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Proceedings of the International Conference on Digital Creation in Arts and Communication, ARTeFACTo2020

Editor: Bruno Mendes da Silva

Published by Centro de Investigação e Comunicação (CIAC)

ISBN: 978-989-9023-32-1
ISBN (eBook): 978-989-9023-33-8

Composition, pagination and graphical organization: Juan Manuel Escribano Loza

Cover image: Pedro Veiga

General coordination: Adérito Fernandes-Marcos and Mirian Tavares

QUALITATIVE PERSPECTIVES ON GESTURE IN SAXOPHONE PERFORMANCE

Two case studies

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ABSTRACT

The increasing research on gesture in music performance demonstrates its influence embraces technical, expressive and communicative dimensions, which mastery is essential to the achievement of skilled, meaningful musical presentations. This study constitutes a preliminary exploration of gesture-making in the specific case of saxophone performance, framed on a larger on-going research centered in understanding the role of gesture and the ways it can improve pedagogy and playing. An analysis of two video recordings of renowned contemporary saxophonists and pedagogues interpreting the same repertoire was conducted through a systematic observation procedure previously applied to other instruments. Whilst each artist had a personal way of communicating through his gesture vocabulary, common features amongst saxophonists (and other wind instrumentalists) were extracted. Findings permitted to establish a set of gesture types related to saxophone performance, as well as expand on their functional nature and correlation with the musical content.

CCS CONCEPTS

• Applied computing → Arts and humanities → Performing arts • Applied computing → Law, social and behavioral sciences → Psychology • Applied computing → Education → Interactive learning environments

KEYWORDS

Musical gesture, Saxophone performance, Body poetics, Motion analysis

1 INTRODUCTION

The relationship between bodily movement and music has been a focus of growing interest of research on the music performance domain over the last decades. Musical gestures are defined as human body movements that go along with music, which manifestation is identified in those who produce sound – musicians – and in those who respond to sound – listeners or dancers. Some of these bodily actions relate directly to the instrument's technique and are responsible for the effective production of sound (e.g. to pluck a string) [1]. On the other hand, given that a musical performance is a multisensorial experience, involving not only auditory stimulus but also visual, the understanding of the expressive and communicative role of gestures seems crucial to architect an artistic presentation [2].

Gestures in music-making are linked to the characteristics of each instrument, since its size, shape and posture of execution limit the ability of the performer to move freely. With this in mind, multiple studies have explored the specific gestures in the performance of piano [3,4], violin [5,6], cello [7], percussion [2], flute [8], clarinet [8–10].

In this paper, we address a preliminary study integrated in the first phase of an on-going research focused on gesture in saxophone performance. With the aim of identifying and comprehending what are the bodily actions – gestures – intrinsic to this practice, the following questions were raised:

- What type of gestures are used in the production of a saxophone musical performance?
- What is the functional nature of these gestures?
- To what degree are gestures related to the musical matter being interpreted?

Two videos of live performances of renowned contemporary saxophonists and pedagogues of the instrument were selected and analysed according to the qualitative methodology of systematic observation for gesture analysis developed by Davidson [8]. A comparative approach between the two artists was carefully chosen with the intention of settling some common manners amongst saxophonists as well as evidencing contrasting ones.

2 BACKGROUND LITERATURE

2.1 GESTURES IN MUSIC-MAKING

In 1988, a pioneer study was conducted by Delalande [11] investigating the playing technique of the famous pianist Glenn Gould. The author identified a strong relationship between gestures and the musical text, and created a three-levelled categorization of gestures: effective – that produce sound, mechanically; accompanist – bodily movements that support the effective in various ways; figurative gestures – mental images conveyed trough sound, without clear correlation to physical movements. Shortly afterwards, Cadoz [12] explored a subgroup of effective gestures, the instrumental gestures, which relate to the technique and manipulation of the musical instrument.

The nomenclature of "musical gesture" is frequently used nowadays and was established by Godøy & Leman [1] who also propose a new functional gestural classification: sound-producing, communicative, sound-facilitating and sound-accompanying. Sound-producing gestures have the goal of producing sound (e.g. blowing,

plucking) or modifying it (e.g. finger movements pressing different note positions). Communicative gestures comprise the domains of communication (e.g. tilt of the head to give an entrance to a co-performer), expressivity (e.g. sway along with the music) and entertainment (e.g. lift hands to encourage audience's participation). Sound-facilitating gestures are gestures that don't relate directly to sound production neither appear to have communicative functions but seem to support both (e.g. open and close hand while singing empowers mental image associated to open or closed sound, therefore facilitating its achievement). Sound-accompanying gestures are made in response to sound, by either performer or audience, and may in some contexts, such as improvisation, affect the subsequent sound created (e.g. nod head while listening to music). The diversity of instruments, repertoire and players contributes to the extent amount of existing gestures.

The social and musical context on which this musical gestures occur is a factor of influence in the kind of information they contain [8]. Through systematic observation methods, Davidson [13] identified a vocabulary of less than twenty movement types in a pianist, which repeated themselves across different music styles. The same "wiggle" of torso was used to illustrate an ornament in Beethoven and a long legato passage in C. P. E. Bach, therefore concluding the same gesture may appear in different contexts, as well as have different functions depending on the context [13]. McRitchie [14] concluded the same structure-related motion standards were present in different pianists' interpretations, despite their background and movement ideas; MIDI, motion tracking systems, audio and video data were analysed. Demos, Chaffin and Logan [6] proved trombonists sway reflects the musical phrasing of the repertoire they are performing, adopting a statistically reliable method relating recurrence quantification analysis (RQA) with the performer's reports of phrasing.

2.1.1 The case of wind instrumentalists. The gestures of wind instrumentalists are limited by the attachment of the mouth to the instrument through the mouthpiece or reed, which establishes a symbiosis of motion: for example, if the player raises the bell, the arms and head will consequently raise too. This condition also translates into a stiffer posture, since fingers rarely leave the keys, and diaphragmatic breathing and embouchure require a firm position in order to correctly emit sound. In fact, in the case of single-reed instruments, like the clarinet or the saxophone, air flow is dependent on the amount of pressure inside the mouth as well as inside the mouthpiece, in order to attain a certain embouchure rate [15], making breath pressure and embouchure value two inter-dependent gestures [16].

Wanderley's work [10,17,18] constitutes an important mark on the research around wind instrumentalist's gestural patterns and focuses on clarinet performance. Analysing video recordings of five clarinettists playing the same solo piece, Wanderley et al. [10] were able to identify common gestures in clarinet playing: circular movements of the bell, raising or lowering the instrument, moving the head or shoulders up and down, bending at the waist or knees, stepping or shifting weight from one foot to the other, curling the back and flapping the arms. Clarinettists showed consistency on the repetition of individual gestural schemes throughout several performances, some measured with months of interval; different musicians utilized different types of movement to different extents, although moving the head and clarinet bell up and down was transversal to all [10,18]. Teixeira et al. [9] based their movement analysis on the motion of the clarinet bell, which revealed to be an important indicator of expressive movements.

From a qualitative point of view, Davidson [8:605] identified mutual movements between flutists and clarinettists: bobbing – "an action of bending and straightening the knees, with an accompanying rising and falling of the torso"; swaying – "side-to-side rocking action, with weight being shifted from one foot to another and the torso inclining in the direction of the foot bearing the weight of the body"; circling end of instrument in a rotational action and head nodding up and down. Idiosyncratic movements included toe tapping and raising eyebrows. The face was identified as less used for expressive purposes, as both instruments involve the mouth in holding and generating breathing-flow.

3 METHOD

This study constitutes a preliminary segment of an on-going research about gestures and bodily movements produced in saxophone performance. It ambitions to test a qualitative methodology of musical gesture analysis, built upon a systematic observation procedure developed by Davidson [8]. Since a multimodal approach has been proved to be more resourceful in the treatment of such complex actions, tests on the quantitative methodology will be carried later on.

Based on the aforementioned findings, we raised the hypothesis that there are characteristic bodily movements in saxophone music-making, which may share similarities with other instruments, as well as variances. A comparative approach between two saxophonist's interpretations of the same piece was undertaken, with the objective of establishing correlations with the musical content.

3.1 STIMULI

Two video recordings of live performances of the same repertoire were used in this study. The artists chosen are renowned references of the contemporary classical saxophone panorama with on-going activity as soloists, ensemble, chamber music and orchestra musicians, as well as pedagogues that influenced several generations of professional saxophonists – Professor Claude Delangle teaches at CNSMP (Conservatoire National Supérieur de Musique of Paris) and Professor Arno Bornkamp at CvA (Conservatorium van Amsterdam). The recordings were accessed through YouTube [19–21].

3.2 MUSICAL STIMULUS MATERIAL

Rhapsodie pour orchestre et saxophone by Claude Debussy is considered standard concert repertoire of the classical saxophone tradition. It was originally commissioned in 1901 by female saxophonist Elise Hall with the intent of expanding the apparent lack of saxophone repertoire at the time and finished by the composer in 1903, lacking the orchestral arrangement, which was created after Debussy's death by his friend Jean Roger-Ducasse. The piece's premier finally took place in Paris, in 1919 [22].

This work follows the line of impressionist musical though carried in *La Mer*, characterized by the exploration of the richness of colours in soundscapes, the influence of *plainchant* and urban folk music, as well as the prevailing beauty in simplicity, rather than mere demonstrations of virtuosity. From performer's point of view, studying this piece may be a slow, long process, as it implies the profound comprehension of the subtle phrasing construction in order to master such mysterious, emotion-evoking musical matter [22,23].

Rhapsodie is a single movement piece containing various tempo and character changes, with approximate duration of ten minutes. It has a symmetrical form that begins with an introduction (bars 1-20) where after an orchestral opening the solo saxophone enters

alone presenting a melancholic *ad. Libitum* theme, followed by a vast body of contrasting atmospheres (bars 21-366) and an ending explosive section that evolves into a final magnificent sweep of melody (bars 366-386). The reduced version of *Rhapsodie* for piano and saxophone is interpreted in the two selected footages.

3.3 PROCEDURE

The recordings were examined multiple times by the author; Adobe Premiere and Kinovea were used to regulate velocity and compare both videos at the same split screen.

A systematic observation procedure drawn upon Davidson's methodology and expressive vocabulary [5,8,13,24] was undertook, using strong criteria for the description of specific movements, with the aim of identifying and perceiving the bodily actions of the saxophonists during performance. Firstly, a bar by bar descriptive grid was created, narrating in detail every bodily movement and its evolution across small units of time – bars (available at: https://drive.google.com/file/d/190QZu45x06eL8lYnseqMUGo7JalRT4Yx/view?usp=sharing); secondly, summary tables were generated per section, grouping movement types in categories for each player (available at: https://drive.google.com/file/d/18e4ITfK0_36ldRm1i-FrIwMlyOA7FV0a8/view?usp=sharing). A final analysis was then conducted, relating the identified gesture categories with the musical discourse and function, considering the research questions previously presented.

It's important to mention that being the author of this study a saxophonist, the knowledge of the instrument's technique and performative manners, as well as the artistic profile of the saxophonists was useful to interpret data. In parallel to this investigation, one practiced the piece with the intention of having a deeper awareness of the possible influencing factors of the bodily behaviours acknowledged in its performance.

Given the extent and structural organization of the piece, we divided it into the following ten parts for analysis:

A (1-20)	**A1** *Très modére* (1-13)	Piano introduction
	A2 *Ad libitum* (14-20)	Sax entrance (melancholic theme)
B *a Tempo* (21-38)		Melancholic theme
C (39-69)	**C1** *Allegretto scherzando* (39-53)	Playful faster theme
	C2 *1º Tempo* (54-69)	Melancholic theme
D au Mouv! (70-84)		Slow transition
E *Allegretto scherzando* (85-145)		Playful faster theme
F (146-200)		Exotic theme
G (201-245)	**G1** *En animant peu à peu* (201-216)	Lyrical theme
	G2 (217-245)	Piano intervention + lyrical theme
H *Plus Vite* (246-311)		Furious fast theme
I *a Tempo* (312-353)		Playful faster theme + exotic theme
J *Revenez au Mouv!* (354-386)		Final fusion of all themes

Table 1: Section division of *Rhapsodie*.

The excerpts contained on bars 147-169, 267-268, 276-311 and 353-366 were excluded of the analysis because the video plane of one of the performances focuses on the pianist, making it impossible to observe the saxophonist's movements, whereas excerpts contained on bars 304-311, 312-324 and 335-353 were excluded because one of the saxophonists plays different musical content, including in his personal interpretation additional parts from the full score. Considering the focus of this study relayed on a comparative approach between performances, we extracted the referred excerpts to attain data of the same musical context.

4 RESULTS

4.1 GESTURE DESCRIPTION

Main gestures identified in the performances are presented in Table 2 and further characterized according to matching musical moments they occur. This kind of categorization seemed adequate, considering various gestures repeated across performances in sections of anticipating entrance, beginning, development and ending of sections and phrases.

Moving parts/ Main gestures	H	T	Hs	K	F	WB	B
Adjustments of sax/score			X				
Glance	X						
Enter playing position						X	
Bend		X		X		X	
Bob							
Curl						X	
Push impulses		X					X
Sway						X	X
Direction change		X				X	
Step					X		
Lean		X				X	
Tilt	X	X					
Circle						X	X
Lift						X	X
Freeze position						X	
Release			X				X

Table 2: Main Gestures and Moving Parts (H – Head; T – Torso; Hs – Hands; K – Knees; F – Feet; WB – Whole Body; B – Bell).

4.1.1 Anticipating entrance. The anticipating entrance actions relate to the preparing moment that precedes an entrance, therefore happen during periods of waiting bars, where the saxophonist gets ready to begin playing and assures favourable conditions for it are gathered. They associate with the instruments specific characteristics and seem to happen almost automatically.

The actions identified in this context were:

- Adjust of neck strap with one of the hands - through a sliding movement up or down saxophonists adjust the height of the instrument;
- Adjust mouthpiece or reed with one or both hands - mouthpiece adjustments concern tuning (by pulling in or out the mouthpiece of the cork of the saxophone's neck) and reed fixing (by pressing fingers against the reed or repositioning it);
- Turn page with one hand;
- Fix hair with one hand;
- Glance down – listening to the music, in a concentrating

kind of way;
- Enter playing position – one or two bars before entrances, we identified a change from a more relaxed posture to the effective playing position where both hands firmly hold the instrument according to respective fingering and embouchure (mouth placing) is stable and ready to start (Figure 2).

Figure 2: Saxophonist's transition from relaxed to playing position.

4.1.1.1 Inter-communication. With the aim of establishing eye contact and communicating, the saxophonists often look and turn rightwards, where the accompanying pianist was located in both performances, as usual. Variations of this movement include the positioning of the feet – together or apart – and the amplitude – it may be a short movement like a subtle torso turn, or a large one, like a whole-body sway. This gesture was identified in key moments of the piece, like section tempo changes and variations (*rallentando*, *ritardando*) as well as entrances of one of the performers, when the other was already solo playing – the saxophonist giving an entrance clue to the pianist, or vice-versa. Assuming the communicative function as principal and essential in group music-making, one may consider an expressive one is also existent, as this act relates to the character and the tempo of the music – if the tempo of the section is slow, the turning movements is also slow (e.g. transition from section A2 to B).

4.1.2 Beginning of sections and phrases. As claimed above, the beginning of a section was marked by the adoption of a "playing posture" by both the artists: stage-centred, straightened and feet apart; when referring to middle sections of the piece, the saxophonists often returned to this initial position (Figure 2). The entrances in sections, as well as in phrases, were also marked by other gestural manners:

- Bend down of torso, usually to right, accompanied by slight bend of knees;
- Total curl down of body, also right-directed;
- Jumpy-like single impulse of torso along with bell, down or forward;
- Lateral vigorous sways;
- Change to opposite direction;
- Initially take a step forward, evolving to any of the above movements.

Naturally all entrances imply proper breathing. Only one breath of each saxophonist during the whole performance was audible and marked by the lift of shoulders; all the others were subtly unified with the music with no direct correspondence to movement.

4.1.3 Development of sections and phrases. The movements comprised during the development of a section or a phrase showed to be the more complex and harder to interpret. The functional nature of these is ambiguous, although we tend triangulate between expressive (conveying the interpreter's expressive intentions), sound-accompanying (in a sense of engaging and physically responding to the musical stimulus) and possibly sound-facilitating (as some swaying coincides with musical parameters like accentuated notes, rhythmical figures, amongst others, whose execution may be facilitated by their incorporation in a larger movement). We present each general type of motion and then describe its variations and contexts of incidence.

Bending involves both upper and lower body. The bend down movement, fixing position (usually rightwards), occurs during long or soft-dynamic notes and difficult passages (to concentrate energy in fingering and embouchure – e.g. bar 140). The Bob movement – that groups the bending with the posterior stretching – associates with pitch contour (body rising and falling according to ascendant or descendant notes of a phrase – e.g. the melancholic triplet theme of section A2) and to pulse tempo with knees.

Figure 3: Bobbing movement according to pitch contour (bars 58-62).

Leaning implicates mostly the upper body. The lean backwards movement associates with the lift of the bell and stretch of body; it was identified in ascending phrases. The combination of leaning forwards and backwards was frequently adopted by Sx 1, following the pitch contour of the phrases, and during motivic repetition (e.g. in bars 42-44, leans forward in first appearance of the motif and

backwards in second).

Tilting of the head and torso was used as a short way of pulsing tempo, engaging into fast music's anxious character, and physically shaping accentuated notes.

Side-to-side swaying is frequent amongst both interpretations and always relates to tempo – when the section is slow, swaying is slow, and when it is fast, swaying is also fast. Free, large, slow swaying occurs both in waiting and playing bars; it doesn't necessarily mark tempo – sometimes it coincides with note changing throughout a phrase. Subtle swaying is almost unnoticeable and combines with a holding position of the body. Quicker swaying regularly happens in semiquavers of faster sections (C1, E, I1) directing the first note of the tempo – it seems to facilitate the metrical fit of such repeated figures in several pulses. The shape of bell movement during these sways may be of a horizontal straight line (Figure 4) or more curved, similar to a pendulum (Figure 5).

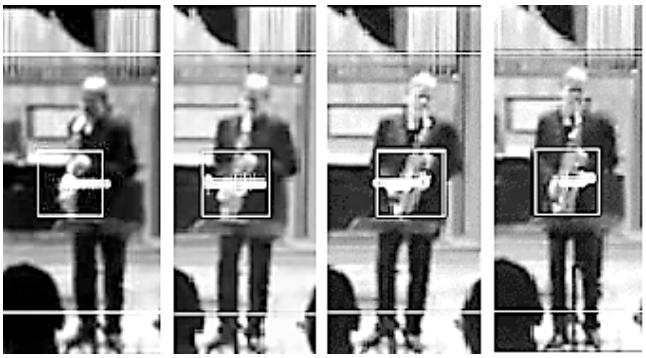

Figure 4: Horizontal straight-lined sway (bars 170-173).

Figure 5: Pendulum-like curved sway (bars 85-86).

Circling may be performed with lifting of the bell only (Sx2) or in a whole body stretching and bending large movement (Sx1). Its minor variation is a 180 degrees rotation whilst its wider one completes an entire 360 degree; either type may rotate clockwise or counter clockwise. This circle-shaped line shares similarities with the contour of pitch in phrasing, motivic repetition and fitting semiquaver passages – for instance an interesting four-circle sequential movement of Sx1 during a repeated semiquaver passage takes place during bars 44-53. Due to its characteristics, circling is sometimes combined with swaying.

Lifting may apply to smaller parts of the body, such as elbows, shoulders and wrists, which rise in relation with accentuations, crescendos and even specific fingerings. Lifting feet, standing in a tiptoe position that affects the entire body, is also common to one of the saxophonists (Sx1).

Stepping forward with left or right foot is also a part of the gestural vocabulary of the saxophonists. This gesture in itself doesn't carry a relevant meaning (to the extent observed), but seems important as a first segment that evolves to other movements, like turning, tilting, stretching, sweeping and curling.

Pushing impulses are short, impulsive singular sways that stress visible units of the music in fast sections: appoggiaturas, accentuated notes, triplets. They convey a strong expressive meaning, being able to transport built-in ideas of the musical content (e.g. elegant, vigorous, jerky).

4.1.3.1 Technique-related. The technique of the saxophone strongly relies on the embouchure, breathing technique and positioning of the hands and fingers. Although the resolution of the videos didn't allow the necessary proximity to observe such movements in detail, some facilitating technique motions were observed: the left wrist and elbow lifting due to c2 fingering position for medium D of Sx 1, whereas Sx2 opted for the regular fingering and kept the left hand in regular position (bar 179); the vigorous pressing of left index finger of Sx1 to easy the attack of the low F (bar 73); and finally taking the left thumb off its place in lower notes and vigorously press the octave key in following higher notes (bars 87-88 and 93-94).

4.1.4 Ending of sections and phrases. The endings reflect the adopted movements during sections and phrases, wrapping up the musical idea developed across many bars; one may compare them to the final punctuation marks of a sentence. Gestures adopted in regard to this conclusive role are:

- Bend body and bell down in a closed position (as note diminishes);
- Hold still position in ending long notes;
- Release left hand along with music (fast, slowly or anxiously). This release movement seems to bring a sense of phrasing conclusion, as sometimes Sx1 releases and immediately puts hand back because another entrance follows, instead of just leaving the hand in position;
- Release sax off mouth along with music (slowly, jerkily);
- Open left hand's front fingers widely;
- Lift bell up;
- Jumpy impulse of body, stretching up or bending backwards – Sx1 often finishes in tiptoed position.

4.2 IDIOSYNCRASIES

Sx 1 has an overall more exaggerated and exteriorizes almost all musical ideas through his gestural approach, frequently evoking the entire body motion throughout the performance. He highly explores the limits of movements as curls down with highly bent knees, in kind of a squat position and on the other hand jumps with both feet (at the ending of a phrase). Another peculiar movement is a dancing hips, side-to-side, relaxed sway he accomplishes by actually engaging to the music in bars 264-272.

Sx 2 gestural approach is more restricted and involves mainly the upper body and the frontal and vertical planes of movement – anterior-posterior movement is rare. Still, he is able to transmit musical ideas through gestures like a large vigorous inclination of torso and head left in the last accentuated notes of phrases (bars 367-374), or the zigzag-like movement that consists of lifting the bell up anxiously as phrases ascend (180-183).

Contrasting approaches between saxophonists are highly evidenced on bars 333-334, where Sx1 takes a step forward with the right foot, bends knees and jumps lifting with both feet off the ground (Figure 6) whilst Sx2 wraps the same segment with a bend down forward and vigorous release of the saxophone off mouth (Figure 7); and in final bars 384 to 386, where Sx1 lifts and bends body backwards, sweeps down to cut the note and immediately rises up for applause, whereas Sx2 lifts bell up and cuts the note by taking the saxophone vigorously off the mouth rightwards.

Figure 6: Uncommon jump at end of ascending phrase (bars 333-334).

Figure 7: Bend and release of sax at end of ascending phrase (bars 333-334).

5 DISCUSSION

This study provides rich data on the development of a saxophone performance gesture vocabulary, which constitutes a first step towards understanding the process of gesture-making in this specific instrumental practice. Literature found about gesture in saxophone comprises tool development for augmented performance [25] and posture analysis for injury prevention [26]. This research intends to fill the gap concerning the role of saxophone gestures in facilitating performance and inducing expression and emotion, by creating scientific basis for further applications in pedagogical environments.

Our findings suggest the palette of gestures used by the saxophonists includes motions of bend, bob, curl, push, sway, step, lean, tilt, circle, lift, release, glance amongst others more technical, such as adjusts of the strap or mouthpiece, fingerings, breathing or turning pages. Most of the movements detected take place in the upper body (torso, arms and hands); lower body (legs and feet) is often in a fixed position and accompanies the upper body flow. It's also possible to identify minor movements carried by a small part of the body (e.g. lift thumb), and major movements involving the functioning of several parts of the body as a whole unit (e.g. wide circling movement accompanied by knees bend and stretch). Regarding this whole-body movement conception, some postures were consistently adopted by each saxophonist in their performance – for example, the playing posture (Figure 1).

Even though some gestures repeated across diverse performative moments, we detected an evidenced intention of marking beginnings and endings of sections. Pushy impulses of the bell forward or sideways were frequently used to define a new entrance, and the vigorous release of the left hand or the sax off the mouth seemed to convey a kind of an undeniable conclusive intention to the section. Not all the gestures mentioned were exclusive to a moment – those pushy impulses were repeated in other contexts, such as in appoggiaturas or accentuated notes during the development of sections. This adds on the results of previous research: "there is a movement vocabulary, but it can be used in a variable manner for similar expressive ends" [8:613].

The functional dimension of the disclosed gestures comprises sound production and technique-related, communicative and expressive, sound-accompanying and sound-facilitating. The sound-accompanying and sound-facilitating gestures frequently overlapped with the expressive ones, as suggested by Godoy & Leman [1], increasing the difficulty of interpretation (e.g. the fitting of a semiquaver passage in a circular movement of the bell is an expressive movement at the same time as facilitating, since the rhythmic enrolling may ease the execution of the excerpt).

In accordance with the outcomes of Davidson [8,13], MacRitchie [14] and Demos et al. [6], the relationship of dependence between bodily actions and the musical content being performed is incontestable. Tempo constantly associated with the velocity of the movements performed – the quickest, shortest movements took place in the "playful faster theme" and "furious theme" sections and the slower, largest ones in the "melancholic theme" and "lyrical theme" sections. Impulses of torso and bell, swaying and tilting reflected pulse or rhythmic configurations; retarding tempo effects like rallentando (bar 30) translated into a slowing down of the gesture; and long static notes give way to frozen postures. On the topic of pitch, bobbing up and down (bars 17-20) and bending back and forwards (bars 173-179) respectively associated at times with ascending and descending musical height.

Similarities to the ones described in flute and clarinet playing, such as lifting/circling the bell, side-to-side sway, amongst others [8–10,17,18] were found, but substantial alterations were noted due to form of execution of the saxophone – for example, the neck strap that supports the weight possibly makes torso and head movements more limited than in the clarinet, or the unequal keys placement along the body of the instrument that makes it impossible to play frontally centred therefore implying a side-turned posture. Alike what happens in these wind instruments, due to the required mouth positioning and breath technique, saxophonists showed the less movement in the face, head and neck zones.

Another interesting point is that the contrast in playing styles between saxophonists reflected on their gestural manners and postures. Even when performing very approximate gestures, one cannot say that they look exactly the same – a personal interpretation of the movement was always present. In one hand Sx1 presented a more diverse gesturality, incorporating an overall higher quantity of motion with larger amplitudes of movement, whole-body involvement (e.g. curl down, vertical stretch up in tiptoe, jump) and

constant combinations of anteroposterior, left-right and up-down directions. On the other, Sx2 didn't move as much (also tended to hold still positions for longer intervals) and restricted his actions to a smaller space around the bell, without great overstatements of bending, stretching or circling; his manners were more patterned and displayed consistency across sections (e.g. side-push impulses in appoggiaturas in C1, E2, I; open left hand's front fingers widely in final bar of E2, I, J).

The qualitative methodology of systematic observation [8] showed to be useful on detecting gestural manners and relating them with the musical text. It provided a basis for further analysis of the movement features present in each gesture type and its variances, such as trajectory, velocity and amplitude. It also reinforced the initial idea that quantitative methods, such as 3D motion capture systems, are essential to attain a more accurate perspective, as stated in several investigations [6,27]. The resolution of the videos, recorded from the audience's point of view, didn't allow for a detailed observation of small parts of the body like fingers or eyebrows, but was satisfactory for picking up a general image of the motions – they were initially chosen because were the only one's publicly available representing two emblematic saxophonists interpreting the same repertoire. Next phases of investigation intend to use: laboratory recordings, therefore assuring a higher video quality; a vaster amount of shorter contrasting excerpts which may provide richer data; an increased number of participants.

6 CONCLUSIONS

This paper comprises an analysis and discussion on morphological as well as functional characteristics of the gestures in saxophone performance. Playing an instrument relies on the mastery of determined tasks based on a gestural code, which in itself relies on the use of capabilities of the human motor system [16]. This biomechanical dimension of the performance coexists with the artistic, expressive urge of conveying musical intentions and meanings through bodily communication [8]. This duality of gesture functioning sustains the importance of its investigation and demonstrates the wide range of purposes it may serve – examples emerge from a pedagogic level of learning basic instrumental techniques to an expert musician looking to improve performance through body expression.

Reexamining the research questions presented in the beginning of this paper, an exploration of the integrated gestures in a saxophone musical performance was achieved, therefore having established a basis for the development of a gesture vocabulary for saxophonists. Across the two performance recordings of saxophone references there were a considerable quantity of identifiable gesture types employed (glancing, turning, swaying, bobbing, bending, lifting, leaning, tilting, circling, stepping, pushing, adjusting instrumental features) although there were also personal stylistic variations (dancing hips side-to-side sway, zigzag lift of the bell). Concerning their functional nature, we observed the presence of sound-producing, technique-related, communicative, expressive, sound-accompanying and sound-facilitating gestures; we did find that a gesture may have one or multiple functions. At last, we detected a correlation between some gestures and the musical matter, namely tempo and rhythm, pitch and phrase contour, structure and ornaments.

Recognizing the restrictions of the video recordings and the reduced sample of only two saxophonists as main limitations of the study that we intend to improve further on, we also pinpoint the effectiveness of the qualitative approach tested on gathering and systematizing data. Our initial hypothesis derived from other research findings applied to the case of different musical instruments. Despite the fact that our conclusions may not seem surprising, we succeeded on creating new knowledge in the area of body-music interaction applied to the specific case of the saxophone that provides clues and further work to the on-going research around its pedagogy and performance.

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