, but taking one full bar for each. She moved forward with the ensemble, supported by the dance partner or other women dancing beside her.

The movements made by Mrs. Elida are recorded as mM_5 in Figure 4. She takes a step forward with her right foot on the first beat. On the second beat of the first bar, she keeps her weight on the right foot while flexing the leg. She alternates and repeats this motif.

The variant performed by Mr Guillermo reflects what was mentioned earlier, namely that he is one of the group’s youngest members, with a background as a dancer and musician. He performs variants that include accents or additional movements. In mM_3 (Figure 4), the core structure matches that of mM_4, except for a variation on the second beat of the second bar. At this point in mM_3, the dancer makes contact with the floor using the toes of the left foot, accompanied by a strong accent.

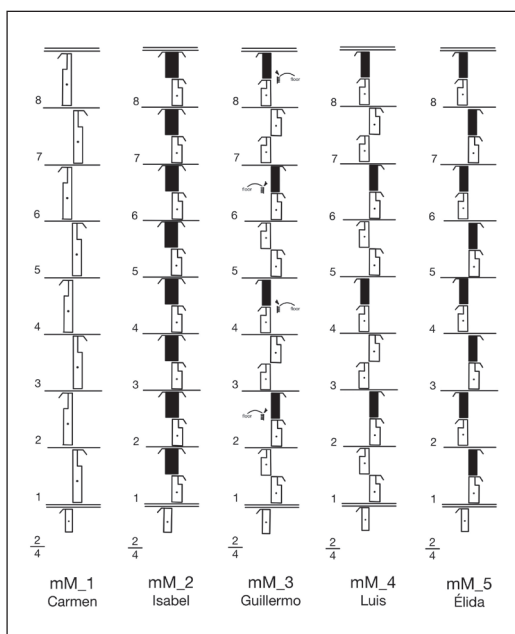


Figure 4. Scores of variants of motifs for traveling/moving (mM) in the *Cumbia Cienaguera*.

4.2. Diagrams of the variants of the Motifs for moving

In Section 4.1, we introduced the motif variants performed within the same dance piece by five members of the *San Felipe* dance group, along with their corresponding Labanotation scores. This section presents graphic representations of the syntactic structure of these variants using FSA. Because the motif variants are intended to be repeated multiple times throughout the performance of *Cumbia Cienaguera*, we first use FSA to model the internal syntactic structure of each variant within its respective category, based on the sequence of movement elements previously documented in Figure 4. Subsequently, a general diagram for each of the three categories is provided at the end of the section to visualise the broader range of movement possibilities accepted and enacted in the performance of *Cumbia Cienaguera*, as shaped by the motif variants executed by the dancers of the *San Felipe* dance group.

4.2.1. mM_1

In Figure 5 we observe two states marked as circles 1 and 2 and specific transitions (arrows) to reach each of those states. The left-hand side arrow indicates the transition to reach state 1. This first state is the initial position of the movement, which in the score (Figure 4) marked before the double horizontal line. It represents the transfer of body weight to the left leg, leaving the right foot free (without weight) so that the following movement can be performed. This motif may be preceded by stillness, as at the beginning of the dance, which would mean the body weight is distributed between both feet. It may also start with a motif that ends with

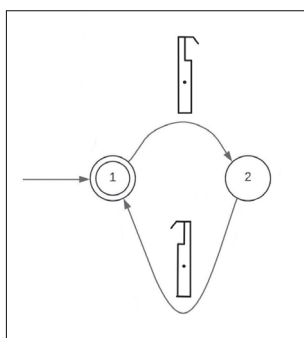


Figure 5. FSA diagram corresponding to movement motif mM_1 (notated in Figure 4).

the body weight on both feet or on the right foot, or it may be a repetition of this motif. In all these cases, it is necessary to specify this preparatory transition in order to execute this motif.

The transition from state 1 to state 2 is a step forward with the right foot at the middle level. State 2 refers to keeping the body weight on the right leg and leaving the left leg free to execute the next movement. The transition from state 2 to state 1 is a step forward with the left foot at mid-level, returning to state 1, with the body weight on the left leg and the right leg free. This forms a cycle that can be repeated several times. The cycle may depend on the change of music, choreographic evolutions, communication between the dance group to make a change, or the choice of each dancer. During fieldwork, up to 32 musical phrases were observed repeating this motif, as it is the one used to move forward and cover large distances on stage.

The double circle in state 1 indicates that this is where the motif ends, regardless of the number of repetitions performed. In this example, the motif ends in the same state in which it began, with the body weight supported on the left foot and the right leg free to execute another movement.

The logic of the diagrams always follows the same rules that correspond to the general rules of FSA:

1. Circles represent *states*.
2. Arrows represent *transitions*.
3. A set of possible *actions* (dance movements) enables the dancer to transition from one state to another.
4. An arrow with no origin pointing at a circle represents the *initial state*. There can only be one initial state.
5. The double circle in a state symbolises a *final state*; it is where the dance should end. There can be several final states.

An innovation to the FSA method in this research is the deployment of Motif Notation. Thus, the action that leads to a transition from one state to another is represented using a Motif Notation symbol. The size of the symbols is in proportion to their duration. In Figure 5, therefore, the symbols appear twice as long as those of most of the transitions. In addition, the transition arrows reflect the decision to provide an overall diagram at the end of each section, bringing together the five different motives and providing a visual representation of the possible movements.

In the following diagrams, we explain only the states and transitions, as the underlying logic remains the same. For a clearer understanding of the FSA diagrams, we suggest reviewing them simultaneously with the score in Figure 4.

4.2.2. mM_2

The distribution of transitions and states in Figure 6 is as follows:

- *Initial transition*: preparation to support the body on the left leg only.
- *State 1*: body weight supported on the left leg and the right leg free.
- *Transition from 1 to 2*: right step forward at mid-level.
- *State 2*: body weight supported on the right leg and the left leg free.
- *Transition from 2 to 1*: stand on both feet in place, with flexion.

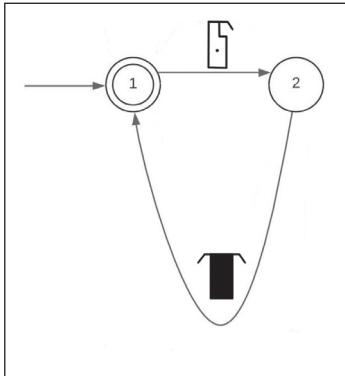


Figure 6. FSA diagram corresponding to movement motif mM_2 (notated in Figure 4).

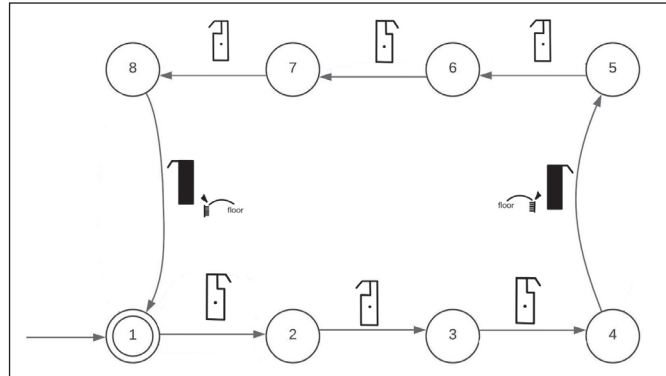


Figure 7. FSA diagram corresponding to movement motif mM_3 (notated in Figure 4)

4.2.3. mM_3

The distribution of transitions and states in Figure 7 is as follows:

- *Initial transition*: preparation to support the body on the left leg only.
- *State 1*: body weight supported entirely on the left leg.
- *Transition from 1 to 2*: right step forward at middle level.
- *State 2*: body weight supported on the right leg and the left leg free.
- *Transition from 2 to 3*: left step forward at medium level.
- *State 3*: body weight supported on the left leg and the right leg free.
- *Transition from 3 to 4*: right step forward at medium level.
- *State 4*: body weight is supported entirely on the right leg.
- *Transition from 4 to 5*: flexion of the right leg supporting the body weight.

At the beginning of this flexion, the toes of the left foot contact the floor with a strong accent.

- *State 5*: body weight supported entirely on the right leg.
- *Transition from 5 to 6*: left step forward at medium level.
- *State 6*: body weight supported entirely on the left leg.
- *Transition from 6 to 7*: right step forward at medium level.
- *State 7*: body weight supported entirely on the right leg.
- *Transition from 7 to 8*: left step forward at medium level.
- *State 8*: body weight supported entirely on the left leg.
- *Transition from 8 to 1*: flexion of the left leg while supporting the body weight.

At the beginning of this flexion, the toes of the right foot contact the floor with a strong accent.

4.2.4. mM_4

The distribution of transitions and states in Figure 8 is as follows:

- *Initial transition*: preparation to support the body weight on the left leg only
- *State 1*: body weight supported entirely on the left leg.
- *Transition from 1 to 2*: right step forward at medium level.
- *State 2*: body weight supported entirely on the right leg.
- *Transition from 2 to 3*: left step forward at medium level.
- *State 3*: body weight supported entirely on the left leg.
- *Transition from 3 to 4*: right step forward at medium level.

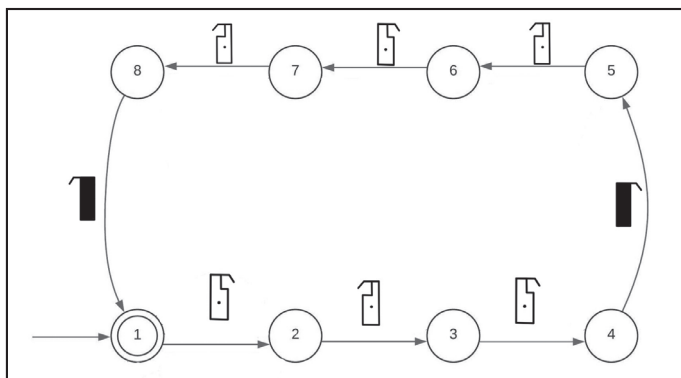


Figure 8. FSA diagram corresponding to movement motif mM_4 (notated in Figure 4).

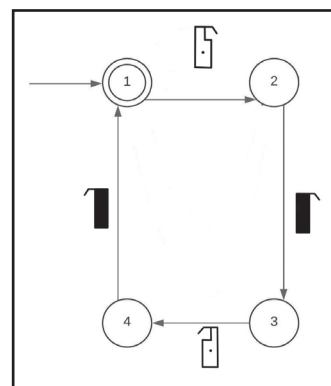


Figure 9. FSA diagram corresponding to movement motif mM_5 (notated in Figure 4).

- *State 4*: body weight supported entirely on the right leg.
- *Transition from 4 to 5*: flexion of the right leg that supports the body weight.
- *State 5*: body weight supported entirely on the right leg.
- *Transition from 5 to 6*: left step forward at medium level.
- *State 6*: body weight supported entirely on left leg.
- *Transition from 6 to 7*: right step forward at medium level.
- *State 7*: body weight supported entirely on the right leg.
- *Transition from 7 to 8*: left step forward at medium level.
- *State 8*: body weight supported entirely on the left leg.
- *Transition from 8 to 1*: flexion of the left leg that supports the body weight.

4.2.5. mM_5

The distribution of transitions and states in Figure 9 is as follows:

- *Initial transition*: preparation to support the body on the left leg only.
- *State 1*: body weight supported entirely on left leg.
- *Transition from 1 to 2*: right step forward at medium level.
- *State 2*: body weight supported entirely on the right leg.
- *Transition from 2 to 3*: flexion of the right leg that supports the body weight.
- *State 3*: body weight supported entirely on the right leg.
- *Transition from 3 to 4*: left step forward at medium level.
- *State 4*: body weight supported entirely on the left leg.
- *Transition from 4 to 1*: flexion of the left leg that supports the body weight.

4.3. Finite-State Diagram of Traveling Motif Variants (mT) in *Cumbia Cienaguera*

FSA diagrams are designed to represent the full range of movement possibilities available to a dancer, while also excluding combinations that are either unperformed or unperformable (e.g., sequences not typically enacted by dancers). In the context of this research, however, each diagram corresponds to a specific motif variant performed by a particular dancer. Accordingly, the diagrams are drawn separately, as each circuit (i.e., sequence of states) is unique to the individual performer. Moreover, during the observation, documentation, and analysis of *Cumbia Cienaguera* as performed by the San Felipe dance group, participants consistently repeated the same movement motifs and their associated circuits. Nonetheless, a deliberate

decision was made to combine all observed possibilities into a single diagram at the end of the section, in order to provide a comprehensive graphic representation of the full range of movement options enacted across performers.

Figure 10 combines the representation of five of the variants that the dancers of the *San Felipe* dance group perform to traverse the stage when dancing *Cumbia Cienaguera*. In each case, the transitions have been marked with a different colour to facilitate visual recognition. Each circuit corresponds to one of the movement scores recorded in Figure 4 and to each of the diagrams shown above.

Having this combined Figure allows us to compare the different variants of movement or traveling motifs and draw specific conclusions:

- All the variants start and end in the same state, with the body being supported on the left leg, while the right leg is free to perform the next movement.
- The first transition of the five variants is a step forward with the right foot at mid-level.
- The difference is that four of these variants perform this motif in one beat, while one variant performs it in two beats.
- Forward steps at medium level predominate across the variants. This is expected since we are comparing variants of a travelling motif, but it is useful to have a systematic confirmation of this fact.
- Observations about the movement of Mr. Guillermo (mM_3) and the adaptations and additions he makes to the motifs are evident in the circuit; it is the only one that includes additional gestures in addition to the changes of support.

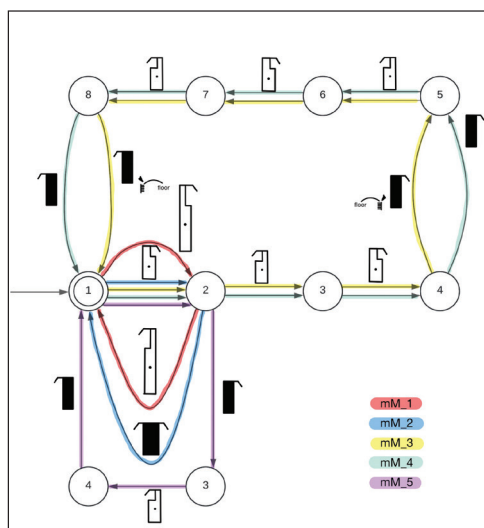


Figure 10. Combined FSA diagram of possibilities for the motifs for moving/traveling in the *Cumbia Cienaguera*.

The same syntax process was applied to the other two categories of movement motifs performed in the *Cumbia Cienaguera*. For clarity and brevity, we present only the final FSA diagrams in the following sections. For a more detailed analysis, please refer to Chapter 3 in Limón Silicéo (2024).

4.4. Finite-State Diagram of Remaining-in-Place Motif Variants (mP) in *Cumbia Cienaguera*

Figure 11 presents a combined representation of five variants of remaining-in-place motifs (mP) as performed by members of the *San Felipe* dance group. In each case, the transitions for each circuit corresponding to different variants are marked with a different colour.

From Figure 11, we conclude the following:

- All the variants start and end in the same state, with the body weight being supported by the left leg, while the right leg is free to perform the next movement;
- In this case, the predominant motifs are alternating support between the right and left feet, which are in place at the middle level;
- Some steps forward, backward, or sideways appear, but they are immediately compensated by the opposite movement in order to maintain the position in space;

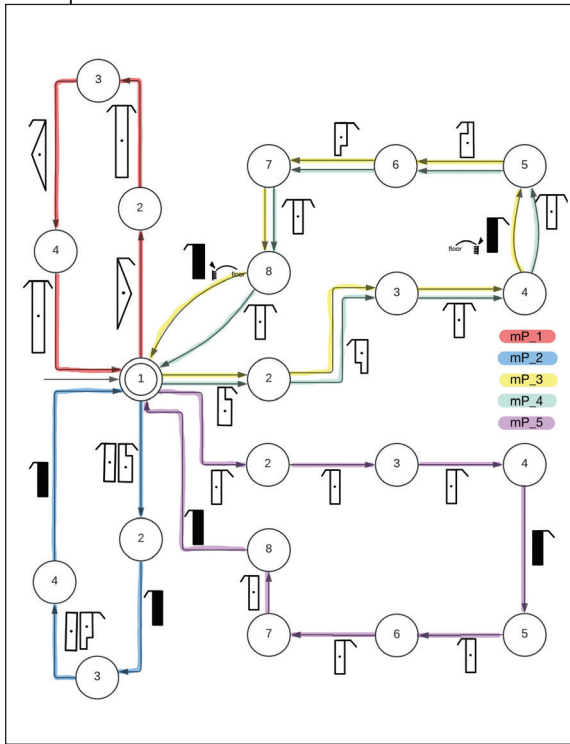


Figure 11. Combined FSA diagram of possibilities for the motifs of remaining in place in the *Cumbia Cienaguera*.

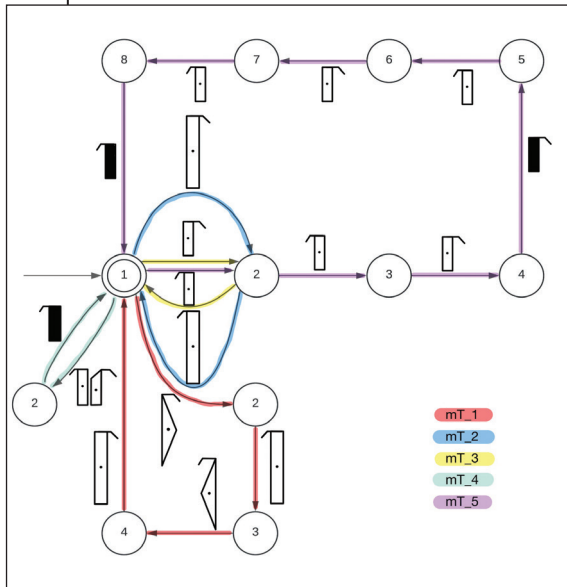


Figure 12. Combined FSA diagram of possibilities for the motifs of turning in the *Cumbia Cienaguera*.

- Once again, the circuit in yellow is the only one that includes leg gestures in addition to the supports;
- Compared to Figure 10, only two circuits share the transition from state 1 to state 2. The other circuits are executed without sharing elements to a significant degree.

4.5. Finite-State Diagram of Turning Motif Variants (mT) in *Cumbia Cienaguera*

Figure 12 combines the representation of five of the variants performed by members of the *San Felipe* dance group while turning in the *Cumbia Cienaguera*. In each variant, the transitions are marked with a different colour.

From Figure 12, we conclude the following:

- All the variants start and end in the same state, with the body weight being supported by the left leg, while the right leg is free to perform the next movement;
- The predominant motifs are alternating supports between the right and left foot, performed in place at the middle level;
- In three of the circuits, the transition from state 1 to state 2 is made with a support on the right foot support at middle level. Two of these circuits alternate this motif to complete the phrase.
- Figure 12 presents the motif elements that constitute turning motif variants (mT), but it does not include turning symbols. Identifying an appropriate notation convention for this action remains an open task for future work.

5. Discussion

We consider that FSA diagrams combined with Motif Notation offer a clear and precise representation of the variety of movement motifs, as well as their potential connections as possibilities for differently abled bodies and improvisational options in the performance of the *Cumbia Cienaguera* dance. The diagrams become useful tools to present essential information regarding the movements in this dance at first glance.

5.1. Reflections from the analysis of each individual FSA diagram.

Temporal duration: The FSA diagrams provide information about the temporal duration of the traveling or movement motifs at first glance.

In each diagram, many of the symbols are of the same height, which indicates a similar temporal duration. For example, in diagram mM_1 (Figure 10), the blue, yellow, green, and purple circuits have symbols of similar height. Referring to the corresponding scores (Figure 4), we notice that each movement motif is executed in 1/4 time (equivalent to half a musical measure, since the piece of music is executed in a measure of 2/4). But in the same diagram, the red circuit has longer symbols because their duration is 2/4, as notated in the score.

Predominance of a movement type: The FSA diagrams give information about the predominance of one type of movement symbol at first glance, giving information about its particular direction and level.

For example, in Figure 10 the prevalence of forward symbols at the middle level is clear, which shows that the motif is used to move forward. In Figure 11, place symbols are predominant, which shows that these movement sequences are used to remain in place.

Ornaments and variations: The FSA diagrams provide immediate insight into ornaments and movement variations that enrich the dance sequences.

In two of the three diagrams, additional symbols appear alongside the base motif. These are displayed in smaller size and placed next to the main symbol, suggesting a movement action that functions as a subtle variant, accent, or expressive highlight within the sequence. This can be seen in Figures 9 and 10, particularly in the yellow circuits, and corresponds to the execution of a dancer who enjoys incorporating technically complex variants.

Variety of possibilities: The FSA diagrams allow us to understand the variety of movement possibilities for different bodies in a dance piece—a variety that is often notated as if there was only one way (possibility) of executing the movement, thereby implying that all dancers move identically and in synchrony.

This point is crucial because folkloric dance performances are often characterised as sequences of identical movements performed uniformly by all participants. At first glance, ensemble execution may appear perfectly synchronised, suggesting a loss of individual expression in favour of uniformity. However, the diagrams provide strong evidence to the contrary. The colour-coded differentiation reveals meaningful differences in the three cases we analysed. These visualizations highlight the subtle richness and variability in execution, affirming that personal interpretation and bodily specificity persist, even within highly coordinated group performances.

5.2. Reflections from a comparison of the three combined diagrams for different motif categories.

Variety comparison: FSA diagrams reveal which motif category exhibits greater variety.

When examining the diagrams corresponding to the three types of motifs—traveling (Figure 10), remaining in place (Figure 11), and turning (Figure 12)—it becomes evident that the diagram for the “remaining in place” motifs displays the greatest variability (Figure 11). This is visually apparent in the four distinct paths shown, compared to only two in Figure 10 and three in Figure 12. The increased variety is also confirmed by the number of times state 2



is deployed in the FSA: once in Figure 10, three times in Figure 12, and four times in Figure 11. These state transitions, marked by the circled number 2, provide a quantifiable indicator of the degree of variation across motif categories.

Individual patterns. The FSA diagrams make it possible to identify consistent movement patterns performed by the same individual across different motif categories.

In terms of movement variation, all three diagrams show additional movements in the yellow-coloured circuit, which stands out from the others and corresponds to ornaments added to the basic movement motifs. Regarding movement duration, the red circuit consistently features longer symbols, indicating that this dancer performs movements over a longer span of time. A third observation comes from the blue circuit, which in Figures 9 and 11 includes only two traveling motifs that are repeated frequently. This may reflect a preference for repetition, but when considered alongside the dancer's personal context—shown in Figure 4—it corresponds to a performer with a hip prosthesis and reduced mobility. Finally, comparing the green and yellow circuits in Figures 9 and 10 reveals a similar path that diverges only in a few transitions. According to Table 1, the green circuit belongs to one of the group's founding members, who aims to reproduce the sequence as originally learned. In contrast, the yellow circuit corresponds to a dancer known for incorporating embellishments into the choreography.



6. Conclusions

Consider the case of the *San Felipe* dance group, where Carmen is an elderly woman with reduced mobility, Isabel is a woman with hip prostheses, Guillermo is a man who tends to add variants to the movements he performs, Élida is a woman with occasional low back pain, while Luis is a man who executes the movements as they are taught by the choreographer. How would you notate a motif from any dance in their repertoire—say the *Cumbia Cienaguera*—given that each of these five dancers performs the motifs differently?

At first, we might believe that Labanotation offers a solution, but it would actually produce five different scores, each corresponding to a different realisation of the dance motif for each of the dancers. How, then, could we arrive at a unified understanding of the motif? One option would be to choose one of these five scores—the one we believe is “correct” according to some criterion—but this would fail to capture the diversity of movement present in the actual performance. Another option would be to create a single score that functions as a kind of “average,” incorporating features from each dancer's motif. However, this option would result in a score that none of the dancers in the *San Felipe* dance group actually performs. Moreover, how would we decide what features of which score to include in our “average”? Besides, we would need a systematic method of comparing the different scores of the different realisations. This leads us to propose the method of Finite-State Automata (FSA) combined with Motif Notation, for it enables a comparison between different realisations. The method does not reduce dance variety, it represents it. While the method does rely on movement analysis and notation, these serve as departure points for a comparison that produces a nuanced understanding of movement possibilities and variability within a dance.

More specifically, this study highlights the importance of studying dance syntax and demonstrates its fruitful application to the *Cumbia Cienaguera*, a Colombian folk piece performed by the *San Felipe* dance group, composed of older adults. The research is grounded

in fieldwork conducted by Marisol Limón, the lead author of this work, during her fieldwork in Cali, Colombia. Additionally, it builds upon prior research conducted by the second author, Juan Miranda, who developed and proposed the application of the FSA method to characterise the syntax of a dance. This interdisciplinary collaboration enabled the integration of rigorous empirical data with an innovative theoretical approach. By employing FSA diagrams in combination with Motif Notation, the study captured and represented the variants in dance motifs performed by dancers with diverse physical and creative capabilities. The graphical and conceptual tools make it possible to visualise and understand how diverse movement possibilities emerge from an apparently uniform context (the performance of a single motif), revealing a diversity that enriches collective performance.

The inclusion of participants with diverse physical abilities underscores the value of the *San Felipe* dance group as an inclusive and creative space, where individual limitations are not only respected but also integrated to enhance the artistic and communal experience. Thus, the primary contribution of this study lies in its ability to analyse and interrelate the possibilities of movement within a choreographic context, highlighting how factors such as space, individual abilities, and group decisions influence the execution of dance.

When it comes to the import of our method to ethnochoreology, the discussion in Section 5 shows that FSA diagrams combined with Motif Notation provide valuable insights into movement structure and variation. First, they yield information about the temporal duration of the motifs and the predominance of a particular movement at first glance, which also makes it possible to retrieve information on movement direction and level. Second, they allow us to understand the variety of movement possibilities available for different bodies in a dance piece—a variety that is often notated as if there was only one possible execution, implying that all dancers move identically and in synchrony. Third, they enable us to identify which motif category has a greater variety (i.e., traveling/movement motifs, motifs to remain in place, or turning motifs). Fourth, the method enables the researcher to identify consistent movement patterns performed by the same dancer across different motif categories.

The approach proposed in this work takes movement analysis only as a point of departure. Its primary concern is *syntax*, understood as the interrelation and comparison of the variety of movement patterns in a dance in order to identify the principles that underlie the combination of movement sequences. The FSA method combined with Motif Notation is a versatile tool that researchers can apply to study other dance forms, exploring the structure and possibilities of movement. This methodology opens new perspectives for research in ethnochoreology, enabling a deeper understanding of dance dynamics as a form of diverse cultural and social expression.

Acknowledgements

We dedicate this paper to the memory of János Fügedi, an outstanding ethnochoreologist, a world-class movement notator, and a kind teacher who inspired both authors of this work and many generations of younger scholars. We are also grateful to the two reviewers for their insightful and rigorous feedback.

NOTES

1. Henceforth, the group's name *San Felipe Apóstol* will be abbreviated to *San Felipe*, to reflect the colloquial way in which its own members refer to it.

2. National folk ballet companies are ensembles that stage dance works rooted in the folkloric cultural identity of

specific contexts—whether local, regional, or national. These companies emphasise synchronised movement and precisely defined choreography, meticulously crafted to align with structured musical patterns.

3. Bakka and Karoblis (2010) maintain that dance has two



dimensions: realization and concept. They explain that “the realization is the actual dancing of a dance. The concept for the same dance is the potential of skills, understanding, and knowledge that enables an individual or a dance community to dance that particular dance and to recognise and relate to each particular realization of it” (Bakka and Karoblis 2010, 172–3).

4. An example of the realisation of this dance, recorded during fieldwork can be found on the YouTube channel of the San Felipe group: (FACSFA 2023).

5. This refers to the fact that in Labanotation symbols must be placed inside a staff (score), which provides specific information about their direction, level, time of realisation, and which part of the body is being moved.

6. All informants consented to the inclusion of their first names in this work.

7. The musical meter of the *Cumbia Cienaguera* is in 2/4, and 8 bars make up a musical phrase in almost the entire piece.

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*Note: All interviews cited were conducted in Spanish. Quotations in the text have been translated into English by the authors.

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