Prosodic Structure of the Foxtrot

by

Matthew Richards
B.Sc., University of Victoria, 2009

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of the Requirements for the Degree of

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Supervisory Committee

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Dr. Suzanne Urbanczyk, Department of Linguistics
Supervisor

Dr. Alexandra D'Arcy, Department of Linguistics
Departmental Member

Dr. Allana Lindgren, Department of Theatre
Outside Member

Abstract

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Language is a common metaphor used to describe dance and how people understand, observe, dance and relate to dances. This metaphor implies that dance has a communicative aspect between people and there is a structure to the patterns found in the dance. The pattern of interest in language is the pattern of articulation of sounds. The dance investigated in this thesis is the Foxtrot, a partner dance, with a view to examining how the structure of this dance is articulated using theories from oral language phonology and sign language phonology. In particular it looks at sonority and prosodic units in sign language and how they apply to dance. The research questions are: (1) Can sonority be defined for dance and used in the analysis of dance steps, and (2) Can dance steps be organized into prosodic units?

This thesis makes the following arguments: Dance has a sonority based on the articulators used to articulate the dance step. The steps are structured around the sonority of the articulators used in the step. In the Foxtrot sonority is defined by the proximity of the articulators to the centre of mass of the dancer. The closer to the centre of mass the more sonorous the movement. The most sonorous movements start the step while following movements are less sonorous. This pattern is repeated with the other prosodic unit of the foot, where the most prominent step starts the foot. The conclusion is that

theories from phonology can be applied to the Foxtrot and may be able to be extended to other types of dance.

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Acknowledgments

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Chapter 1: Introduction

1.1 Introduction

Dance as a language is a common metaphor used to describe how people understand, observe and dance dances. One of these metaphors describes dance as a movement conversation (Myers, 1980, p. 246), connecting dance with language. This metaphor has two implications that are important to this thesis: that dance has a communicative element between the dancers, and that there is a structure to the patterns found in the expression of dance that is similar to the patterns in language. This observation has led anthropologists to study the structures present in different forms of human movement, including sign language (Farnell, 2006) and dance (Williams, 2004). This study of human movement has resulted in the conclusion that specific forms of human movement have different levels of symbolic meaning in different human societies.

In the process of these studies anthropologists have studied the structure of dance by using methods from linguistics. Some of the earliest studies connecting dance and language were done by anthropologists using the theories of the Prague School of Linguistics (Martin & Pesovár, 1961; Williams, 1975; Kürti, 1980; Williams, 2004). Applying theories from linguistics and folkloristics, the study of folk tales, researchers created a field called motif morphology (Martin & Pesovár, 1961). The motifs are the smallest compositional unit of the dance in motif morphology analysis (Kürti, 1980). Motif morphology decomposes dance into component motifs and proposes a structure of how the motifs can be combined.

The process of analyzing dance using theories of linguistics continued to be developed by anthropologists. They built on motif morphology and included further

developments from linguistics. Williams developed the connection between dance and language, incorporating the concepts of transformations and levels of structure from Noam Chomsky's work in linguistics (1957), into her doctoral research (Williams, 1975; Williams 1976a, b). Myers (1980) continued to use linguistic theories to analyze dance by developing phrase structure rules for the partner dance the Foxtrot, applying linguistic theories with little modification to describe the structure of dance. More recently Hagendoorn (2010) has proposed studying the structure of dance from a neurological perspective, using techniques from psychology and psycholinguistics.

Two questions of interest arise from this prior work. How far can theories from linguistics be applied to dance, and what sort of dances can be analyzed using theories from linguistics? Kaeppler (1972) Williams (1976a, b) have analyzed folk dances and ballet in their work. Kaeppler (1972) used the concepts of kinemes a unit of analysis similar to the motifs and motif morphology to analyze Tongan dance. Williams (1976a, b) developed a system of rules based on the division between deep and surface structure in generative linguistics developed by Chomsky (1957). Myers (1980) extended this work to partner dance and applied phrase structure rules from generative linguistics to the figures of the Foxtrot.

This thesis builds on the subject of Myers' 1980 paper the partner dance the Foxtrot. Rather than looking at the dance figures and developing phrase structure rules for the figures of the Foxtrot, this research examines the structure of the articulation of the steps and units within the dance figures.

This thesis analyzes the structure of dance during the execution or articulation of the dance using prosodic theories from linguistics. The theories are extended from

existing work applying prosodic structure to sign languages. This approach is similar to the work of Myers (1980) who applied linguistic theories to directly study dance as opposed to Williams (1976 a, b) who developed a new framework using concepts from linguistics. This will provide further evidence that linguistic theories can be used to explore the structure of dance and how the analogy of dance as a language fits structurally.

1.2 Scope of Work

Partner dance is a dance where two individuals articulate dance steps in relation to each other and to the music, with one partner choosing the steps while the other partner executes the complimentary steps (Morton, 1966, p. 30). The steps are not necessarily choreographed ahead of the articulation of the dance and instead are chosen by the lead dancer in response to the music and their partner. The steps are expressed by communication between the dancers through the structure of the dance. This communication between dancers, in all steps in the dance, makes the structure of partner dance different from choreographed dances such as tap and ballet (Morton, 1966).

The dance studied in this thesis is the Social Foxtrot (henceforth, the Foxtrot). The Foxtrot is a dance in which the partners travel around the dance floor in a counter clockwise circle with specific figures defined by ballroom dance instructors and dance instruction books, for example, The Teaching of Popular Dance (Morton, 1966) and Modern Ballroom Dancing (Sylvester, 1993).

As discussed above, the structure and organization of steps in relation to the music in the Foxtrot has been previously studied by Myers (1980). Myers formulated a structure for Foxtrot using the theory of phrase structure rules and transformations as

proposed by Chomsky (1957). Myers focused on two steps from the Foxtrot, the Magic Step and Box Step, and how they can be combined and organized in sequence in relation to the music. This project analyzes the same steps for which Myers developed his phrase structure rules. However, it expands the analysis to include other steps in the dance not reviewed by Myers such as the promenade and weave. In addition, the focus is the articulation of the individual dance steps and figures, extending the work done by Myers who focused on the organization of steps in sequence to the music. The main focus of the investigation into the articulation of the dance is the difference in prominence between the dance steps. The hypothesis of this thesis is that prominence of a movement is analogous to the sonority of a segment in language.

Foxtrot was chosen to build directly on the prior work of Myers (1980) and the development of the application of linguistic theory to partner dance. The Foxtrot also has a limited number of figures and improvisation within figures that allows for analysis (Myers, 1980; Morton, 1966).

The object is to show that the system of articulation for dance steps is structured analogously to the articulation of language. Sign language is used as a connection between language and physical movement. Linguists have applied linguistic theories to the domain of physical movement of signs (Brentari, 1998). This thesis uses the theories developed for the linguistic study of sign language as a basis for the study of the movements in dance, adapting them to partner dance. The next section describes the background of the researcher in dance. The final section of this chapter then outlines the structure of the thesis.

1.3 The Dancer

I came to dance in my early twenties as a student at the University of Victoria. After trying first rowing and then fencing for a year I was invited to go ballroom dancing by a friend and decided to try it out. Following this first time I joined a group of friends who regularly went ballroom dancing and attended lessons through the university club. This initial introduction consisted of an event called Swing City that started with a beginner lesson in a ballroom dance. Most often the lesson that started the dance when I first joined was a swing dance called lindy hop. Following the lesson was three hours of dancing to all variety of ballroom dance music, from waltzes, to quickstep, to swing and even some blues. I was rather overwhelmed by the eight or so dances that you would encounter each evening on the dance floor.

From this introduction I joined the ballroom dance club with my friends for a crash course in the dances and technique of ballroom dancing. I stayed with the club for my main dance instruction and practice for several years and then started attending the Latin dance classes in addition to the ballroom dances. This introduced me to Salsa and Bachata.

I wanted to push myself to perform and improve my dancing at this point and joined a local Salsa and Latin dance performance group. I expanded my lessons beyond the university club to take lessons with the group and started to learn performance choreographies, instead of just improvised social dance steps. I also learned some of the basics of staging and audience interaction during this time.

During this time, I found my favourite partner dance in the form of West Coast Swing. West Coast Swing is a derivation of the swing dance I started with in that first lesson I attended. However rather than dancing to the traditional jazz and big band swing

music, West Coast Swing is danced to blues and contemporary music including R&B and Hip Hop. This variety of music combined with the physical form of the dance felt the most connected to my expression as a dancer. I started taking lessons to learn West Coast Swing and for the first time travelled to dance events outside Victoria to acquire more experience and instruction from instructors from across the country and continent.

After a few years performing locally with the Salsa group I decided to push my physical dance abilities. I looked for the most challenging dance I could find and found an adult beginner Ballet class with openings. This class focussed on classical technique and basic figures. The class presented the figures and exercises at the pace of the abilities of the students.

Ballet has exceeded my expectations for not just pushing my physical and musical dancing abilities but as an artistic expression with which I can identify. As I have reduced my other dancing commitments to work on this research I have made sure to make time to continue practicing and learning Ballet.

Over the past ten years I have moved from beginner social dancer to beginner Ballet dancer. I plan to continue pushing my dancing to new expressions and experiences. I would like to return to performing and seek new instruction in all my dances in the future.

1.4 Structure of Thesis

Following this introduction Chapter 2 reviews prosodic structure and sonority in prosodic and sign languages, previous study of the structure of dance, and the prior application of linguistic theory to the study of dance. The research questions regarding whether the theories of sonority and prosodic structure can be applied to partner dance

are presented in Chapter 3. Chapter 3 also discusses the hypotheses and the methodology used to study the Foxtrot. Chapter 4 presents the data recording method and how to analyze the dance from this data to find linguistic properties of interest. Chapter 5 discusses how the findings fit into current linguistic theory and the prosodic structure of the dance. Chapter 6 presents a review of the findings and a discussion of limitations of the work. It then highlights possible future work.

Chapter 2: Key Concepts and Background

2.1 Introduction

This chapter discusses the motivation to study dance using theories from linguistics, and background on the linguistic and sign language theories on which the analysis and discussion are based. In addition, a survey of prior work on the structure of dance in general from linguistic and non-linguistic perspectives is presented.

Section 2.2 reviews the motivation to study the Foxtrot using prosodic theory. In section 2.3 some of the terms that I use in my analysis of the Foxtrot are defined. Following this in section 2.4 prosodic theory in spoken language is reviewed. Section 2.5 discusses the phonology of sign languages. Section 2.6 reviews the previous work on structure of dance from anthropology. Section 2.7 discusses the extension of the theory of sonority from sign language to dance.

2.2 Motivation

This study is motivated by the observation that partner dance and language are both structured communication systems capable of producing and understanding novel utterances. The initial exploration of communication between dancing partners by the researcher led to the analysis of different dance steps and the observation that some steps have greater prominence in the dance. That is, the step is more salient than the preceding or following steps and indicates something about the dance to the dancers. The prominence of each dance step contributes directly to the successful communication of the step. The hypothesis of this thesis is that prominence of a movement in a step is analogous to the sonority of a segment in language. Sonority, the salience of the sound (Brentari, 1998; Ohala & Kawasaki, 1995), is a key concept used to determine the prosodic structure of the syllable in languages (Selkirk, 1982; Blevins, 1995; Jantunen &

Takkinen, 2010). Sonority is used to determine the nucleus of syllable and how the segments are organized in relation to the syllable based on the sonority of the sound (Selkirk, 1982; Blevins, 1995). How the segments are ordered in the syllable is determined by the sonority sequencing principle, that determines the order that types of sounds can occur in a language (Blevins, 1995). The theory of sonority for dance is developed and used to propose a prosodic structure for dance.

The initial observations about the prominence of steps were made through the researcher's experience dancing and taking lessons in partner dances learning the structure of dance from a dancer's perspective. The observations about prominence led to a review in the literature of the structure in sequences of dance steps and how steps are communicated between the partners. This led to the idea of applying linguistics to the study of the structure of dance.

This extends previous work on dance as a language, such as the work by Williams (1976a, b). Rather than using the concepts of deep and surface structure as Williams (1976a, b), or the phrase structure rules of the figures as Myers (1980), this thesis examines the structure of articulation of partner dance using linguistic theories of sonority and prosody as the basis for the analysis. Sign language is used as a starting point as a language of physical movement for which Brentari (1998) has already developed a comprehensive theory of phonology including sonority and prosodic units.

The key linguistic concept used as the basis for the analysis is sonority or prominence of the sounds in speech or movements in sign language and dance. This is compared through the mediums of speech, sign language and dance. Sonority and the

sonority sequencing principle is used to examine syllable structure in dance as compared to other languages.

This thesis is another step towards extending linguistic analysis to dance and a better understanding of human communication systems. Building on previous work from dance and using linguistic theories to determine the structure of articulation between partners demonstrates that the Foxtrot and language may share a common structure for communication.

2.3 Definitions

In order to study dance using linguistic concepts it is necessary to establish definitions for the terms and movements used in the work. The definitions below are taken from the dance and linguistics literature and elaborated where necessary to fit the scope of this work.

Dance: Dance is a series of movements articulated within a system. In her 1975 dissertation Williams capture this concept with the following definition:

> Dancing is essentially the termination through actions of a certain kind of symbolic transformation of experience. Speaking is also a symbolic transformation of experience. The terminal symbols of speech are expressed in words, sentences and paragraphs. The terminal symbols of dances are expressed in gestures, poses and movement phrases. The terminal symbols of speech are often considered to be symbolic in quite different ways from the terminal symbols of any dance form, but both kinds of symbolic system, (movement and language) share the function of meaning, for that is what any symbolic system is about, and

> meaning has both logical and psychological aspects. (Williams, 1975 as cited in Williams, 2013, p. 3)

Dance Instance: Dance instance is a dance articulated to a particular piece of music. A dance instance can also be called a "instance of the dance".

Dance Step: See Step.

Figure: A figure is a combination or sequence of steps, or movements between poses, articulated in sequence to make a pattern to musical timing (Morton, 1966, p. 37).

Gesture: Gesture is a movement of a part of the body (Soanes, Stevenson, &Hawker, 2006; Brentari, 1998, p. 75).

Language: Language can be defined as the system underlying the human communication of a community (Matthews, 2007). This system is composed of a limited number of components that can be composed into near limitless number of larger units (Trask, 1999).

In this thesis, the community refers to those that dance the Foxtrot following the figures set out by the dance teachers (Myers, 1980, p. 252) and the system of communication is the Foxtrot steps articulated by a community of partner dancers. Like language, dance allows for a variation of combination of components to produce novel sequences from a set of figures for each dance (Morton, 1966, p. 126).

Lead: In partner dance, the term 'lead' is used with three different meanings. I will use the terms for each meaning as defined here.

> **Lead:** As a verb lead is the action of articulating the lead step when communicating the follow dancer.

Lead dancer: As a noun lead dancer is the role adopted by one of the partners in the dance. This partner is responsible for choosing the dance steps in the dance instance.

Lead step: As a noun lead step the gestures, poses, and movement phrases used by the lead dancer to communicate the next step to take to the follow dancer.

Partner Dance: Partner dance is the termination, through the actions of two connected dancers, of symbolic transformations of experience to gestures, poses and movement phrases known as steps. This definition of partner dance is derived from the definitions of dance from Williams that include gesture, pose and movement phrases (Williams, 1976). The steps are combined into figures. The order of the figures danced is most often not choreographed; rather they are led by one of the partners, the lead dancer, while the other partner, the follow dancer, follows the figure and articulates the complimentary steps (Morton, 1966, p. 33). The steps are articulated in time to a piece of music that sets the pace of the dance and influences the steps the lead chooses.

All partner dances, including the Foxtrot, have the same transformation of experience with the terminal symbols constrained by the requirement that they be articulated by both partners. In partner dance the terminal symbols are known as steps. Most steps in partner dance can be articulated by a solo dancer, but there are some steps such as aerials in swing dance where one dancer loses contact with the floor entirely for a period of time that require a dancer to bear a significant amount of the weight of the other dancer. Without the partner the dancer has to support her own weight and cannot complete the figure correctly.

Phonological system: A phonological system is the sound system of language including general and language specific structures and constraints (Matthews, 2007). This level of grammar has a direct link to the articulatory and perceptual systems (Selkirk, 1984). These systems include auditory/vocal systems for spoken language, visual/gestural systems for sign language (Brentari, 1998), and for partner dance I propose the dance frame/gestural systems.

Pose: A pose is a particular position assumed with purpose (interpreted from Soanes, Stevenson, & Hawker, 2006). A pose is assumed at the end of a gesture, or movement of the body.

Prosodic Structure: Prosodic structure is the canonical units of the syllable, prosodic feet, prosodic word and prosodic phrase of the phonological system and how these units interact (Brentari, 1998).

Prosody: Prosody can be defined as phonological properties that extend beyond the segment to the units of the syllable, prosodic foot and higher (Brentari, 1998).

Step: A step or dance step is the gesture to arrive at a pose.

Sonority: Sonority is the grammatical role played by perceptual salience in phonology (Brentari, 1998, p. 75). Sonority consists of two components, a perceptual and articulatory component. The perceptual component of sonority is the correspondence between the distance at which a sound can be perceived, the more sonorous the greater the distance (Brentari, 1998, p. 75). This perception is governed by the articulators used in the production of the segment. The more open the articulator, vocal and nasal tracts in spoken language, arm movement in sign languages, the more sonorous the segment (Brentari, 1998, p. 75). Sonority is organized into a scale ranking the salience of

segments relative to each other based on the articulators used in the production of the segment.

With these definitions the next sections will discuss the background research in linguistics, sign languages and sign language phonology. The section after that discusses the research into the structure of dances.

2.4 Sonority and Prosodic Structure in Spoken Language

The two linguistics concepts drawn on here are sonority and prosodic structure. The structure proposed for the Foxtrot is based on structure developed by Brentari for sign language phonology. Brentari based her structure of sign language on the structured defined for spoken languages.

Sonority as defined above is the perceptual salience of a sound in spoken language and has both articulatory and perceptual components (Brentari, 1998). The perceptual correlate of sonority is the distance at which a sound can be perceived (Brentari, 1998). The articulatory component is the openness of the vocal tract during the production of the sound (Parker, 2008).

In spoken language sonority of segments is organized according to the sonority sequencing constraint (Selkirk, 1982). This constraint is used to identify the nucleus of the syllable with sonority values of the segments rising to the nucleus in the onset and falling after the nucleus in the coda (Selkirk, 1982). This structure of the syllable is illustrated in Figure 1, from Selkirk (1982).

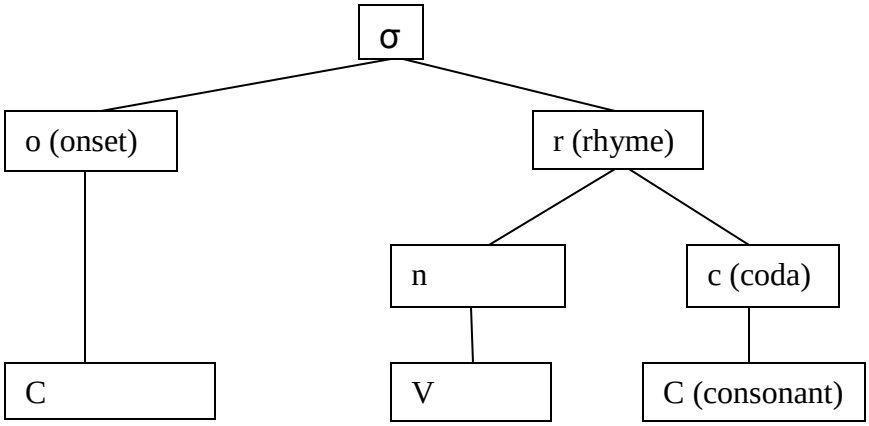

Figure 1 Hierarchical structure of the syllable (Selkirk, 1982, p. 341)

The syllable is a prosodic unit and is contained in the prosodic structure of the language (i.e. the prosodic units in the language). The syllable is then contained within a prosodic foot (a unit of two or three syllables one of which is marked) which in turn is contained within a prosodic word (a word like unit used to define the main stress of utterance) (Selkirk, 1984). The analysis of the Foxtrot is not extended to the prosodic word in this thesis. The prosodic word is presented here only to provide context for the syllable and foot in the prosodic hierarchy. Figure 2, from Selkirk (1984, p. 15), shows the prosodic hierarchy from syllables to prosodic words with the word tempest. The syllable "tem" is a strong syllable and has stress while "pest" is the weak syllable.

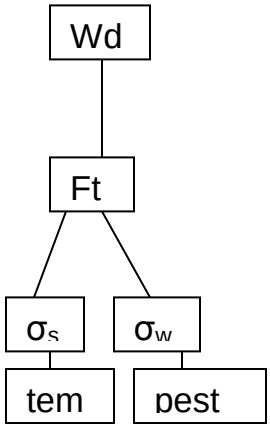

Figure 2 Prosodic Structure with prosodic word, foot and strong and weak syllable

The syllable is a phonological unit that plays a crucial role in the mapping from the surface syntactic representation to the underlying phonological representation (Selkirk, 1984). Phonologically the syllable is important for phonological derivation in determining where some rules are applied (Selkirk, 1984). The syllable serves as a domain for the phonological rules, determining what segments of an utterance the rule can be applied to (Selkirk, 1984).

Above the syllable is the prosodic unit of the prosodic foot that provides distinction between stressed (strong) and unstressed (weak) syllables (Selkirk, 1984). The foot is the domain of phonological rules that determine where the stressed and unstressed syllables fall in the utterance (Selkirk, 1984).

The prosodic word is a phonological unit that defines a unit like the word in phonology (Selkirk, 1984). The phonological word can be used to determine the main stress (Selkirk, 1984). The word is also the domain of phonological rules that define changes to the word initial, word internal and word final positions (Selkirk, 1984).

The syllable and foot are the prosodic units in spoken language that will be investigated in the Foxtrot in this thesis. Brentari develops a prosodic theory for sign language. This thesis uses the Brentari's Prosodic Model as the base for a model of prosodic theory for dance.

2.5 Sign Language

Sign language is of interest to both linguists and anthropologists who study dance. Both disciplines study the structure of sign languages from the perspective of systems that give rise to languages. Sign language is another language to investigate in the modality of physical gesture. For anthropologists studying dances provides a movement system with significant structure (Williams, 2004).

Sign language is a full language with the complexity and properties of spoken languages (Brentari, 1998; Williams, 2004). Through examination of the structure of human movement from isolated gestures to complex systems anthropologists investigate the place sign languages occupy in communities and social systems (Williams, 2004). Linguists have conducted significant research into sign language using different linguistic theories and applied these theories to all levels of analysis from syntax to phonetics (Brentari, 2010). Of interest here is the phonology or structure of the articulation of the sign language.

2.5.1 Sign Language Phonology: the Prosodic Model

Linguists have developed theories in phonology to account for the structure of articulation in sign language, such as the Hold-Movement Model developed by Liddell and Johnson (1983), which divides signs into units of holds and movement, and the Hand Tier model developed by Sandler (1986), which organizes the signs into two feature

trees: the hand configuration tree and the location feature tree (Brentari, 1998). I will be using the Prosodic Model of sign language phonology as proposed by Diane Brentari as the framework for my analysis. Brentari developed the Prosodic Model as a unified model of sign language phonology (Brentari, 1998, p. 1). The Prosodic Model is built on prior models of sign language phonology. This model is based on dividing aspects of sign into inherent and prosodic features. Inherent features are those such as which fingers are used in the sign (Brentari, 1998). The prosodic features are defined as the dynamic properties of the sign such as how the hand moves when making the sign (Brentari, 1998). This divide allows for the definition of concepts of sonority, timing and prosodic hierarchy in relation to articulation of signs to create a comprehensive theory of phonology for sign languages.

The Prosodic Model of sign language phonology provides a full model of phonology in sign language. The model defines a feature geometry, a set of properties that define how sounds or signs in language can be composed. Features can be binary, either selected in the sound or sign or not selected. In the Prosodic Model signs are composed of prosodic and inherent features of signs, and proposes subsyllabic units, sonority, timing and syllables.

Brentari divides signs into two feature classes: inherent and prosodic. These classes are the two branches of a common root node in the feature geometry of the sign (Brentari, 1998 p. 94). Inherent features are properties of the sign that are specified once per lexeme, the abstract representation of a word, and do not change during production, such as the fingers that are used to make the sign that do not change, the selected fingers (Brentari, 1998, p. 22). Prosodic features are properties of the sign that can change or are

realized as dynamic properties of making the sign, such as finger aperture, the opening created between the fingers and hand (Brentari, 1998, p. 22).

The features of the sign are attached to the feature tree defined by the inherent and prosodic branches. The lexeme or sign is the root of the tree and has two branches, inherent features and prosodic features. The sign is represented in Figure 3 by the aspects of its articulation, as features, organized into a hierarchy. At the top is the root which represents the lexeme of the sign. Below this node are the two feature divisions in the Prosodic Model, the prosodic and inherent features. Each of these nodes dominates the features in the respective classes. Some of these nodes in turn dominate other features.

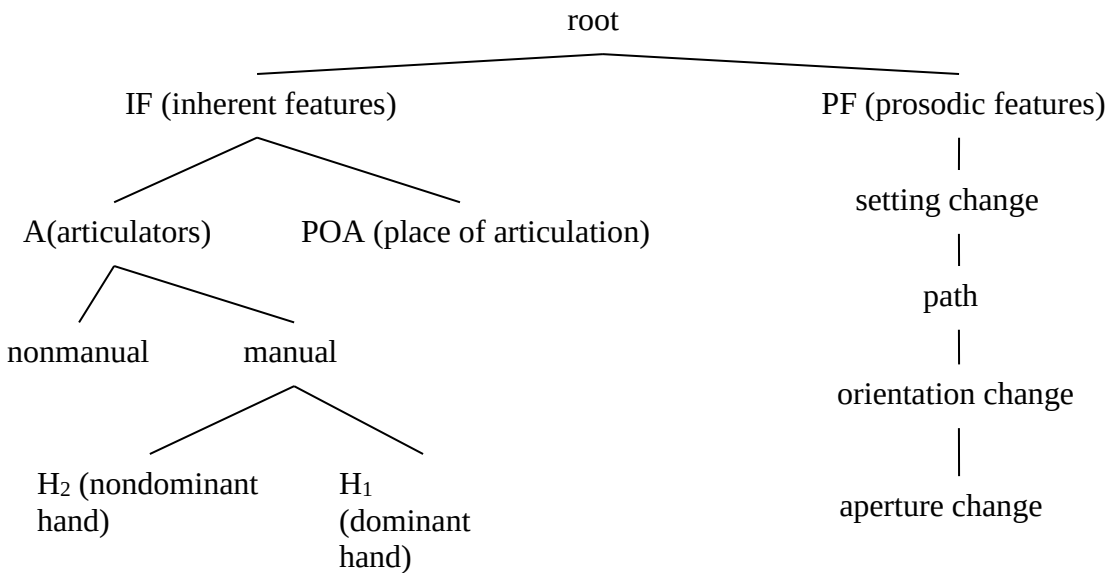

Figure 3 Proposed Feature Tree for ASL (Brentari, 1998, p. 94)

The inherent feature branch of the feature geometry in the Prosodic Model contains the articulator and place of articulation nodes (Brentari, 1998, p. 94). The place

of articulation specifies the plane in relation to the body where the sign is articulated. The place of articulation can be specified in relation to the plane on which it is located, the frontal, horizontal and midsagittal planes (Brentari, 1998, p. 120). The articulator node branches into manual and non-manual nodes. The manual node consists of the hands, arms and fingers. The non-manual articulators are articulators like the eyes and mouth that may be used to articulate some signs.

Prosodic features are placed on their own branch separate from the inherent features in the Prosodic Model. Prosodic features comprise all movement in the sign. Prosodic features are those that may change during the production of the lexeme realized sequentially through time (Brentari, 1998, p. 129). Prosodic features are realized by a default set of joints specified by the lexeme. The finger joints execute the handshape changes, the wrist executes the orientation change, the elbow provides the path feature, movements of the hand in the space in front of the signer and the shoulder creates the setting change required to articulate the sign (Brentari, 1998, p. 133).

Brentari uses the features to define the segments and syllables in sign language (1998). She starts by defining the timing units in sign language. Brentari calls the timing units x-slots and they correspond to the terminal nodes of the prosodic feature branch (Brentari, 1998, p. 179). Path features generate two x-slots and all other prosodic features generate one x-slot (Brentari, 1998, p. 183). The number of x-slots in the sign will be equal to the prosodic feature that generates the highest number of x-slots (Brentari, 1998, p. 183). The maximum number of x-slots for a sign in the Prosodic Model is two if the sign has a path feature.

The equivalent unit to a segment in the Prosodic Model is called a weight unit. The segment was used in other models of sign language phonology such as the Hand Tier model (Brentari, 1998). However, depending on how segments are defined by the Hand Tier model some movements of the sign are missed when analyzing the sign (Brentari, 1998). To solve this issue of missing movements in the Prosodic Model Brentari proposes to use a measure of the number of branches in the prosodic features (1998). This unit of measurement is called a weight unit and is a measure of complexity in the Prosodic Model (Brentari, 1998). Every branching or non terminating prosodic feature in the sign generates a weight unit (Brentari, 1998, p. 241). As prosodic features refer to movement in a sign, the weight units correspond to different types of movement. The more weight units in the sign the more complex the movement in the sign (Brentari, 1998).

Brentari uses the concept of the weight unit to define the next unit in the prosodic hierarchy in sign language, the syllable. The formal definition of the syllable provided by Brentari for the Prosodic Model of sign language phonology is: "a syllable must contain at least one weight unit" (Brentari, 1998, p. 205). As the weight units are generated by prosodic features and prosodic features are the movement in the sign this leads to definition of the number of syllables in a string is the number of sequential phonological movements in the string (Brentari, 1998, p. 205). The functional result of the requirement is that each syllable must contains some sort of movement. The limit on the length of signs is the limit of sequential movements (Brentari, 1998, p. 205).

The weight unit is used to differentiate between signs. Most signs have one weight unit and fewer have two or more weight units (Brentari, 1998, p. 245). Brentari (1998) only analyzes signs with one or two weight units but Jantunen and Takkinen

(2010) discuss signs in Finnish Sign Languages that have been analyzed using the Prosodic Model with three and four weight units. This indicates that the limit of two weight units is a property of American Sign Language, not a limitation of the model.

This thesis uses the Prosodic Model as the framework for the linguistic analysis of dance. This model was chosen because it has the most abstract representation of the features, sonority and syllable that can be most directly adapted for the Foxtrot. The other models surveyed depended more directly on articulators of sign language such as the hand and the position of the hand and fingers.

The analysis starts by defining the concept of sonority in dance. Sonority is an important property in language for determining the structure of the syllable by identifying the nucleus (Brentari, 1998, p. 227). The next section will describe sonority in the Prosodic Model in detail and set up my initial analysis of sonority in dance.

2.5.2 Sign Language Phonology: Sonority

My analysis of dance steps is based on sonority, prosodic features and prosodic units as developed in the Prosodic Model for sign language. Brentari provides an articulatory definition for sonority in sign languages. This is an important aspect of sonority and allows for the model to be adapted to dance as both sign language and dance are articulated using the body, primarily the limbs but also the torso, face and head (Jantunen and Takkinen, 2010). Sign language uses a subset of the articulators used in dance. Dance uses the legs and hips in addition to the arms, torso and head used by sign language.

Sonority is defined by Brentari for spoken languages as:

> Spoken Language Sonority: The degree of sonority is correlated with the relative openness of the oral cavity of the vocal tract; the more open the vocal tract is the greater the degree of sonority (Brentari, 1998, p. 217).

For this study I will base the definition of sonority in dance on the definition of sonority provided by Brentari for sign language. This definition is used because it incorporates direct reference to physical gestures in sonority:

> Sign Language Sonority: The degree of sonority is correlated with the proximity to the body of the joint articulating the sign gesture to the body; the more proximal the joint articulating the movement is to the midline of the body, the greater the degree of sonority (Brentari, 1998, p. 217).

This definition was chosen as the basis for the definition of sonority in the Foxtrot because it makes explicit reference to physical articulation in the same space that dance is articulated using some of the same articulators. The definition also provides an articulatory correlate that is similar in perceptual output, larger magnitude gestures, that mirrors the perceptual output of high sonority articulators in the Foxtrot.

According to Brentari, sonority has two components: a perceptual component and an articulatory component. The perceptual component of sonority is the salience of the segment or sign. In sign languages this salience can be linked to the visibility of the movement in the sign based on the articulating joint, with signs articulated by joints closer to the body (referred to by Brentari as proximal joints) having greater sonority than

those signs with movement articulated by joints further from the body (distal joints) (Brentari, 1998). Brentari supports this by making the connection between sonority and perception, the more sonorous the segment the greater the distance at which the segment can be perceived (1998). Gestures articulated with proximal joints, shoulder and elbow can be perceived at a greater distance then those articulated with the distal joints, wrist and finger joints (Brentari, 1998).

As an example of sonority Brentari compares the signs for DAY and PERPLEXED. The sign DAY is composed of more sonorous gestures and PERPLEXED is composed of less sonorous gestures. DAY is articulated by placing the arm of the nondominant hand across the body and the dominant arm perpendicular to the nondominant arm. Both hands have the index finger pointed and nonindex fingers forming a circle. The dominant hand is moved in an arc so that it is lying on top of the nondominant arm. This movement creates a very visible sign that can be easily perceived due to the large movement.

In contrast, PERPLEXED is formed by holding the dominant hand to the forehead with the index finger extended and remaining fingers folded across the palms. The index finger is then bent from the middle joint to form a hook shape. This movement is much smaller and more closed therefore not as easily perceived.

This argument has been criticized by Sandler and Lillo-Martin for conflating sonority with loudness (2006). That is, amplitude of the movement of the sign is the same as the sonority. Jantunen and Takkinen (2010) acknowledge this criticism by Sandler and Lillo-Martin (2006) and address it by arguing that sonority is based on the size of the articulator, not the size of movement. To address this they modify Brentari's sonority

scale that includes the head and upper body and mouth in their study of Finnish Sign Language. Jantunen and Takkinen (2010, p. 316) conclude that more study needs to be done on sonority and loudness in sign language. The sonority scale based on articulator joint as proposed by Brentari is as follows with sonority decreasing from left to right:

shoulder > elbow> wrist > base [finger] joints > nonbase [finger] joints

This hierarchy was extended by Jantunen and Takkinen (2010) in their analysis of Finnish Sign Language to include upper body and head and the mouth thus enabling description of the sonority of nonmanual signs. The sonority scale they propose, including Brentari's original scale, is as follows:

upper body & head > shoulder > wrist > base joints > nonbase joints > mouth

Sign languages have sonority and sonority hierarchy based on articulators similar to spoken languages. The sonority hierarchy is used in syllable formation in sign language to identify a nucleus element of the sign as in spoken syllables. The next section describes syllables in sign language and the role of sonority in well-formed signs.

2.5.3 Sign Language Phonology: Syllables

Brentari defines the syllable as consisting of one sequential movement (Brentari, 1998, p. 225). According to her well-formedness condition, a prosodic word in sign language must consist of at least one syllable and by extension at least one movement.

Signs that do not contain movement in the underlying form, for example THINK, have epenthetic movement inserted into the sign to be grammatical and meet the well-formedness condition (Brentari, 1998, p. 75). The lack of movement in the underlying form can be seen when the sign is part of a compound sign like THINK^SELF. In

THINK^SELF the sign THINK is static with the index finger pointing to the side of the signer's head, compared to the individual sign THINK where the hand moves toward the signer's head (Brentari, 1998, p. 229). Without this epenthetic movement, the sign would not surface in the output. This movement epenthesis is equivalent to vowel epenthesis in spoken languages like Iraqi Arabic where vowels are inserted into consonant clusters to make them grammatical. A higher sonority element is inserted into a sequence to make the sequence grammatical and so the sequence surfaces in the language (Brentari, 1998).

In the Prosodic Model key concepts in linguistics are defined for sign language of the prosodic units of the syllable and the prosodic words. The syllable is defined as a single sequential movement in the sign. Most signs are monosyllabic such as the sign THROW that consists of a single movement of the fore arm. Disyllabic signs consist of two sequential movements such as the sign for PROJECT where the dominant hand passes up towards the signer's head behind the secondary hand then back down in front of the hand (Brentari, 1998). Prosodic words are comprised of one or two syllables corresponding to two movements in the Prosodic Model. The limitation of prosodic words to two syllables is called the *prosodic well-formedness condition on movement* (Brentari, 1998, p. 225).

In this thesis it is shown that dance steps are analogous to syllables in sign language and have similar prosodic structure as language structure with segments, syllables and prosodic feet. To connect the Foxtrot and sign language, the prior work on the study of dance using linguistic theories must be reviewed. The next section presents a review of the relevant prior work.

2.6 Linguistic Analysis of Dance

The first use of a linguistic analogy for the structure of dance was done as part of the field of study known as folkloristics, conducted by researchers in the 1950s (Martin & Pesovár, 1961; Williams, 2004; Myers, 1980; Kürti, 1980). Dance folkloristics studied folk dances from different regions of the world and provided a unified structure for dances from around the world (Williams, 2004).

Some used structuralist theories from linguistics following Saussure (Martin & Pesovár, 1961; Williams, 1975). Other researchers created classification schemes that focused on the movements present in the dance based on theories from anthropology (Birdwhistell, 1970 as cited in Williams, 2004; Lomax, 1968 as cited in Williams, 2004).

The linguistic analogy of morphemes and words used by folkloristics was based on the Prague School of Linguistics and attempted to describe dance in terms of the morphology of steps that link to the structure of the music. The framework developed is called motif morphology after the proposed smallest unit of meaning in dance, the motif (Kürti, 1980). The concept of motif in dance is based on the proposed units in structuralist theories in linguistics and anthropology, which analyzed topics in terms of signs and the signified concepts for each sign, with the focus on finding elements and defining how they fit into an overall structure (Williams, 2004, p. 186).

In motif morphology the motif is the smallest unit of meaning in the domain being analyzed. The motifs are units that carry the essential characteristics of the dance (Kürti, 1980). Motifs are composed of basic movements that do not have meaning called kinetic elements. They can be a movement to the hand or a specific step or foot position. Kinetic elements are not specific to any dance, but a simple gesture (Kürti, 1980, p. 50). A kinetic element may be a shift of weight from the right foot to the left. Kinetic elements are

combined into cells. Cells are combinations of the kinetic elements that form a basic pattern in the dance but are not specific to a dance. A cell would be the shift of weight, followed by a step with the right foot and a shifting of weight back from the left to the right foot. Motifs are combination of cells that are identifiable as components of a particular dance.

Motif morphology considers dances as combinations of different units tied to the rhythmic structure of the song to which the dance is executed. Motifs are in turn combined to form the phrases of the dance. Phrases are structured around the motifs and are categorized by the pattern of motifs used in the phrase. Kürti briefly describes higher order structures in the dance: dance, part and section (1980). The section is composed of phrases and in turn composes the parts which in turn compose the dance.

This use of linguistic theories by motif morphology to study dance influenced later researchers such as Williams and Myers to apply theories from linguistics to dance (Williams, 1975; Myers, 1981), who incorporated later linguistic theories such as transformations and phrase structure rules from syntactic theory into their analysis. Transformations are used by Williams (1976 a, b) to explain how the underlying movements are manifest in the surface form of dance. Myers (1980) takes the concept of phrase structure rules and develops them for the Foxtrot.

Using language as an analogy for dance Williams incorporated some of the linguistic developments in the 1950s and 1960s into her work. Williams (1975) wrote her dissertation *The Role of Movement in Selected Symbolic Systems* in which she proposes a framework she called semasiology to study the structure of dance. She draws on the concepts of differentiating domains of underlying structure versus articulation, rules and

transformation from linguistics from Chomsky's (1957) work on linguistics. Williams also incorporates the dancers' perspective and the place of the dance in the community with the goal that the framework can be applied to describe the structure of any human movement.

Williams (1976a, b) was chosen as the connection to previous research into dance as a language because her work is derived from generative grammar as proposed by Chomsky. This is the most direct link to modern phonology and linguistic theories. The other theories such as motif morphology used older linguistic theories that do not provide the link needed to phonology and prosodic structure used in this thesis.

The theories of Williams were combined with Brentari's (1998) work to bring in the perspective of phonology. Brentari (1998) uses optimality theory as well as referencing generative grammar in her work. This provided another theoretical approach that helped put this analysis in perspective. Had there been issues with using Williams work as a base the analysis from the sign language side may have shown some of those issues.

Myers (1980) directly applies the theory of phrase structure rules developed by Noam Chomsky (1957) to describe the Foxtrot. His analysis is based on foot position and musical count as the basic elements in the dance. These are combined to create set steps in the dance. The steps are combined into a phrase which is the highest root unit of analysis as described by Myers (1980). Phrases are sequenced together to form a complete dance.

In Foxtrot the lead chooses the steps from the set, and the follow executes these steps. The lead uses his knowledge of the music, steps and position of other couples on

the floor to determine what steps to take as the couple moves around the floor (Morton, 1966). Myers proposed that the steps in the Foxtrot can be broken down into the components of direction, beat and movement. These form the terminal nodes of the tree. The nodes combine to form steps, which in turn combine to form phrases. Each phrase follows a musical phrase and consists of 32 beats or 8 measures of music in Myers' analysis (1980, p. 252).

Musical beats are stable mental periodicities that establish the timing in music (Patel, 2008). In Western European musical beats are grouped together into measures with the number of beats in each measure determined by the style of music (Patel, 2008). The measures are identified by accents to the first beat of each measure (Patel, 2008, p. 103). Beats can be subdivided into shorter beats determined by the style of the music (Patel, 2008). In the music for the Foxtrot measures consist of 4 beats (Myers, 1980). Dancers time their steps by the beats in the music stepping on time of one of the divisions of the beat, such as on the beat, or the half beat (Myers, 1980).

After reviewing these initial observations and the significant gaps in the research on communication and the articulatory structure of dance were found. All the references found were to the structure of the dance steps in isolation, not between partners. The investigation and analysis here focuses on the structures present in partner dance as part of the communication between the lead and follow dancers. The Foxtrot was chosen as the partner dance as there is prior work by Myers (1980) on this dance and the researcher has a personal knowledge of and interest in the Foxtrot.

Chapter 3: Research Question and Methodology

This chapter presents the research questions and associated hypothesises. Finally, the research methodology used is described.

3.1 Research Questions

The aim of this thesis is to further investigate the structure of the articulation of dance. Specifically it addresses two areas of phonology as they relate to dance: sonority and prosodic units. This project will address two research questions:

1. Can sonority be defined for dance and used in the analysis of the Foxtrot steps?
2. Can the Foxtrot steps be organized into prosodic units?

Question one arises from dance experience in which specific dance steps have greater prominence relative to the other dance steps. This prominence is in terms of both articulation and perception of the step. Can sonority be studied systematically and fit into an organizational theory of how dance steps are articulated?

The second question arises following the first question, if there is sonority it follows that syllables and other prosodic units may exist. As well there is the question of how the standard figures defined in books on ballroom dance instruction fit into the prosodic structure. Myers (1980) developed a set of phrase structure rules to define two standard figures in the Foxtrot, the Magic Step and the Box Step, with each step dominated by higher level structures of the dance. This included the overarching musical structure of the song for the dance. Can the steps in the dance be organized at the level of articulation relative to each other independent of the phrasal structures described by Myers?

There are two hypotheses to match the research questions above that will be tested in this thesis. The first hypothesis is that there is a property of movement in Foxtrot

of prominence that is analogous to the sonority of a segment in language. The second hypothesis is that this property can be used to define prosodic units in the Foxtrot.

For this study I will base the definition of sonority in dance on the definition of sonority provided by Brentari for sign language. I propose the following hypothesis of an articulatory definition of sonority in dance that will be tested in this study:

> Dance: The degree of sonority is correlated with the proximity to the body of the joint articulating the lead step to the body; the more proximal the joint articulating the movement is to the core or centre point of balance of the body, the greater the degree of sonority.

3.3 Methodology and Outline

The thesis defines sonority and two phonological units in dance. The first phonological unit defined is the step as equivalent to the syllable and the second is the prosodic foot. This requires laying out the articulatory and perceptual properties of sonority in dance. This will form the basis for a phonological analysis of the steps in the dance.

Chapter 4, Analytic Framework, analyzes the basic figures as taught in introductory ballroom dance classes and in books on partner dancing. These figures form the primary units in the Foxtrot that are taught in introductory classes to partner dancing (Morton, 1966). The Foxtrot figures are analogous to signs and this thesis proposes that there are prosodic features and domains analogous to those in language. The figures are taught as units that exemplify the dance (Morton, 1966). The figures are composed of smaller units of steps and can be combined and modified in time to the music as dancers become more familiar with the dance (Morton, 1966).

The evidence of prosodic units in the Foxtrot is obtained by breaking down the figures into the individual movements and evaluating the sonority of the movements using the proposed sonority scale. The patterns in the sonority are analyzed to determine sonority peaks and how those line up to steps and figures in the Foxtrot.

The following chapter will develop the data collection method for analyzing the figures in the Foxtrot. The analysis will focus on the steps and the sonority of the articulators used in the steps. This will allow for the analysis the structure of the figures and constituent steps.

Chapter 4: Analytic Framework

This Chapter describes the method used to analyze the Foxtrot into constituent parts. The figures are organized according to the articulators used in the figure. These articulators are assigned sonority values and the resulting sonority profiles are analyzed to determine the prosodic units of which the figures are composed.

The first subsection will review my hypothesis and background relevant to the analytic framework. Following this the framework is described in detail. The final section describes the sonority profiles of the steps analyzed.

Two volumes on dance instruction are referenced, Wright (2003) and Morton (1966), to provide details of the dance figures. These references are used to describe the dance figures, music timing of the figures and the details on how to move in the Foxtrot. Wright (2003) provides detailed instructions on how to move your body and communicate between the dance partners. Morton (1966) describes the Foxtrot steps and details on the musical timing.

4.1 Sonority in Dance

Partner dances like the Foxtrot provide a good opportunity to study figures in dance using linguistic theories because they contain an explicit communication between the dancers through the connection between dancers. Prior work by Myers investigated the structure of the figures as a collection of steps to a particular timing (1980). However, steps are articulated by the partners and communicated between them within the dance, and they use the arms, hips and torso in addition to the foot patterns investigated by Myers. The communication between dancers allows me to study both the articulatory and perceptual aspects of sonority entirely within the dance in my investigation as both partners are able to perceive the properties and structure in the dance. In non-partner

dances the perceptual aspects such as sonority may be directed entirely to an observer, who may not pick up on these structural aspects.

The definition of sonority for the Foxtrot refers to the core of the body. The core is the centre point of balance of the body and is located just above the hips in the abdomen (Wright, 2003). The centre point of balance is referred to as the core as that is the term the research is most familiar with from dance. Both terms refer to the same point that communicates the movements between the dancers in partner dance.

With her definition of sonority in sign language, Brentari (1998) proposes a sonority scale for sign language based on the scale described for spoken language by Kenstowicz (1994). Brentari proposes the sign language sonority parallels to the sonority scale in spoken language as indicated in this table. The higher the sonority value provided, the higher the sonority of the feature.

For single sign movement			For speech (Kenstowicz, 1994)	
Features	Joints	Sonority value	Features	Sonority value
Setting	Shoulder	6	Vowels	5
Path	Elbow	5	Glides	4
Orientation	Wrist	4	Liquids	3
Aperture	Metacarpal	3	Nasals	2
	Interphalangeal	2	Obstruents	1

Table 1 Sonority scale for sign and for speech (Brentari 1998, p. 218)

Below Table 1 is extended in Table 2 to include the proposed the sonority hierarchy for partner dance relating it to the existing hierarchies for sign and speech:

For dance steps		For single sign movement (Brentari 1998)			For speech (Kenstowicz, 1994)	
Joints	Sonority value	Features	Joints	Sonority value	Class	Sonority value
Hips	5	Setting	Shoulder	6	Vowels	5
Knees	4	Path	Elbow	5	Glides	4
Shoulders	3	Orientation	Wrist	4	Liquids	3
Elbows	2	Aperture	Metacarpal	3	Nasals	2
wrists	1		Interphalangeal	2	Obstruents	1

Table 2 Sonority Scale for dance, sign and speech

This is the proposal for sonority and the sonority scale that will be used in this study.

4.3 Figure Annotation

A grid is used to illustrate the sonority of the articulation of the figures in the Foxtrot. This grid breaks the figures down into the articulators used in the figure and the beats over which the figure is articulated. There is one grid for each dancer, one for the lead dancer and a second for the follow dancer. The grids allow for the building of sonority profiles of the figure and subsequent identification of the prosodic units of the dance.

The articulators are listed as rows in the grid. The articulators are ordered with the most sonorous articulator at the top and the least sonorous at the bottom. This order was

chosen to highlight sonority peaks and easily create a sonority profile of the figure. The sonority profiles are used to identify the prosodic units of the Foxtrot.

The articulators can be grouped into classes based on sonority value and region of the body. There are five sonority classes in descending order of sonority: trunk joints, proximal joints, distal joints, the head and the feet. These classes are a parallel to the sonority classes defined by Brentari in descending order of sonority: setting by shoulder, path by elbow, orientation wrist, aperture, metacarpal and interphalangeal joints (1998, p. 218). The sonority is determined by the distance to the center line of the body for sign language or the core in dance. The further away from that a joint is from the center line of the body, or the core, the lower the sonority.

The articulators are grouped into sonority classes based on how the articulator affects the movement of the core of the dancer. The groups are based on how directly the articulator can move the core of the dancers in the Foxtrot. In the grids, a sonority class is identified by the coloured boxes that span the rows of all the articulators in that class. The classes are used to describe the sonority profiles to reduce the number of rows and make the profiles more clear.

The articulators grouped in the trunk sonority class directly affect the movement of the dancers' cores (Wright, 2003). These movements from the articulators in the trunk have the highest sonority as they can move the core which produces the continuous movement as described above. This is a parallel to correlates of articulates to sonority in spoken and sign language. In sign language the highest sonority movements in sign are the open movements in sign language generated by the shoulder joint (Brentari, 1998). In

spoken language, the more open the vocal tract, the higher the sonority of the sound produced (Brentari, 1998, p. 217).

The articulators in the proximal joints sonority class are the legs, as they are closest to the core. As knees and ankles are directly below the core, they have the next most direct effect on movement of the core as they move the core in space. They are lower in sonority as the movement generated by those articulators is more limited than the movement of the hips (Williams, 1976b).

The distal joints sonority class consists of the articulators in the arm. These joints are further from the core. Distal joints can move the core but are more limited in their ability to move the core of the dancer than are the proximal joints or the trunk.

The head and feet sonority classes have the lowest sonority as they have the most restricted movement and limited effect on the core of all articulators.

Table 1 lists all the joints used in the Foxtrot by descending sonority of movements generated by each joint. The left column is the sonority classes in the Foxtrot and each joint on the right is lined up with the sonority class to which it belongs. All joints are listed in order of descending sonority to accurately annotate the dance figures. For example, to capture the sonority of a step forward in the Foxtrot you need to be able to mark the movement of the core, hip, knee, heal and ankle.

Sonority Class	Articulator
trunk	Core (Lower Back)
	L Hip
	R Hip
	Upper Back
	L shoulder
	R shoulder
Proximal Joints	L Knee
	R Knee
	L Ankle
	R Ankle
Distal Joints	L elbow
	R elbow
	L wrist
	R wrist
	L Hand
	R Hand
Head	neck/head
	eyes
Feet	L heel
	R heel
	L toes
	R toes

Table 1 Sonority of Articulators

Dance figures are articulated to the beat of the music with the articulators used in the figure moving on a specific beat of music. The beat is the consistent tempo that keeps all the musicians together when playing a piece of music (Wright, 2003, p. 12). The beat

is usually indicated by instruments such as the bass or bass drum (Wright, 2003, p. 12). The beats are grouped into larger musical structures called measures, with each measure having the same number of beats (Wright, 2003). The measures are defined by the number of beats in the measure and duration of the beat (Wright, 2003). Measures are described as a fraction called a time signature with the number of beats per measure on top and the duration of the beat on the bottom (Wright, 2003). For example, a time signature of 2/4 indicates that there are two quarter notes per measure and each note is 1/4 of a whole note and gets one beat (Wright, 2003).

Social dance is most commonly danced to music in 4/4, 2/4, or 3/4 time (Wright 2003). The time signatures for the music indicate the number of beats in each measure of the music. The first number is the number of beats in the measure and the second is the note that indicates a beat. For 4/4 time there are four beats per measure and the quarter note indicates the beat. Foxtrot is danced to music in 4/4 time (Morton, 1966, p. 126). In dance, each step is associated with a specific beat in the measure (Wright, 2003). The number of beats in a dance figure does not always match the number of beats in a measure of music. For example, the Magic Step is 6 beats which takes one and a half measures of music in the 4/4 time of the music.

Dance figures have beats based on the musical beats with each step corresponding to a fraction of a beat, whole beat, or multiple beats of the music (Wright, 2003). Some dance figures take multiple musical measures to complete as the figures take more beats than are in one musical measure, or the duration of the steps takes more than one musical beat (Morton, 1966). As dance figures are counted on the beats but potentially have more beats than musical measures, the tables list both the music beats that count the beats in

the measures of the music and the figure beat that counts the steps in the dance figure. The figure beat is always on the musical beat or fraction of the music beat with each step of the figure having one at least one beat.

Table 2 is the grid used to describe the articulators used in the steps and figures of the Foxtrot based on the metrical grid theory of Prince (1983) and Selkirk (1984) for language. Each column in the table represents a beat in the music. The top four rows of Table 2 contain the beat number of the Music Beat and Figure Beat for each column. The music beats on the second row are the beats counted in the measures in the music. The figure beats on the fourth row are the beats counted in the figure. In the example in Table 2 the first four beats of the music and figure are the same but beat five of the figure is beat one of the second measure of the music. Between the numbered beats the half beats are included indicated by +. This is used to show when movement of the articulators start before the beat or continue after the beat.

To illustrate when the articulator is used in the steps of the figures all the articulators are listed on the left side of the grid of Table 2. Each articulator intersects the beat columns. If the articulator is used in the step on that count a character indicating the direction (one of F, B, L, R) is put in the cell of the articulator, indexed by the row, and beat, indexed by the column.

	Lead Active Joint																			
		Music Beat 4/4 Time																		
						1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+
		Figure Beat																		
Sonority Class	**Joint**	5	+	6	+	1	+	2	+	3	+	4	+	5	+	6	+	1	+	2	+
trunk	Core (Lower Back)																			
	L Hip																			
	R Hip																			
	Upper Back																			
	L shoulder																			
	R shoulder																			
Proximal Joints	L Knee																			
	R Knee																			
	L Ankle																			
	R Ankle																			
Distal Joints	L elbow																			
	R elbow																			
	L wrist																			
	R wrist																			
	L Hand																			
	R Hand																			
Head	neck/head																			
	eyes																			
Feet	L heel																			
	R heel																			
	L toes																			
	R toes																			

Table 2 Figure Articulation Grid with Musical and Figure Beats in the Columns

Steps can move in one of four directions relative to the frontal plane of the body: forward, left, right and backwards. This is a subset of the degrees of movement for a dancer's body proposed by Williams (1967, p. 163) that is used in the Foxtrot (Wright,

2003, p. 53). The directions are indicated in the grid with F for forward, B for backward, L for left and R right.

The figures are composed of a sequence of steps ordered by the beats (Morton, 1966, p. 128). Between the steps and figures there are prosodic feet which are combinations of one, two or three steps within the figure. The first step in a particular direction will have more prominence due to a change in the direction than steps that continue in the same direction (Wright, 2003). This added prominence of the step is a heavy step and forms the head of the prosodic foot. This step is often on the first or third beats, corresponding to the on beats, of the music (Morton, 1966, p. 128). A heavy step is the first step by one of the dancer's feet in a different direction from the previous steps. This includes the first step after the dancer has come to a complete stop; any movement after a stop is a different direction from the stopped position (Wright, 2003, p. 7). For example, the first forward step in the Magic Step will be the first step in the forward direction in the figure making this the heavy step and head of that prosodic foot. The first step to the left in the figure is a change in direction and another heavy step and the head of all the following the steps that move to the left. Heavy steps are marked in the data grid by bold font in the column corresponding to the step in the grid.

The steps are articulated using the articulators listed in the grids. Each articulator used in the step is marked with a F (forward), B (backward), L (left), R (right) in the cell in the articulator’s row in the column on the beat which that articulator starts moving. The F, B, L, R indicate which direction the articulator is moving on that beat. The beats over which the step happens are grouped by the same background colour and pattern. Each articulator with the same background colour is part of the same step.

This notation was developed to transcribe how the articulators produce the movements in dance. The purpose is to identify the articulators used in the steps and figures and allow for the identification of patterns in the step. The notation allows for sonority in dance to be represented in grids as is done with sonority in language to find patterns.

This is different from Labanotation and the step diagrams that are presented in dance instruction books such as Wright (2003). The differences are a result of trying to highlight the articulators and sonority relationship between them. The purpose is not to document dance with exact detail as in Labanotation or provide a reference for learning dance as in dance instruction books.

	Lead Active Joint																			
		Music Beat 4/4 Time																		
						1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+
		Figure Beat																		
Sonority Class	**Joint**	5	+	6	+	1	+	2	+	3	+	4	+	5	+	6	+	1	+	2	+
trunk	Core (Lower Back)				**F**				F				**L**		L						
	L Hip				**F**								**L**								
	R Hip								F						L						
	Upper Back																				
	L shoulder																				
	R shoulder																				
Proximal Joints	L Knee				**F**								**L**								
	R Knee								F												
	L Ankle					**F**								**L**							
	R Ankle									F						L					
Distal Joints	L elbow																				
	R elbow																				
	L wrist																				
	R wrist																				
	L Hand																				
	R Hand																				
Head	neck/head																				
	eyes																				
Feet	L heel					**F**									**L**						
	R heel									F							L				
	L toes						**F**							**L**							
	R toes										F					L					

Table 3 Grid for Lead Dancer Steps of the Magic Step

In order to describe both the lead dancer and follow dancer I have created separate grids for each dancer. This allows for each articulator to be associated with a particular step for a dancer. Table 3 illustrates the Magic Step for the lead dancer and Table 4, at the end of this section, illustrates the Magic Step for the follow dancer. This figure is

demonstrated in the Howcast video: https://www.youtube.com/watch?v=LQCDkaDaMjI (2013).

To populate Table 3 with the detail of the movements in the Magic Step the instruction books details on the magic step were reviewed. The instructional video on the Magic step was watched several times reviewing each step in detail to make sure the timing is correct. In addition, the researcher danced through each step to confirm the order of the dances.

Table 3 describes the lead dancer's steps in the Magic Step figure. The lead dancer stands facing the follow dancer face to face in this step. The figure starts with a step forward using the left leg. This is the first step in a new direction and is marked by bold font. The step starts from the core, left hip and left knee all start moving just before beat one of the music. This is represented by the bold F in the column of the half beat before beat one. The foot lands on the one beat of the music, with the heel and ankle active as they touch the ground. The step finishes after the beat as the toes hit the ground, in the half beat following beat one. All contiguous actions taken by the same body part, the left side from core to leg to foot for example, are part of the same step. The second step is taken with the right foot in the same sequence as the first step with left foot. The second step is in the same direction as the first step so it is not in bold font. Each of the forward steps takes two musical beats. The second music beat in a slow step is a slight pause in directional movement (Morton, 1966, p. 128) creating a syncopation in the dance figure to match the music.

The third step in the figure changes direction as a move to the left so is in bold font. The step starts just before the beat five of the figure and beat one of the second

measure of the music. First the core and left hip move sideways to the left while the knee bends to pick up the foot. Then on the beat the left toes and ankle activate as the toes touch the ground leaving the feet apart. The step finishes as the left ankle touches the ground just after the beat. This happens at the same time as the core, right hip and knee start the final step in the figure, moving to the left to close the feet together. Each side step takes one musical beat.

In the magic step the follow dancer faces the lead dancer the follow dancer performs the mirror movements of the lead dancer in the magic step. The first step is backwards with the right foot which mirrors the forward step with the left foot of the lead dancer. The follow dancer starts moving at the same time as the lead dancer, so the foot lands on the beat, with the toes first, unlike the heal on the forward step by the lead dancer. The follow dancer does two back steps followed by a right step.

The steps are communicated from the lead dancer to the follow dancer through the arms. The arms are in a firm hold between the dancers. One hand from each dancer is placed near the shoulder of the other and the other hand holds the other dancers hand directly. In some steps such as the magic step the arms do not move, but others like the under arm turn the hands on the shoulders release allowing the follow dancer to turn. Even when the hold releases partially the remaining arm maintains tension and connection to the core. This hold is called the dance frame. As the arms do not disconnect between the partners and move with the core of the body when it starts to move the dance frame communicates the movement between the dancers. In steps where the arms do move they produce movement with the sonority value associated with the joints used in the movement.

	Follow Active Joint																			
		Music Beat 4/4 Time																		
						1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+
		Figure Beat																		
Sonority Class	**Joint**	5	+	6	+	1	+	2	+	3	+	4	+	5	+	6	+	1	+	2	+
trunk	Core (Lower Back)				**B**				B				**R**		R						
	L Hip								B						R						
	R Hip				**B**								**R**								
	Upper Back																				
	L shoulder																				
	R shoulder																				
Proximal Joints	L Knee								B												
	R Knee				**B**								**R**								
	L Ankle									B						R					
	R Ankle					**B**								**R**							
Distal Joints	L elbow																				
	R elbow																				
	L wrist																				
	R wrist																				
	L Hand																				
	R Hand																				
Head	neck/head																				
	eyes																				
Feet	L heel										B						R				
	R heel						**B**								**R**						
	L toes									B						R					
	R toes					**B**								**R**							

Table 4 Grid for Follow Dancer Steps of the Magic Step

4.4 Sonority Profiles

The grids also show the sonority of the movements used in each step and are used to create sonority profiles for the steps and figures. The sonority profile allows for patterns in sonority to be used to delimit the prosodic units of the Foxtrot. The sonority

profiles have columns for each beat of the figure and a row for the sonority class forming a grid. In the columns there is an asterisk that represent the highest sonority of the movement in that beat. All lower sonority values below this highest sonority are filled in. The step on beat five is the same as the steps on beats one, three and six but as it has only one beat, the sonority of the movement created by the foot on beat 5+ is subsumed by the movement of the trunk at the start of the next step. Table 5 is the sonority profile of the Magic Step described in the grids in Tables 3 and 4. The sonority profile of the Magic Step Figure is the same for both the lead and follow dancer.

The sonority profiles allow for the structure of the sub-figures to be evaluated based on the sonority of the components of the figures. The sonority shows a pattern of sonority peaks followed by descending sonority. Each of these peaks where the sonority is equal to or greater than the previous peak is the start of a new step in the Foxtrot where a step is the action taken to arrive at the next pose. Tables 6 to 10 illustrate the sonority profiles of the other figures evaluated.

	Step		1				2				3		4	
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+
Sonority Classes	trunk	*				*				*		*		
	proximal joints	*	*			*	*			*	*	*	*	
	distal joints	*	*			*	*			*	*	*	*	
	hands	*	*			*	*			*	*	*	*	
	feet	*	*	*		*	*	*		*	*	*	*	*

Table 5 Sonority profile of the Magic Step Figure

	Step		1				2				3		4	
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+
Sonority Classes	trunk	*				*				*		*		
	proximal joints	*	*			*	*			*	*	*	*	
	distal joints	*	*			*	*			*	*	*	*	
	hands	*	*			*	*			*	*	*	*	
	feet	*	*	*		*	*	*		*	*	*	*	*

Table 6 Sonority Profile of the Promenade Figure

Table 6 is the sonority profile of the promenade figure. It has the same profile as the Magic Step and is the same for both the lead and follow dancers.

	Step		1				2				3		4	
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+
Sonority Classes	trunk	*				*				*		*		
	proximal joints	*	*			*	*			*	*	*	*	
	distal joints	*	*			*	*	*		*	*	*	*	
	hands	*	*			*	*	*		*	*	*	*	
	feet	*	*	*		*	*	*		*	*	*	*	

Table 7 Sonority Profile of the Promenade with Under Arm Turn Figure

Table 7 shows the sonority profile for the figure, Promenade with Under Arm Turn. In this figure the lead dancer leads the follow to do a turn during the second forward step. To do this the arm makes a circular movement from the elbow, so the distal joint class is marked with an asterisks on the 3+ beat. This is different from the regular Promenade where the 3+ beat is just the toes touching the floor.

	Step		1				2				3		4	
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+
Sonority Classes	trunk	*				*				*		*		
	proximal joints	*	*			*				*	*	*	*	
	distal joints	*	*			*				*	*	*	*	
	hands	*	*			*				*	*	*	*	
	feet	*	*	*		*	*			*	*	*	*	*

Table 8 Sonority Profile of the Corner Step Figure

Table 8 shows the sonority profile of the Corner Step figure. The second step of the figure is a transfer of weight back from the left foot to the right foot, without bringing the right foot forward. This consists of an action initiated from the trunk producing a high sonority movement and an action from the toes as they break contact with the floor on beat three producing a low sonority action.

	Step		1				2				3		4		5		6	
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+
Sonority Classes	trunk	*				*				*		*		*		*		
	proximal joints	*	*			*	*			*	*	*	*	*	*	*	*	
	distal joints	*	*			*	*			*	*	*	*	*	*	*	*	
	hands	*	*			*	*			*	*	*	*	*	*	*	*	
	feet	*	*	*		*	*	*		*	*	*	*	*	*	*	*	*

Table 9 Sonority Profile of the Sway Figure

Table 9 shows the sonority profile of the sway figure. The sonority profile is similar to the Magic Step but extends for two more beats for a six step figure.

	Step		1				2		3		4		5		6		7		8		
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	1	+	2
Sonority Classes	trunk	*				*		*		*		*		*		*		*			
	proximal joints	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	distal joints	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	hands	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	feet	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	

Table 10 Sonority Profile of the Weave Figure

Table 10 shows the sonority profile of the Weave Figure. The figure is an eight step figure that starts with one slow two beat step followed by six quick one beat steps

and ends with a slow two beat step. It follows the same profile of a higher sonority movement followed by lower sonority movement within a step.

From these examples we have the following pattern. The highest sonority movement comes first in any step and the sonority of all following actions decreases over the step. In no steps of the figures does a higher sonority movement follow a lower sonority movement. The next high sonority movement is part of the next step and is taken with the other foot.

The pattern of the highest sonority movement occurring first in the step is consistent through all the figures evaluated. This pattern of movements matches the description of how steps are executed in instruction books such as Wright (2003) and Morton (1966).

The other pattern found in the analysis is that the figures are divided into movements in the different directions with the first step in this new direction having greater prominence. These are the movements in the step that are bolded in the full analysis tables Table 3, 4. This difference in prominence between the steps delimits the prosodic foot in the dance. Each figure can be composed of one or more prosodic feet.

The step with greater prominence is the head of the prosodic foot. In the analysis the head always starts the foot and never ends with the head. This indicates that feet in the Foxtrot are left headed feet. There are no right headed feet.

The following prosodic units of dance are used in this thesis: the step defined by the sonority profile of the articulators used in the step, the prosodic foot defined by the change in emphasis caused by changing direction. These units correspond to the linguistic prosodic units as illustrated in Table 11.

Linguistic Prosodic Unit	Dance Prosodic Unit
Syllable	Step
Prosodic feet	Prosodic feet

Table 11 Linguistic and Dance Unit Equivalence

The units of the step, prosodic foot and figure in dance are defined in terms of prominence. The step is defined in terms of the sonority peaks that occur at the beginning of the step. The sonority falls for all subsequent actions taken by the step. The next sonority peak indicates the start of the next step.

Prosodic feet are marked by prominence of the steps. The first step in a new direction, forward or sideways for example, is more prominent than all following steps in the same direction. A change in direction requires a change in the prominence of the movement to start the dancers moving in a new direction (Morton, 1966). A dance figure contains several prosodic feet.

These are the linguistic units found in this thesis for the Foxtrot. The next chapter will elaborate on the connection between spoken language, sign language and the Foxtrot.

Chapter 5: Discussion

This chapter discusses the parallels in the communication modalities of spoken language, sign language and the Foxtrot. The Foxtrot displays some similarities to both modalities of language but has some significant differences. The previous chapter analyzed the movements of the Foxtrot as well as the prosodic units of the syllable, in steps and the prosodic foot. However, unlike the syllable in spoken languages where sonority is rising in the onset, the steps in the Foxtrot start with the highest sonority element. In addition, the prosodic foot head is always at the start of the foot effectively making it left headed.

The differences between modalities in the analysis are in the structure of syllables and prosodic feet. In the Foxtrot the element of highest sonority occurs at the start of the syllable. In language the most sonorous segment of the syllable, the nucleus, often occurs in the middle of the syllable preceded by an onset and followed by a coda (Selkirk, 1982). The structure of the onset and coda is governed by the sonority sequencing constraint of the language (Blevins, 1995). In the Foxtrot, the most prominent step in the prosodic feet is the first step. This is unlike prosodic feet in spoken languages that can be right headed or left headed and are not strictly left headed as the Foxtrot is in this analysis.

This chapter starts by discussing the similarities and differences in sonority in all three modalities. Following the discussion of sonority, the syllable in the modalities is reviewed and similarities and differences are highlighted. Finally, the prosodic foot is compared across modalities.

5.1 Sonority

To compare how sonority is manifest in the three different modalities of communication, this section will look first at articulatory correlates then perceptual

correlates. The articulatory correlate is the state of the articulators when producing the sound. The perceptual correlate is how the movement is perceived by the recipient. The correlates are similar between the modalities allowing for the prosodic structures to be compared.

5.1.1 Articulation

In each modality there is an articulator that is correlated to the sonority value of the sound or movement. Like in speech and sign language, there is an articulatory correlate to sonority in the Foxtrot. In spoken language the correlate is how open the vocal tract is, in sign language it is the proximity to the midline of the body and in dance it is the articulator's proximity to the core. The similarity in the sonority correlate in articulation are used to determine the prosodic units in the dance.

Sonority in sign language is based on the articulators used to produce the sign (Brentari, 1998). Similar to how sonority is determined in the Foxtrot by the location of the articulator determines the sonority of the movement. The closer the articulator of a movement is to the midline of the body, the higher the sonority of the movement (Brentari, 1998). The highest sonority movements in American Sign Language are movements initiated from the shoulder as the shoulders are closest to the midline of the body, and the lowest sonority movements are made by the interphalangeal joints in the fingers (Brentari, 1998). All the other joints produce movement with sonority between these limits.

In sign language there are two types of sonority, inherent sonority and derived sonority. Inherent sonority is the sonority of the movements based on the input features of the sign (Brentari, 1998). The derived sonority is the sonority based on the output form

of the sign (Brentari, 1998). In spoken language the more open the vocal tract correlates to a more sonorous sound (Parker, 2008). The most sonorous sound is the vowel [a] and the least sonorous are the voiceless stops like [p, t, k] (Blevins, 1995). Each segment in a spoken language has a sonority value correlated with the articulators used to produce the segment (Parker, 2008). These similarities in articulation between the modalities provide the basis for analysis of the dance figures and steps in Chapter 4.

5.1.2 Perception

As in sign and spoken language, the Foxtrot has perceptual correlates to sonority as well. Higher sonority movements in the Foxtrot can be prolonged for longer like higher sonority sounds and movements in sign. The highest sonority articulators are the hips and legs that produce movements that can move within the reach of the legs. Lower sonority articulators are those articulators that cannot move as far.

The high sonority movements are more prominent in communication between the partner dancers. Movements closer to the core move more of the person's mass than movements initiated at the more distal joints. This is described in the tables presented in Chapter 4 with the highest sonority articulators, the core and articulators near the core, at top of the table.

As in the Foxtrot and spoken language, sonority has perceptual correlates in sign language (Brentari, 1998). The higher the sonority movement is the more prominent the movement is to the listener in sign, similar to how movement of the core is more prominent in the Foxtrot. In sign language higher sonority movements are more visible than lower sonority movements (Brentari, 1998). Movements with higher sonority also

have greater continuity of movement; they can move further than more distal joints that have more restricted movement.

The perceptual correlates of sonority in spoken language are the duration and intensity, or audibility, of the segment (Parker, 2008). These perceptual correlates of sonority determine the distance at which a sound may be heard (Parker, 2008). The higher the volume or the more continuous the sound the further the distance at which the sound can be perceived (Parker, 2008).

In this thesis sonority is used to establish the prosodic unit of the syllable and argue for the concept of perceptual salience in dance. Sonority allows for segments to be grouped into syllables based on the sonority sequencing principle in language. Analysis to determine syllables from the sonority is extended to sign language by Brentari (1998). This thesis extends the analysis to the Foxtrot.

5.2 Syllable

Sonority is used to identify the structure of the syllable in the Foxtrot, similar to how it is used in spoken and sign language. The highest sonority movements identify the nucleus of the syllable in all three modalities. However, there is a significant difference in the structure of the syllables between sign and spoken language and the Foxtrot. In the Foxtrot the nucleus is at the start of the syllable as opposed to spoken language where the syllable often has an onset of lower sonority sounds before the nucleus.

The nucleus of the syllable is the highest sonority segment in the syllable (Blevins, 1995; Selkirk, 1982). The nucleus is the required part of the syllable and can be considered the head of the syllable (Selkirk, 1982) and the relation of the other segments to the nucleus is determined by the sonority sequencing constraint in spoken language

(Blevins, 1995). The main difference between sign and spoken language and the Foxtrot is in the location of the nucleus. The sonority will rise towards the nucleus of the syllable and fall following the nucleus in spoken language (Blevins, 1995). In the Foxtrot the highest sonority movement will occur at the beginning of the step followed by movement with falling sonority.

As defined in Chapter 2 a step in the Foxtrot, the equivalent to the syllable in sign and speech, is an action taken to arrive at a pose. It is accomplished by moving the articulators required for each pose into the position of the final pose. Each articulator initiates movement on a particular beat, or sub-beat of the music. At the end of the beat all the articulators will be in the position required for the pose. Within a step there will be a movement that is most prominent (Wright, 2003). The most prominent movement in the step has the highest sonority and is the nucleus of the step. The articulator that is used sets the direction and duration of a step (Wright, 2003).

The syllable in Foxtrot differs from languages, sign and spoken, in that it starts with the highest sonority movement of the hip or legs (Wright, 2003) and all following movements have lower sonority.

Foxtrot may have a sonority sequencing constraint that determines the order of movements in a step similar to the sonority sequencing constraint in language that determines the order of segments in the syllable. The highest sonority movement will be the first movement in the step and all following movements will have decreasing sonority value. Any movement that has a higher or equal sonority value will be the start of a new step and a new syllable. This is how instruction books describe how dance steps are

executed in dance where the movements are initiated from the core or joint closest to the core involved in the step (Wright, 2003).

Sign language does not have a similar structure with rising sonority from consonants and vowel segments (Brentari, 1998). This requires a different method for identifying the nucleus of the syllable (Brentari, 1998). In sign language the syllables correspond to the number of sequential movements in a sign (Brentari, 1998). If shorter movements occur at the same time as a longer movement, the longer movement is the only one counted as the movement of the syllable (Brentari, 1998). In American Sign Language the number of syllables per sign is either one or two (Brentari, 1998). Other sign languages, such as Finnish Sign Language can have signs with three syllables, or three movements (Jantunen & Takkinen, 2010).

In sign language the role of sonority in the syllables can be observed forming the nucleus of the syllable in the creation of new signs (Brentari, 1998). As the existing signs have simultaneous movement, the nucleus can be hard to identify (Brentari, 1998).

Brentari (1998) provides evidence that sonority in sign language determines the nucleus in signs that are formed in cases where there is no existing sign for a word. When there is no established sign for a concept, a sign is formed from the finger spelling of the word through a process called rapid local lexicalization (Brentari, 1998). During this process the finger spelled characters are dropped to form a contraction, and the highest sonority movements in the signs for the letters are preserved in the new sign and form the nucleus of the sign (Brentari, 1998).

The basic structure of the syllable in spoken language consists of an onset, nucleus and coda (Kenstowicz, 1994; Blevins, 1995). The onset generally follows the

sonority sequencing constraint of the language with the sonority of the segments rising the closer they are to the nucleus of the syllable (Selkirk, 1982). Often languages follow the principle of onset maximization where in sequence of segments preceding the nucleus is the longest sequence (Selkirk, 1982).

The coda consists of the segments that follow the nucleus (Selkirk, 1982). The coda has falling sonority according to the language's sonority sequencing constraint over the segments of the coda (Selkirk, 1982). Vowels are the most sonorous sounds in spoken language and the least sonorous are unvoiced consonants with the other consonants in between (Blevins, 1995). The length of the coda can be limited by the onset maximization of the following syllable in the same word (Selkirk, 1982).

5.3 Prosodic Feet

In spoken languages the prosodic foot is the prosodic unit that combines syllables (Hayes, 1995). Prosodic feet contain a stressed and unstressed syllable with the stressed syllable having the most prominence in the foot (Selkirk, 1984). The stressed syllable constitutes the head of the foot (Hayes, 1995). In the Prosodic Model of sign language prosodic feet are not used, the timing component of the language is captured in x-slots generated by the movement of the sign and the syllables are contained directly in the prosodic word (Brentari, 1998). In the Foxtrot prosodic feet have been identified as the steps that travel in the same direction. A change in direction is more prominent than the steps that precede or follow it (Wright, 2003).

The steps in Foxtrot are arranged in a temporal order like syllables in spoken and sign language. The steps are arranged into figures of one or more steps (Wright, 2003) with no limit in the number of steps that can be in each figure. This is unlike the limit of

two syllables in ASL (Brentari, 1998). Between the steps and figures there are prosodic feet which contain all the steps in a particular direction for each figure. There is differentiation in prominence between the steps in Foxtrot as they change direction within the same figure (Wright, 2003).

In the Foxtrot prosodic feet are the steps that travel in the same direction. As soon as the steps change direction, a new prosodic foot is created. The head of prosodic feet in the Foxtrot is the first step in a new direction emphasized over the steps that follow. This emphasis is required to indicate to the dancer that the direction has changed (Morton, 1966).

Steps with movement that continues in the same direction as previous movement is easier than changing direction (Wright, 2003). Changing the direction of movement requires the dancer's weight and centre of balance to move first (Wright, 2003; Morton, 1966). This change in direction is more effort than continuing in the same direction (Wright, 2003).

Unlike spoken language, in sign language the phonological unit above the syllable is the prosodic root node not a prosodic foot (Brentari, 1998). This is the unit from which the branches of prosodic and inherent features of the sign are rooted (Brentari, 1998). The timing units are generated by the prosodic features of the sign as in Figure 4 (Brentari, 1998).

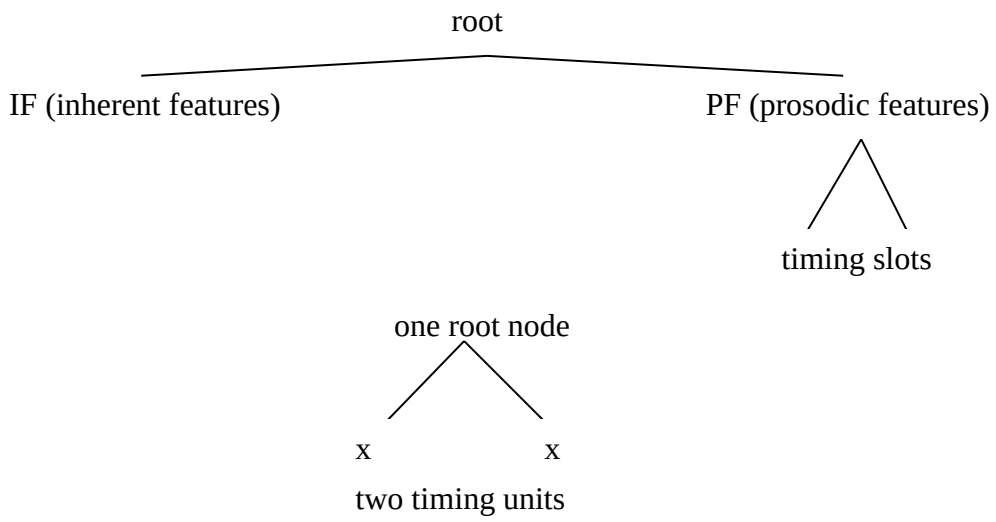

Figure 4 Canonical relationship between timing units and root nodes in the Prosodic Model (Brentari, 1998, p. 305)

As can be seen in Figure 4 the timing slots are generated by the prosodic features of the sign and are located just below the root node. Path prosodic features generate two x- slots and all other prosodic features generate one x-slot (Brentari, 1998). This is different from spoken language, where each timing unit corresponds to a segment (Brentari, 1998).

Although the Foxtrot has simultaneous actions like sign language, each step in the dance follows the previous one in temporal order (Wright, 2003). As well, timing in dance is directly linked to the steps (Morton, 1966; Wright, 2003), which is more similar to spoken language than sign language.

Prosodic feet have a prosodic function as a domain to which specific phonological rules apply (Selkirk, 1984). Some phonological changes cannot be accounted for by the syllables in the utterance (Hayes, 1995). In the Foxtrot this is demonstrated with the prominence of some steps over others. There is no reason within the step that it would be

more prominent than other steps, but once the sequence of steps is considered the prominence can be assigned based on the change in direction.

5.4 Foxtrot and Language

The sonority and prosodic units in the Foxtrot are similar to spoken and signed languages. As in spoken and signed language the Foxtrot has both perceptual and articulatory correlates for sonority. This correlate corresponds to the magnitude of the gesture or sound produced by the articulator. Another similarity with language is the Foxtrot has the prosodic units of the syllable and the prosodic foot.

Spoken language and the Foxtrot are both composed of smaller units ordered sequentially in time. In spoken language the segments are ordered in time and in the Foxtrot, movements are ordered in time. This is different from sign language where movements happen all at once. In sign language sonority profiles cannot be used to delimit syllables as they can be for spoken language and the Foxtrot.

The differences between the Foxtrot and spoken language are in how they are articulated and their sonority correlates. The sonority of gestures is related to the proximity of the articulator to the core of the body not the state of the articulator. In spoken language the sonority of the sound is correlated to the openness of the vocal tract, not whether or not it is used to produce the sound. In the Foxtrot and sign language the articulators may not be used in the step or sign at all. So the location of the articulator is the correlate rather than the state of the articulator.

These similarities and differences between the Foxtrot and language may be due to the model chosen for this analysis. There is some similarity between the Foxtrot and sign language in articulation that makes the model fit, but to determine how well the

model works it needs to be applied to other dances beyond the Foxtrot. In further analysis the model will have to be refined to account for differences in dances and more of the underlying structure shared by dance and language should be clarified.

The structure of the Foxtrot supports the conclusion that dance is a language. Between this research and Myers (1980) the Foxtrot has been shown to have structure in both syntax and phonology. This conclusion is also supported by other observations not discussed in this thesis. For example, dance has communities of dancers that have different dialects (Morton, 1966). Depending on your community of dancers the way you dance, and figures may be different. In addition, dance and language both share the fact that a limited number of small components can be combined following rules, into novel sequences of these components (Morton, 1966; Wright, 2003).

The understanding of dance as a language helps us build a more complete picture of human communication. It includes spoken language, sign language and shown here the direct communication in the Foxtrot. Further study of other dances will refine the models and provide more information on what underlying structure of communication is shared between all mediums.

5.5 Future Considerations

If other dances are analyzed using the same method presented in this thesis they may have a more variety in the prosodic structure. There may be dances that exhibit a syllable structure more similar to language where some syllables start with lower sonority articulations leading to a higher sonority nucleus. Likewise, some dances may have different headed prosodic feet if they have different ways of marking prominence.

In order to address whether the syllable in dances starts with the nucleus or if this is unique to the Foxtrot more dances need to be analyzed using the framework presented here. The hypothesis is that non-partner dances or maybe even partner dances not from the ballroom dance curriculum will have steps or syllables that have a sonority profile similar to spoken language. The hypothesis is that the step will start with low sonority movement with the movements rising to a high sonority element, and then followed by lower sonority movement.

Unlike prosodic feet in the Foxtrot, which are exclusively left headed, analysis of other dances will likely find that there are both right and left headed prosodic feet in those dances. This is because dances like West Coast Swing have figures with both a start and a stop within the figure. Depending on the figure and context the stop at the end of the figure may be more prominent than the change in direction that starts the step.

5.5 Conclusion

This chapter has presented the parallels and differences between languages and dance in sonority, syllables and prosodic feet. The sonority or prominence of the segments has been developed for spoken language and sign language. Sonority is extended from sign language to dance. The definition of sonority developed for dance is used to identify syllables in dance. Prosodic feet do not follow the same development. Spoken language and dance share a common structure for prosodic feet, as linear organizing of steps or syllables organized around a syllable or step with more prominence. Sign language does not have the linear organization of movements in a syllable as the movements in the sign can occur simultaneously, and the Prosodic Model does not discuss prosodic feet.

Chapter 6: Conclusion

6.1 Findings

This thesis demonstrates the presence of sonority through three modalities of communication: spoken language, sign language and dance. Sonority in all three is based on how the sound, sign or step is articulated. The larger and more open the articulator the more sonorous. As well, more sonorous articulations have more perceptual salience than less sonorous articulations, as described by Brentari (1998).

Sonority is shown to play an important role in defining prosodic units in all three modalities. In spoken language sonority determines the nucleus of the syllable with the most sonorous segment forming the nucleus. Sonority also determines part of the structure of the syllable in spoken language through the language's sonority sequencing principle that determines how segments can be organized next to each other by sonority. In sign language sonority determines what movements are preserved in locally constructed signs from finger spellings for words that do not have established signs. The most sonorous movements will be preserved in the final sign, while movements with less sonority will be potentially dropped to make the new sign. In the Foxtrot the more sonorous movements start the step forming the nucleus and sonority of the following movements decline in sonority. Using sonority, this thesis has determined the equivalent prosodic units of the syllable in the Foxtrot. Other movements then follow this high sonority movement.

The prosodic foot in Foxtrot is similar to the prosodic foot in language and consists of one or more steps in a figure. Prosodic feet in dance consist of a head step with raised prominence and possibly one or more steps following that have lower prominence. In the Foxtrot this prominence is determined by changes in direction in

travel. Steps that change direction are more prominent than those that continue in the same direction.

This thesis has demonstrated some of the linguistic theories that apply to the Foxtrot. However there are some limitations to this work. The next section discusses some of those limitations.

6.2 Limitations

This thesis has three main limitations. First, only the Foxtrot was examined, limiting the ability to generalize the results. Second, the thesis examines only the prosodic units of steps and feet. Third, only sonority is discussed. No work presented here provides evidence regarding whether or not concepts such as prosodic word, phrase, or segment can be defined for partner dances in the same way sonority can.

Whether prosodic structure as an organizing principle exists in other dances and what form it would take is not addressed but there is no reason to expect that it could not be extended to other partner dances such as the Waltz. The work here could be most closely adapted for other partner dances as sonority as the perceptual salience of the movements between partners would likely be the same or similar because the ballroom dances have the same hold (Morton, 1966). This similarity between the ballroom dances means the movement of the core will be salient between the dancers (Wright, 2003). More work would be required to transfer the concepts to non-partner dances such as Ballet, because Ballet is a choreographed dance where the dance is that is communicated not between partners but to an audience.

In addition to focusing on a single partner dance, the thesis proposed only two prosodic units, the step equivalent to the syllable and the prosodic foot. Subsyllabic units

that may be equivalent to the segment and units of the prosodic word and larger prosodic units are not defined or explored. More work is needed to define these concepts in the Foxtrot.

In the next section I outline some of the other possible avenues for future research based on the work in this thesis.

6.3 Future Research

Future research based on this thesis has three directions that could be taken: one is to address the limitations of the current project, the second to extend the research and build on the findings presented in this thesis and the third is to examine the structure of prosodic feet in other partner dances. These approaches would provide further details of the application of linguistic theories to the structure of dance.

The first direction of further research would be to look at other partner dances to address the main limitation of this study in its focus on the Foxtrot. To start the other dances in the standard ballroom dance curriculum such as the Waltz and the Quickstep should be analyzed. These are the most similar, so the notations and theories presented here should be applicable to those dances. The next step would be to apply the analysis to other partner dances such as the Swing and Latin dances. The final step would be to look at non-partner dances such as Ballet.

The second direction to take future research would to look at other prosodic units. As part of setting the scope for this study defining the unit of the prosodic word was considered. This was removed to reduce the scope but hypothesized that the figure in dance would be the equivalent unit with similar phonological structure. Future work

could look into this and determine if the figure is analogous to the prosodic word, or if another group of steps should be considered the prosodic word.

Another topic to examine is the forms of prosodic feet in the dances. As the prosodic feet in the Foxtrot are headed by steps with difference prominence it may be possible to determine if iambic and trochaic feet exist in Foxtrot and other dances. A trochaic foot is the prosodic foot found in this study where a more prominent step is followed by a less prominent step(s). An iambic foot in dance would be a less prominent step followed by a more prominent step, the opposite of what was found in this study.

This project has built on previous work to define the structure of dance using theories of linguistics. It has expanded the analysis that was based on the ideas of deep and surface structure from Williams (1976 a, b) and phrase structure rules (Myers, 1980) to the phonology and prosodic structure. Future work could expand the analysis of phonology and prosodic structure. This provides a new method to study the structure of dance and a new domain to test phonological theories.

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Appendix

This appendix contains all the data analyzed as described in Chapter 3 to produce the sonority profiles of the Foxtrot figures.

Empty Rubrics

Dance Figure Articulators Evaulation Rubric																			
Dance:																			
Figure:																			
Video Link:																			
	Lead Active Joint																		
		Music Beat 4/4 Time																	
				1 +	2 +	3 +	4 +	1 +	2 +	3 +	4 +								
		Figure Beat																	
Sonority Class	**Joint**	7 +	8 +	1 +	2 +	3 +	4 +	5 +	6 +	7 +	8 +	9 +	10 +	11 +	12 +	13 +	14 +	15 +	16 +
trunk	Core (Lower Back)																		
	L Hip																		
	R Hip																		
	Upper Back																		
	L shoulder																		
	R shoulder																		
Proximal Joints	L Knee																		
	R Knee																		
	L Ankle																		
	R Ankle																		
Distal Joints	L elbow																		
	R elbow																		
	L wrist																		
	R wrist																		
	L Hand																		
	R Hand																		
Head	neck/head																		
	eyes																		
Feet	L heel																		
	R heel																		
	L toes																		
	R toes																		

Forward	F																																			
Backward	B																																			
Left	L																																			
Right	R																																			
Follow Active Joint																																				
	Music Beat 4/4 Time																																			
					1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+																
	Figure Beat																																			
Joint	7	+	8	+	1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	9	+	10	+	11	+	12	+	13	+	14	+	15	+	16	+
Core (Lower Back)																																				
L Hip																																				
R Hip																																				
Upper Back																																				
L shoulder																																				
R shoulder																																				
L Knee																																				
R Knee																																				
L elbow																																				
R elbow																																				
L Ankle																																				
R Ankle																																				
L wrist																																				
R wrist																																				
L hand																																				
R Hand																																				
neck/head																																				
eyes																																				
L heel																																				
R heel																																				
L toes																																				
R toes																																				

	Step													
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+
Sonority Classes	trunk													
	proximal joints													
	distal joints													
	hands													
	feet													

Prep Step Figure Rubric - Lead

Dance Figure Articulators Evaulation Rubric																			
Dance:	Foxtrot																		
Figure:	Prep step																		
Video Link:																			
	Lead Active Joint																		
		Music Beat 4/4 Time																	
		1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+		
		Figure Beat																	
Sonority Class	**Joint**	8	+	1	+	2	+	3	+	4	+	5	+	6	+	7	+		
trunk	Core (Lower Back)			**R**		**L**		**R**											
	L Hip					**L**													
	R Hip			**R**				**R**											
	Upper Back																		
	L shoulder																		
	R shoulder																		
Proximal Joints	L Knee																		
	R Knee																		
	L Ankle																		
	R Ankle																		
Distal Joints	L elbow																		
	R elbow																		
	L wrist																		
	R wrist																		
	L Hand																		
	R Hand																		
Head	neck/head																		
	eyes																		
Feet	L heel																		
	R heel																		
	L toes																		
	R toes																		

Prep Step Figure Rubric – Follow

Forward	F															
Backward	B															
Left	L															
Right	R															
Follow Active Joint																
	Music Beat 4/4 Time															
	1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+
	Figure Beat															
Joint	8	+	1	+	2	+	3	+	4	+	5	+	6	+	7	+
Core (Lower Back)			**L**		**R**		**L**									
L Hip			**L**				**L**									
R Hip					**R**											
Upper Back																
L shoulder																
R shoulder																
L Knee																
R Knee																
L Ankle																
R Ankle																
L elbow																
R elbow																
L wrist																
R wrist																
L Hand																
R Hand																
neck/head																
eyes																
L heel																
R heel																
L toes																
R toes																

Prep Step Figure Sonority Profile

	Step		1		2		3									
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+		
Sonority Classes	trunk		*		*		*									
	proximal joints		*		*		*									
	distal joints		*		*		*									
	hands		*		*		*									
	feet		*		*		*									

Magic Step Figure Rubric - Lead

Dance:	Social Foxtrot																												
Figure:	Magic/Basic Step																												
Video Link:	https://www.youtube.com/watch?v=LQCDkaDaMjI																												
	Lead Active Joint																												
		Music Beat 4/4 Time																											
						1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+								
		Figure Beat																											
Sonority Class	**Joint**	6	+	7	+	1	+	2	+	3	+	4	+	5	+	6	+	1	+	2	+	3	+	4	+	5	+	6	+
trunk	Core (Lower Back)				**F**				F				**L**		L														
	L Hip				**F**								**L**																
	R Hip								F						L														
	Upper Back																												
	L shoulder																												
	R shoulder																												
Proximal Joints	L Knee				**F**								**L**																
	R Knee								F																				
	L Ankle					**F**								**L**															
	R Ankle									F						L													
Distal Joints	L elbow																												
	R elbow																												
	L wrist																												
	R wrist																												
	L Hand																												
	R Hand																												
Head	neck/head																												
	eyes																												
Feet	L heel					**F**									**L**														
	R heel									F							L												
	L toes						**F**							**L**															
	R toes										F					L													

Prep Step Figure Rubric - Follow

	Forward	F																											
	Backward	B																											
	Left	L																											
	Right	R																											
	Follow Active Joint																												
		Music Beat 4/4 Time																											
						1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+								
		Figure Beat																											
Sonority Class	**Joint**	7	+	8	+	1	+	2	+	3	+	4	+	5	+	6	+	1	+	2	+	3	+	4	+	5	+	6	+
trunk	Core (Lower Back)				B				B				R		R														
	L Hip								B						R														
	R Hip				B								R																
	Upper Back																												
	L shoulder																												
	R shoulder																												
Proximal Joints	L Knee								B																				
	R Knee				B								R																
	L Ankle									B						R													
	R Ankle					B								R															
Distal Joints	L elbow																												
	R elbow																												
	L wrist																												
	R wrist																												
	L Hand																												
	R Hand																												
Head	neck/head																												
	eyes																												
Feet	L heel										B						R												
	R heel						B								R														
	L toes									B						R													
	R toes					B								R															

Magic Step Sonority Profile

	Step		1				2				3		4	
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+
Sonority Classes	trunk	*				*				*		*		
	proximal joints	*	*			*	*			*	*	*	*	
	distal joints	*	*			*	*			*	*	*	*	
	hands	*	*			*	*			*	*	*	*	
	feet	*	*	*		*	*	*		*	*	*	*	*

Magic Step flat footed Figure Rubric – Lead

Dance:	Social Foxtrot																											
Figure:	Magic/Basic Step																											
Video Link:	https://www.youtube.com/watch?v=LQCDkaDaMjI																											
	Lead Active Joint																											
		Music Beat 4/4 Time																										
						1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+							
		Figure Beat																										
Sonority Class	**Joint**	7	+	8	+	1	+	2	+	3	+	4	+	5	+	6	+	1	+	2	+	3	+	4	+	5	+	6
trunk	Core (Lower Back)				F				F				L		L													
	L Hip				F								L															
	R Hip								F						L													
	Upper Back																											
	L shoulder																											
	R shoulder																											
Proximal Joints	L Knee				F																							
	R Knee								F																			
	L Ankle																											
	R Ankle																											
Distal Joints	L elbow																											
	R elbow																											
	L wrist																											
	R wrist																											
	L Hand																											
	R Hand																											
Head	neck/head																											
	eyes																											
Feet	L heel					F								L														
	R heel									F						L												
	L toes					F								L														
	R toes									F						L												

Magic Step flat footed Figure Rubric – Follow

Forward	F																										
Backward	B																										
Left	L																										
Right	R																										
Follow Active Joint																											
	Music Beat 4/4 Time																										
					1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+							
	Figure Beat																										
Joint	7	+	8	+	1	+	2	+	3	+	4	+	5	+	6	+	1	+	2	+	3	+	4	+	5	+	6
Core (Lower Back)				B				B				R		R													
L Hip								B						R													
R Hip				B								R															
Upper Back																											
L shoulder																											
R shoulder																											
L Knee								B																			
R Knee				B																							
L Ankle																											
R Ankle																											
L elbow																											
R elbow																											
L wrist																											
R wrist																											
L Hand																											
R Hand																											
neck/head																											
eyes																											
L heel									B						R												
R heel					B								R														
L toes									B						R												
R toes					B								R														

Sonority Profile Magic Step Flat Footed

	Step		1				2				3		4	
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+
Sonority Classes	trunk	*				*				*		*		
	proximal joints	*				*				*		*		
	distal joints	*				*				*		*		
	hands	*				*				*		*		
	feet	*	*			*	*			*	*	*	*	

Promenade Step Figure Rubric – Lead

Dance:	Foxtrot																											
Figure:	Promenade																											
Video Link:	https://www.youtube.com/watch?v=bQX7rlhQdMM																											
	Lead Active Joint																											
		Music Beat 4/4 Time																										
						1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+							
		Figure Beat																										
Sonority Class	**Joint**	7	+	8	+	1	+	2	+	3	+	4	+	5	+	6	+	1	+	2	+	3	+	4	+	5	+	6
trunk	Core (Lower Back)				F				F				L		L													
	L Hip				F								L															
	R Hip								F						L													
	Upper Back				F								L															
	L shoulder				F								L															
	R shoulder				F								L															
Proximal Joints	L Knee				F								L															
	R Knee								F						L													
	L Ankle					F								L														
	R Ankle									F						L												
Distal Joints	L elbow																											
	R elbow																											
	L wrist																											
	R wrist																											
	L Hand																											
	R Hand																											
Head	neck/head																											
	eyes																											
Feet	L heel					F								L														
	R heel									F						L												
	L toes						F								L													
	R toes										F						L											

Promenade Step Figure Rubric – Follow

Forward	F																											
Backward	B																											
Left	L																											
Right	R																											
Follow Active Joint																												
		Music Beat 4/4 Time																										
						1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+							
	Figure Beat																											
Joint	7	+	8	+	1	+	2	+	3	+	4	+	5	+	6	+	1	+	2	+	3	+	4	+	5	+	6	+
Core (Lower Back)				F				F				R		R														
L Hip								F						R														
R Hip				F								R																
Upper Back				F								R																
L shoulder				F								R																
R shoulder				F								R																
L Knee								F						R														
R Knee				F								R																
L Ankle									F						R													
R Ankle					F								R															
L elbow																												
R elbow																												
L wrist																												
R wrist																												
L Hand																												
R Hand													`															
neck/head																												
eyes																												
L heel									F							R												
R heel					F									R														
L toes										F					R													
R toes						F							R															

Promenade Step Figure Sonority Profile

	Step		1				2				3		4	
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+
Sonority Classes	trunk	*				*				*		*		
	proximal joints	*	*			*	*			*	*	*	*	
	distal joints	*	*			*	*			*	*	*	*	
	hands	*	*			*	*			*	*	*	*	
	feet	*	*	*		*	*	*		*	*	*	*	*

Promenade with Underarm Turn Figure Rubric – Lead

Dance:	Foxtrot																												
Figure:	Promenade with Underarm Turn																												
Video Link:	https://www.youtube.com/watch?v=MxakBt0Aqjw																												
	Lead Active Joint																												
		Music Beat 4/4 Time																											
						1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+								
		Figure Beat																											
Sonority Class	**Joint**	7	+	8	+	1	+	2	+	3	+	4	+	5	+	6	+	1	+	2	+	3	+	4	+	5	+	6	+
trunk	Core (Lower Back)				F				F				L		L														
	L Hip				F								L																
	R Hip								F						L														
	Upper Back				F				F				L																
	L shoulder				F				F				L																
	R shoulder				F																								
Proximal Joints	L Knee				F								L																
	R Knee								F						L														
	L Ankle					F								L															
	R Ankle									F																			
Distal Joints	L elbow				F				F	F	F		L																
	R elbow															L													
	L wrist																												
	R wrist																												
	L Hand																												
	R Hand																												
Head	neck/head																												
	eyes																												
Feet	L heel					F								L															
	R heel									F						L													
	L toes						F								L														
	R toes										F						L												

Promenade with Underarm Turn Figure Rubric – Follow

Forward	F																											
Backward	B																											
Left	L																											
Right	R																											
Follow Active Joint																												
	Music Beat 4/4 Time																											
					1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+								
	Figure Beat																											
Joint	7	+	8	+	1	+	2	+	3	+	4	+	5	+	6	+	1	+	2	+	3	+	4	+	5	+	6	+
Core (Lower Back)				F				F				R		R														
L Hip								F						R														
R Hip				F								R																
Upper Back				F				F				R																
L shoulder				F																								
R shoulder				F				F				R																
L Knee								F						R														
R Knee				F								R																
L Ankle									F						R													
R Ankle					F								R															
L elbow																												
R elbow				F				F	F	F		R																
L wrist																												
R wrist																												
L Hand																												
R Hand																												
neck/head																												
eyes																												
L heel									F																			
R heel					F								R		R													
L toes										F						R												
R toes						F								R														

Promenade with Underarm Turn Figure Sonority Profile

	Step		1				2				3		4	
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+
Sonority Classes	trunk	*				*				*		*		
	proximal joints	*	*			*	*			*	*	*	*	
	distal joints	*	*			*	*	*		*	*	*	*	
	hands	*	*			*	*	*		*	*	*	*	
	feet	*	*	*		*	*	*		*	*	*	*	

Corner Step Figure Rubric - Lead

Dance:	Foxtrot																												
Figure:	corner step/check step																												
Video Link:	https://www.youtube.com/watch?v=s2F8VS6MUI4																												
	Lead Active Joint																												
		Music Beat 4/4 Time																											
						1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+								
		Figure Beat																											
Sonority Class	**Joint**	7	+	8	+	1	+	2	+	3	+	4	+	5	+	6	+	1	+	2	+	3	+	4	+	5	+	6	+
trunk	Core (Lower Back)				F				B				L		L														
	L Hip				F								L																
	R Hip								B						L														
	Upper Back																												
	L shoulder																												
	R shoulder																												
Proximal Joints	L Knee				F								L																
	R Knee														L														
	L Ankle					F								L															
	R Ankle															L													
Distal Joints	L elbow																												
	R elbow																												
	L wrist																												
	R wrist																												
	L Hand																												
	R Hand																												
Head	neck/head																												
	eyes																												
Feet	L heel					F								L															
	R heel									B						L													
	L toes						F								L														
	R toes								B								L												

Corner Step Figure Rubric - Follow

Forward	F																														
Backward	B																														
Left	L																														
Right	R																														
Follow Active Joint																															
	Music Beat 4/4 Time																														
				1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+													
	Figure Beat																														
Joint	7	+	8	+	1	+	2	+	3	+	4	+	5	+	6	+	1	+	2	+	3	+	4	+	5	+	6					
Core (Lower Back)				**B**				**F**				**R**			R															
L Hip								**F**							R															
R Hip				**B**								**R**																			
Upper Back																															
L shoulder																															
R shoulder																															
L Knee															R															
R Knee				**B**								**R**																			
L Ankle															R															
R Ankle					**B**								**R**																		
L elbow																															
R elbow																															
L wrist																															
R wrist																															
L Hand																															
R Hand																															
neck/head																															
eyes																															
L heel								**F**								R															
R heel						**B**								**R**																	
L toes									**F**						R																
R toes					**B**								**R**																		

Corner Step Figure Sonority Profile

	Step			1				2				3		4																	
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+																	
Sonority Classes	trunk	*				*				*		*																			
	proximal joints	*	*			*				*	*	*	*																		
	distal joints	*	*			*				*	*	*	*																		
	hands	*	*			*				*	*	*	*																		
	feet	*	*	*		*	*			*	*	*	*	*																	

Sway Step Figure Rubric - Lead

Dance:	Foxtrot																												
Figure:	Sway step																												
Video Link:	https://www.youtube.com/watch?v=BBvPTt0VqmA																												
	Lead Active Joint																												
		Music Beat 4/4 Time																											
						1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+									
		Figure Beat																											
Sonority Class	**Joint**	7	+	8	+	1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	1	+						
trunk	Core (Lower Back)				L				R				L		L		L		L										
	L Hip				L								L				L												
	R Hip								R						L				L										
	Upper Back																												
	L shoulder																												
	R shoulder																												
Proximal Joints	L Knee																												
	R Knee																												
	L Ankle					L								L				L											
	R Ankle									R						L				L									
Distal Joints	L elbow																												
	R elbow																												
	L wrist																												
	R wrist																												
	L Hand																												
	R Hand																												
Head	neck/head																												
	eyes																												
Feet	L heel					L								L				L											
	R heel										R						L				L								
	L toes					L								L				L											
	R toes								R						L				L										

Sway Step Figure Rubric - Follow

Forward	F																							
Backward	B																							
Left	L																							
Right	R																							
Follow Active Joint																								
	Music Beat 4/4 Time																							
				1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+					
	Figure Beat																							
Joint	7	+	8	+	1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	1	+		
Core (Lower Back)				**R**				**L**				**R**		R		R		R						
L Hip								**L**						R				R						
R Hip				**R**								**R**				R								
Upper Back																								
L shoulder																								
R shoulder																								
L Knee																								
R Knee																								
L Ankle								**L**						R				R						
R Ankle					**R**								**R**				R							
L elbow																								
R elbow																								
L wrist																								
R wrist																								
L Hand																								
R Hand																								
neck/head																								
eyes																								
L heel									**L**						R				R					
R heel						**R**								**R**			R							
L toes								**L**						R				R						
R toes					**R**								**R**				R							

Sway Step Figure Sonority Profile

	Step			1				2				3		4		5		6						
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+						
Sonority Classes	trunk	*				*				*		*		*		*								
	proximal joints	*	*			*	*			*	*	*	*	*	*	*	*							
	distal joints	*	*			*	*			*	*	*	*	*	*	*	*							
	hands	*	*			*	*			*	*	*	*	*	*	*	*							
	feet	*	*	*		*	*	*		*	*	*	*	*	*	*	*	*							

Weave Figure Rubric – Lead

Dance:	Foxtrot																												
Figure:	Weave																												
Video Link:	https://www.youtube.com/watch?v=bfRdRJRMdio																												
	Lead Active Joint																												
		Music Beat 4/4 Time																											
						1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+								
		Figure Beat																											
Sonority Class	**Joint**	7	+	8	+	1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	1	+	2	+	3	+	4	+
trunk	Core (Lower Back)				F				B		B		B		L		F		F		F								
	L Hip								B				B				F				F								
	R Hip				F						B				L				F										
	Upper Back																												
	L shoulder																												
	R shoulder																												
Proximal Joints	L Knee												B				F				F								
	R Knee				F						B				L				F										
	L Ankle									B				B				F				F							
	R Ankle					F						B				L				F									
Distal Joints	L elbow																												
	R elbow																												
	L wrist																												
	R wrist																												
	L Hand																												
	R Hand																												
Head	neck/head																												
	eyes																												
Feet	L heel										B				B				F			F							
	R heel					F							B				L			F									
	L toes									B				B				F					F						
	R toes						F					B				L					F								

Weave Figure Rubric - Follow

Forward	F																											
Backward	B																											
Left	L																											
Right	R																											
Follow Active Joint																												
	Music Beat 4/4 Time																											
					1	+	2	+	3	+	4	+	1	+	2	+	3	+	4	+								
	Figure Beat																											
Joint	7	+	8	+	1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	1	+	2	+	3	+	4	+
Core (Lower Back)				B				F		F		F		R		B		B		B								
L Hip				B				F				F				B				B								
R Hip										F				R				B										
Upper Back																												
L shoulder																												
R shoulder																												
L Knee				B				F				F				B				B								
R Knee										F				R				B										
L Ankle					B				F				F				B				B							
R Ankle											F				R				B									
L elbow																												
R elbow																												
L wrist																												
R wrist																												
L Hand																												
R Hand																												
neck/head																												
eyes																												
L heel						B			F				F					B				B						
R heel											F				R					B								
L toes					B					F				F			B				B						
R toes												F				R			B									

Weave Figure Sonority Profile

	Step		1				2		3		4		5		6		7		8		
	Figure beat	+	1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	1	+	2
Sonority Classes	trunk	*				*		*		*		*		*		*		*			
	proximal joints	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	distal joints	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	hands	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	feet	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	