A PHRASE-STRUCTURAL ANALYSIS OF THE FOXTROT, WITH TRANSFORMATIONAL RULES

Social dancing is described as a 'movement conversation' by teachers of social dancing. They see the many steps, combinations of movements and the blending of these as a kind of danced 'conversation' between two people. This folk explanation, interestingly, coincides with a fundamental axiom of semasiology: movement, danced or otherwise, is linguistically tied. There are many metaphorical references in the dance world that link spoken language to movement.

Another assumption of semasiological theory is that in any body language we can make a distinction between the social and the individual: the familiar Saussurian distinction of la langue and la parole. In other words, we are able to investigate the 'codes' of body languages minus the acting.

Chomsky was, I think, primarily interested in the rules of the codes of spoken languages, especially those deep and surface structural rules that are inaccessible to direct sensory perception. Chomsky formulated such rules for conventional language and changed the focus of description in linguistics from taxonomic concerns to the investigation of rule-complexes. For Chomsky to say that someone 'knows a language' means that the speaker has internalized a system of rules, but more of that later.

This paper represents a partial answer to the question 'What are the rules that create events[1] in social dancing?'. Specifically, we will examine in how far Chomskyan phrase-structure grammar is applicable in the framework of a semasiological analysis of the American Foxtrot. To my knowledge, no such application has been attempted, thus the paper is obviously not meant to be taken as the 'last word' regarding applications of this kind or as the final answer to the many questions that will inevitably arise.

For purposes of clarity I have arranged the materials in this way: I briefly review Chomskyan phrase-structure rules, then explain the basic steps in Foxtrot with which I am concerned. From that, a set of phrase-structure rules for the Foxtrot is developed. In addition, because Chomsky proposed that transformations are a property of all languages, I consider what kinds of transformational rules might be generated for the Foxtrot.

Syntactic Structures

In 1957, Chomsky formulated syntactically deeper structures that co-existed with the surface structures of sentences. The deep structure generated the surface structure and explained the relationship of the parts of the sentence to one another based on phrase-structure rules of grammar. An analysis of the constituents of a sentence based on this

grammar was called 'constituent syntactic analysis'. The basic theme in Chomsky's writings is the inadequacy of linguistic theories that confine themselves to surface structures to explain the process whereby language-users are able to generate and understand an infinite array of utterances. Since Syntactic Structures (1957), there have been many revisions and developments in his theory, both in name and in general concept. These developments cannot be discussed completely in one semester of course work, far less one paper, so that my version here is somewhat abridged.

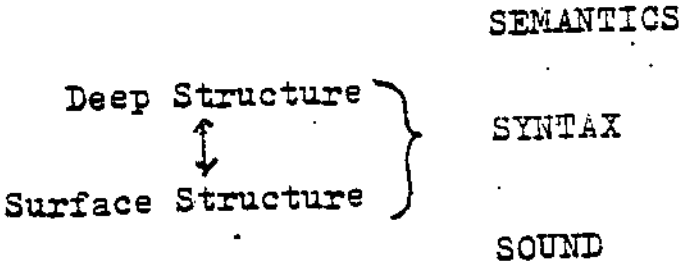


Figure 1

The above figure represents Chomsky's initial formulation in 1957 of the relationship between deep and surface structures and their place in syntactic structure. There have been several developments since then and many debates as to where in this structure the semantics fit: which part of the structure generates what, and even if this, by nature, is an adequate model to explain the rules and structure of language. There has been hot debate between the school of 'transformational generative grammar' and the 'generative semantics' over many of these questions, but these will not detain us here.

We are interested in the fact that this kind of theoretical model is formal and derives its explanatory power from logical lines of development. The phrase-structure rules were organized in the following way. A grammatical sentence is chosen from the language; rules are developed to explain it; then other sentences are found that either adhere to these rules or are counter-examples. These are juggled side-by-side until either a larger rule is found that will accommodate both example and counter-example or a new rule is developed to explain the counter-examples — and the process continues. Figure 2 represents a simplified example of some of the phrase-structure rules that Chomsky developed.

$$S \rightarrow NP + VP$$

$$NP \rightarrow (Det) + NP$$

$$VP \rightarrow V + (NP)$$

Figure 2

These rules can be quickly applied to the following sentence:

The lion killed the buffalo.

The tree diagram is a very useful mechanism to display the constituent syntactic analyses of such sentences. Simply, this is what it would look like.

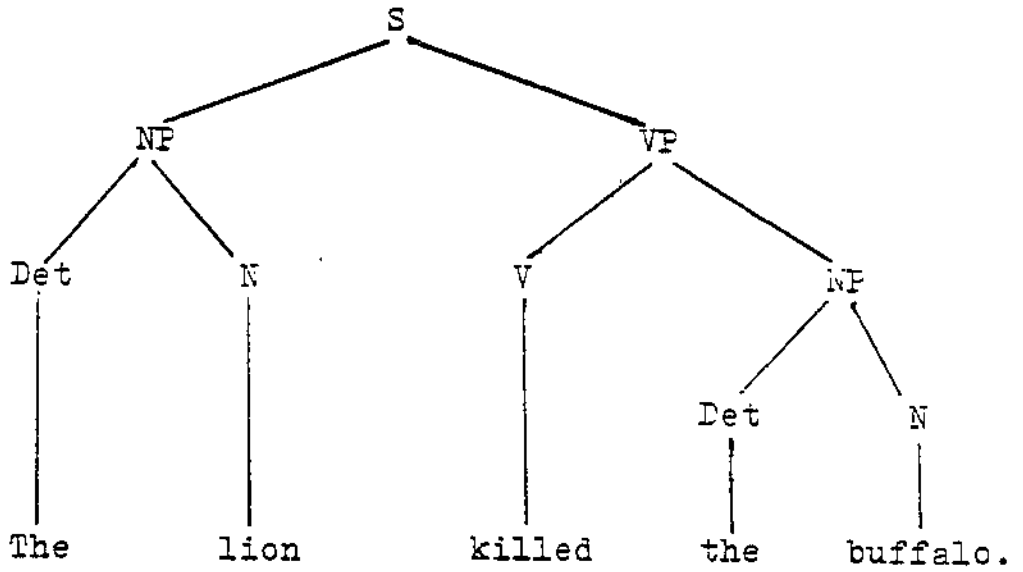


Figure 3

The deep structure here demonstrates the syntactic relationship between the noun lion to the NP part of the sentence and the noun buffalo to the VP part of the sentence. The two nouns are generated from two different parts of the sentence, one being the subject of the action, the other being the object of the action. To exchange the positions of the nouns in the sentence is to change their relationship to the action:

The lion killed the buffalo.
The buffalo killed the lion.

In this way we can explain why these two sentences do not mean the same thing.

With the addition of transformational rules one can also explain how two similarly structured sentences, with different meanings, actually derive from two different deep structures. The classic example is:

John is eager to please. ('John' is the subject of the action.)
versus
John is easy to please. ('John' is the object of the action.)

On the other hand, transformational rules can explain how the following sentences are all derived from the same or very similar deep structures:

The lion killed the buffalo.
The buffalo was killed by the lion.
Did the lion kill the buffalo?
The lion killed the buffalo, didn't it?
The lion will kill the buffalo.
The lion may have been killing the buffalo.

And, by the lack of these transformational rules being applied, certain sentences become ungrammatical:

The lion kill the buffalo.
The lion killed the buffalo, wasn't she?

Gell (1979) put it concisely: transformations are the operations which are performed on strings of symbols emanating from deeper levels in the course of their being realized as surface strings. They convert a 'deeper' or 'kernel' representation of a linguistic string into a surface representation with appropriate syntactic features. They are rules, and their non-application in contexts which demand them results in utterances which are syntactically unacceptable.

In addition, there are three features of transformational rules that are important to mention. Some rules are obligatory and must be applied in every analysis. Some are optional and are only applied if certain conditions exist. A third feature of transformational rules is that they are ordered. They are applied only once, and in the order that they are arranged. I will mention this later as the same rule conditions apply to the Foxtrot.

To sum up in two sentences: a grammar is a device which successfully distinguishes between sentences that are syntactically acceptable and unacceptable, i.e. those that the grammar can generate, and those which it cannot. A transformational generative grammar such as Chomsky and his successors developed traces the derivation of sentences uttered in natural language to their source in deeper levels of linguistic structure.

The Foxtrot

Social dance movement is structurally very complex. There can be as many as four elements that occur simultaneously in any given step: (i) the timing of the step, (ii) which foot is used, (iii) the direction of the movement, and (iv) the amount and direction of turn, if any. Although there are also lead/follow cues, styling and technique rules, body position and tempo variations that would be included in a complete structural analysis of the Foxtrot, I confine this study to basic foot patterns and basic rhythms in 'closed ballroom position'. Foxtrot, like most forms of social dancing, is an externally motivated system. The music and the rhythmic structure dominate movement patterns and 'steps'. The music of the Foxtrot is composed in 4/4 time and there are two basic rhythmic patterns, as shown below:

MAGIC STEP

Timing	1	2	3	4	1	2	3	4
Rhythm	S		S		Q	Q		

This step is uneven, takes 1½ measures to complete, is repeatable from the middle of the measure.

BOX STEP

Timing	1	2	3	4
Rhythm	S		Q	Q

This step is uneven, takes one measure to complete, starts at the begining of a measure.

(Harris, et al, 1978:320)

Figure 4

It is general knowledge among trained social dancers that usage of 'quick' and 'slow' beats, and a combination of them into rhythmic patterns, form the basis for all modern Foxtrot steps. The two parent forms of Foxtrot were based on 2/4 rhythms; the one-step and the two-step, and both were popularized before World War I by Irene and Vernon Castle with their famous 'Castle Walk'. Later on, Harry Fox developed the dance that has since borne his name: the Foxtrot. Although both older and newer forms are still danced today, they have given way to a slower, smoother 4/4 time and a more streamlined style.

The Foxtrot is danced in three tempos: slow, medium, and fast, and can be adapted to almost any tempo played in the music. Many books on technique tell us that basic Foxtrot steps can be used together in any combination or sequence.

The basic 'Magic Step' and 'Box Step' for the man are notated in their plainest form in Figure 5. In the interest of simplicity, all the written examples given will be steps for the man.[2] In these examples the woman will perform the 'natural opposite': that is, when the man goes forward the woman goes backward or when the man uses his right foot the woman uses her left foot.

The dancer who knows the basic steps and understands the fundamentals of rhythm can make up his or her own combinations easily, and can gradually develop the possibilities for variation in position, direction, and tempo. In fact, this is how the name 'Magic Step' was coined. There is so much one can do with just this one step combination that Arthur Murray considered it 'magic', and it won America's heart (all the way to his wallet).

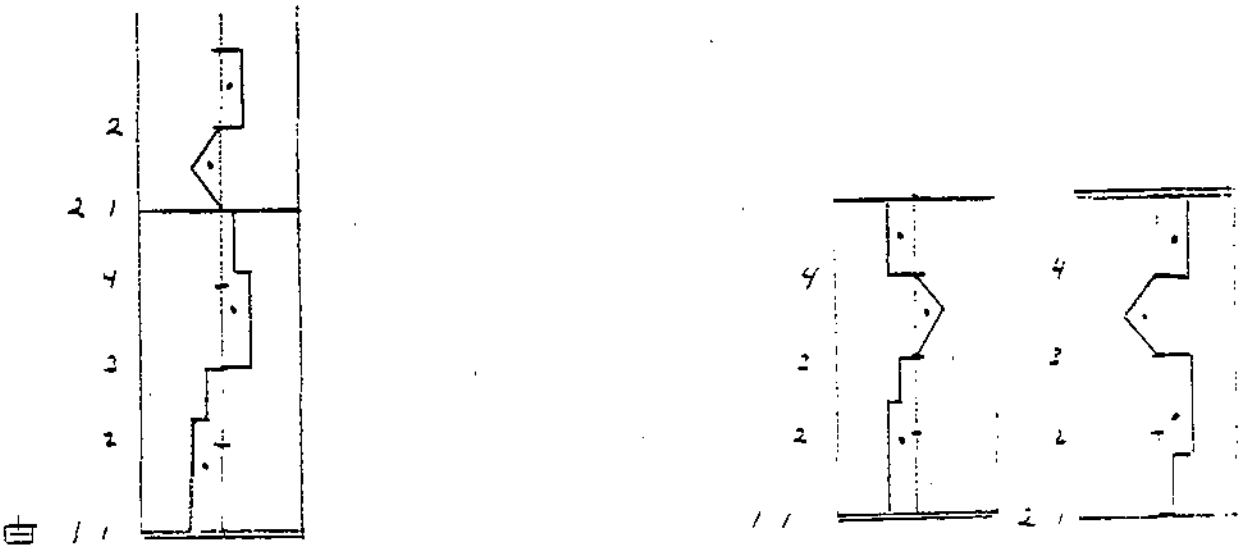


Figure 5

The Phrase-Structure Rules

Before starting, I believe that it is important to make something explicit. Williams, in 'Deep Structures of the Dance' (1976) states that rules for speech and rules for human movement belong to different conceptual worlds of semantic and logical complexity. Although this is a topic that merits full discussion by itself, and is beyond the scope of this paper, I mention it here as I believe that it is very easy to

become seduced by analytic models from other disciplines. It is too easy to believe that any analytical model can (or even should) be mapped directly onto movement data. At this point in the development of dance research I do not think that it can be stressed too strongly that though these models are 'good to think with', and can be helpful in articulating relationships that we see in our particular data bases, they can also blind us to the unique attributes of dance forms.

Toulmin (1960) has stated that it is not the empirically perceivable regularities of phenomena that science attempts to discover, but rather the nature of the forms of those regularities. It is here that we enter into the application that I have made of the concepts of phrase-structure and transformational grammars to the basic steps of the Foxtrot. What follows is a rendering of these rules. (See Appendix I for a complete list of phrase-structure rules for the Foxtrot.)

One important difference between speech and human movement in the Foxtrot presents itself as we try to define a unit comparable to the sentence, or a complete thought. In addition, there is no similar rule for order in these dance phrases comparable to the S → NP + AUX + VP in spoken language. Although phrasing in the Foxtrot dance music varies with the melodic line, the underlying rhythmic structure written in 4/4 time usually has a phrase length of four or eight measures. Therefore the unit comparable to the sentence used in this analysis will be called a 'phrase' and will be eight measures or thirty-two beats (or counts) long. The first phrase-structure rule will then be:

PS 1. Ph → 32c(...MS + BX + MS...)

In other words: a Foxtrot phrase is 32 counts of music comprised of Magic Steps and Box Steps; the order is not important. Social dance teachers have developed an extensive taxonomic system for the dances and dance steps they teach. Arthur Murray has, for example, a comprehensive booklet that represents the standards they hold for social dancing. As such, it is a veritable playground for an 'emic/etic' approach (see Appendix III). They break the steps down into parts like this:

We will continue our phrase-structure grammar with these divisions, but will then go further and look at the grammatical structure of these steps. We will develop a grammar that explains all the structural relations, both with regard to movement and rhythm, for example:

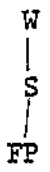
PS 2. MS → W + W + Ch

PS 3. BX → W + Ch + W + Ch

The difficulty in the development of phrase-structure rules for movement is that more than one kind of structural information occurs simultaneously. Both foot positions and timing, for instance, co-exist in the same moment. Neither can be reduced to one aspect of the other, but foot position is subordinate to timing. How to reflect this in the phrase-structure rules was problematical and two possibilities seemed logical. The first option was to create a rule stating:

PS 4a. W $\longrightarrow$ S/FP, i.e. a walk can be rewritten as consisting of a slow rhythm component and a foot position component that is subordinate to the rhythm component.

In a tree diagram it would appear this way:



But then the phrase-structure rules could be written thus:

$$W \longrightarrow \begin{cases} S \\ QQ \end{cases} ; \text{ and } S \longrightarrow FP \ .$$

The problem with this notation is that sometimes the slow component (S) can be reduced to a 'quick' (Q), or split into two 'quicks' (QQ). The way it is shown above destroys the rhythmic relationship between the S and Q in the PS rules:

PS 6. S $\longrightarrow$ cc, a slow rhythm component is two counts of music.
PS 7. Q $\longrightarrow$ c, a quick rhythm component is one count of music.

In addition, this description might create problems with dangling non-terminal elements, or in creating transformational rules to keep the proper elements together, especially proper foot assignments.

A second option was to create this rule:

PS 4b. W $\longrightarrow$ S + FP, i.e. a walk can be re-written as consisting of a slow rhythm component and a foot position component.

This option would allow each component to be acted upon separately and could be linked in their proper subordinate position at the proper time with a transformational rule, but this will be discussed later.

Something that is told to new students at a Murray studio from the start is that there are only six different ways that one can move in social dance. There is forward/backward, side left/side right, and turning right/turning left. That is all there is, everything else is a combination of these six directions. PS 10. represents four of these possibilities which can be explained in more detail through the use of a Klein group.[3]

forward	forward + right
backward	forward + left
right	backward + right
left	backward + left

Except for the turning component, these are all the logical possibilities of movement direction in space in the Foxtrot. PS 11. and PS 12. further describe the terms in Ps 10. PS 13. defines the turning component.

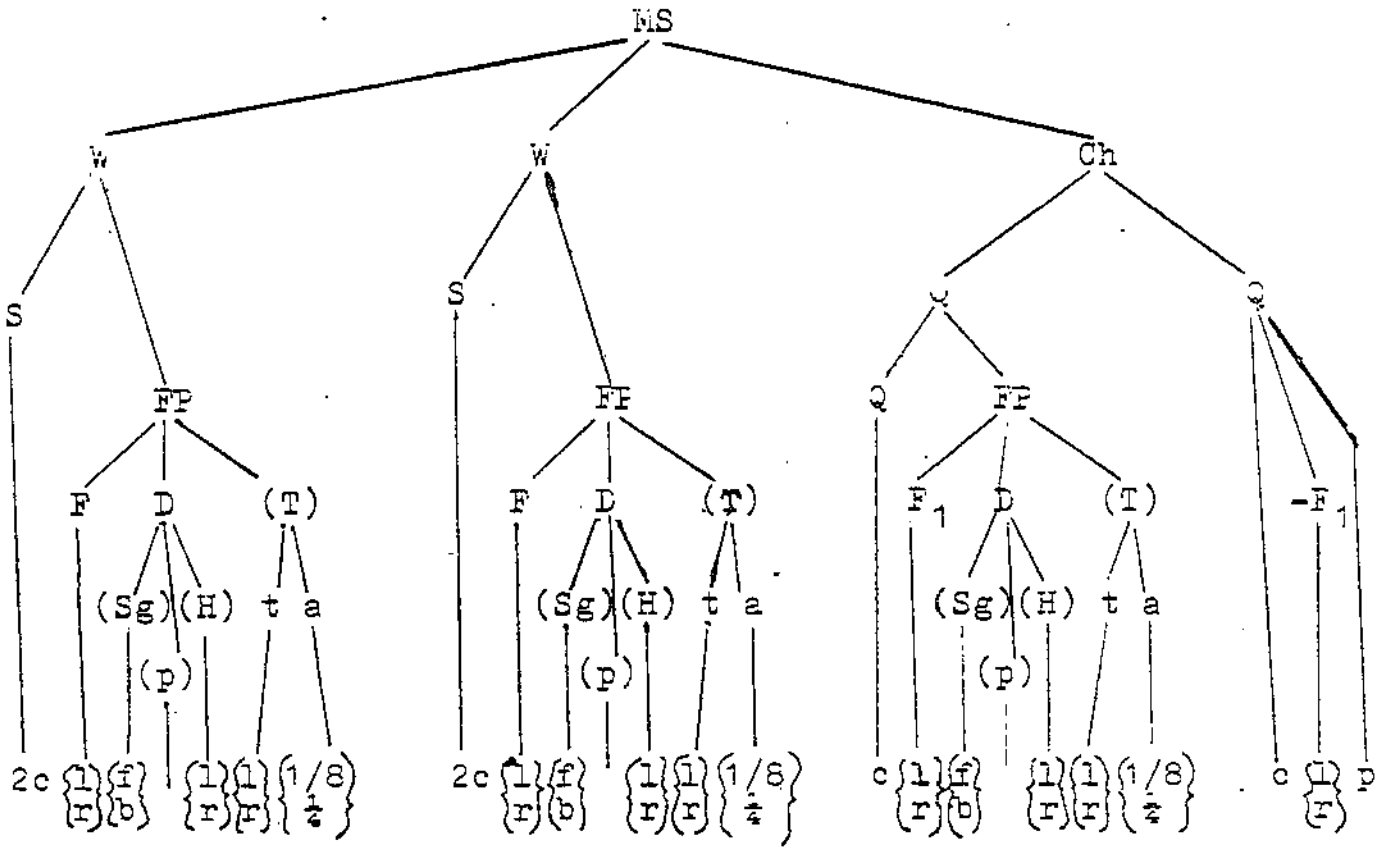
PS 10. $D \rightarrow \begin{Bmatrix} (Sg) + (H) \\ p \end{Bmatrix}$ i.e. direction will either include movement in the sagittal and/or horizontal plane, or in place, but not both.

PS 11. $Sg \rightarrow \begin{Bmatrix} f \\ b \end{Bmatrix}$ i.e. sagittal plane movement is either forward or backward.

PS 12. $H \rightarrow \begin{Bmatrix} r \\ l \end{Bmatrix}$ i.e. horizontal plane movement is either right or left.

PS 13. $T \rightarrow \begin{Bmatrix} r \\ l \end{Bmatrix} + a \begin{Bmatrix} 1/8 \\ 1/4 \end{Bmatrix}$ i.e. the turning component will include up to 1/4 turn either to the right or left.

With the application of these phrase-structure rules, the tree diagram that follows represents and accounts for all the theoretical permutations of the Magic Step as performed at the level of general social dancing. In drawing the tree diagram it appeared helpful to



place the rhythm elements S and Q on a separate line from the foot position (FP) elements. This provided for easy visual inspection of the number of counts in the dance phrase.

The tree diagram for a basic Box Step would look like the tree for one walk (W) and one chassé (Ch) repeated twice. For brevity only the first few branches will be drawn.

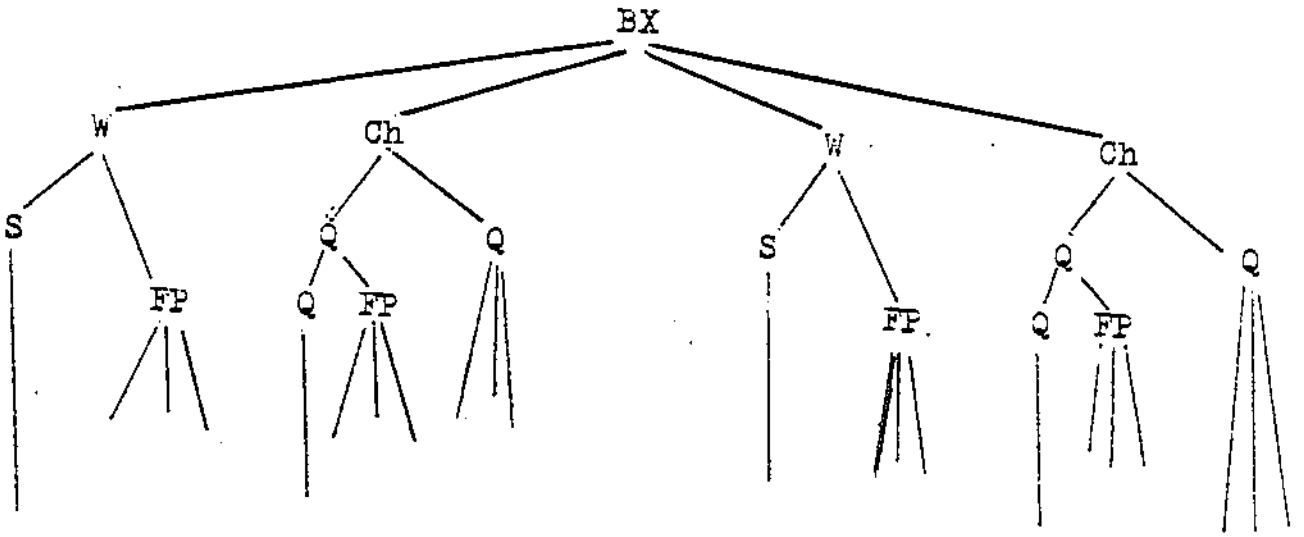


Figure 7

Transformational Rules

Chomsky stated that transformations are a property of all languages, and we believe this proposition to be true of body languages as well. I now consider what kinds of transformational rules might be generated for the Foxtrot. It is important to note before proceeding that Williams (1976:127) formulated seven basic transformational rules for sequential realization in space. Although Williams uses the term 'transformational rules' and alludes to Chomskyan analysis, her rules are not the same kinds of rules that he developed. Though Chomsky was searching for deep structures of all languages, his transformational rules applied only to specific spoken languages, not all spoken languages. In contrast, the rules that Williams has developed underlie any dance or structured system of movement anywhere in the world. For any and all step-patterns in space, regardless of the idiom of dance that is under examination, these seven rules are the only possible ones.[4]

Because Williams' structural rules are universal, they are of value to an analyst in cross-cultural comparisons of various systems of human movement. For example, one and only one of these rules, the 'rule of alternating stress', underlies all Foxtrot step patterns, and indeed, all patterns in American social dance. This 'rule of alternating stress'

and the difference between it and the kind of Chomskyan transformational rule that is employed in this syntactic analysis will be explained further in conjunction with the T_5 rule of the Foxtrot.

Below are seven transformational rules for the Foxtrot. Three are optional rules that account for certain variations which may occur while dancing at a club or in the studio while choreographing a dance. Four rules are obligatory. One rule accounts for 'gender agreement' in proper foot choice, and three rules establish the internally subordinate relationship to the FP structure and externally to the S-Rhythm structure. The seven transformational rules are listed below in ordered sequence.

T_1 Rhythm Transformation (optional)

T_2 Chassé Support Rule (optional)

T_3 Walk Support Rule (optional)

T_4 S-Rhythm/Foot Position Junction (obligatory)

T_5 Gender Agreement Rule (obligatory)

T_6 Direction/Turning Junction (obligatory)

T_7 Foot/Direction Junction (obligatory)

T_1 Rhythm Transformation (optional)

Condition: W + W of a MS are directionally forward, backward, or the reverse.
Example: Advanced Magic Left Turn (all done in 'quicks'); see Appendix III, phrase 4, measure 4.

SD	W	-	W	-	CH
Rhth Str	S	-	S	-	QQ
SI	1,2	-	1,2	-	3
SC	1,∅	-	1,∅	-	3
Rhth Str	Q	-	Q	-	QQ

Phrase 4 after application of T_1

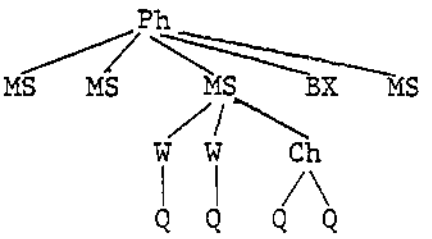


Figure 8

This sort of rhythmic change offsets the integrity of the 32 count phrase. The next two transformational rules were developed to meet that condition and variations of it.

Conditions: 1. When at PS 1. level the sum of S + Q does not complete a 32 count phrase.

2. In choreography or spontaneous dancing when the melodic line supports a rhythm change.

3. a crowded floor situation which requires quick maneuvering movements.

T_2 Chassé Support Rule (optional)

Further condition: minimum 2 counts of music free.

SD W - W - Ch
SI 1 - 2 - 3
SC 1 - 2 - 3,3 (3) (3)

optional to repeat up to three times.[5]

T_3 Walk Support Rule (optional)

Further condition: minimum 4 counts of music free.

SD W - W - Ch
SI 1 - 2 - 3
SC 1 2, 1 - 2 - 3

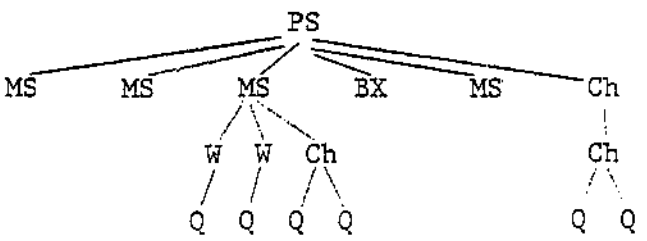
(May optionally be placed between 2 and 3 or after 3)

SC_1 1 - 2 - 1 2 - 3

SC_2 1 - 2 - 3, 1 2

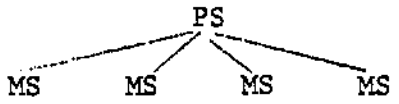
We can apply T_2 to Phrase 4 to restore the integrity of the 32 count phrase. The Chassé is added to the end of the phrase. Compare this tree diagram with the one followint T_1 application in Figure 8.

T_2 application:



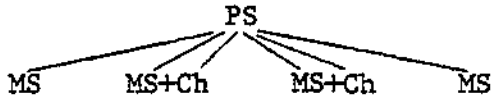
Phrase 2 (Appendix III) also received these applications; in fact, both the Chassé Support and the Walk Support rules.

DS:



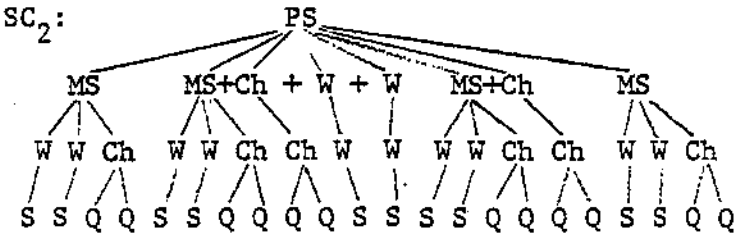
=24 counts

T_2:



=28 counts

T_3, SC_2:



The next four transformations are obligatory, but must not be applied before the phrase is complete so that proper foot positions will be correct. This would especially become obvious if ungrammatical sentences were analysed, particularly with foot gender agreement and rhythm in mind. Some of this is pointed out in Appendix III in phrases 5 and 6, but, will not be discussed here.[6]

T_4 <u>S-Rhythm/Foot Position Junction</u>[7] (obligatory)

This transformation was developed in lieu of the alternate notation with regard to the subordination of the FP to the rhythm component (page 253; PS 4a). The rationale for delaying this tranformation until now is to allow the rhythmic changes to be cleared up first, before the foot position is wedded to the rhythm.

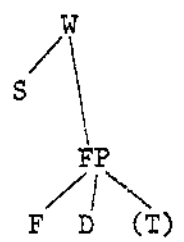
SD $\begin{Bmatrix} S \\ Q \end{Bmatrix}$ - FP

SI 1 - 2

SC 1#2 - Ø

n.b. '#' = Chomskyan adjunction[7]

The application of this rule looks as follows:



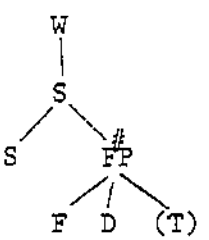


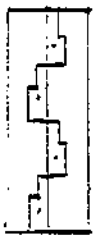
Figure 9

This notation and rule allows the rhythmic component to manifest itself high in the tree structure and also have a terminal element in the bottom line.

T_5 Gender Agreement Rule (obligatory)

That a man always starts with his left foot and a woman always with her right foot is one of the first rules taught in American social dancing. What is implicitly understood by both teacher and student is that the transference of weight through space occurs only by alternating from one foot to the other as in walking. There are no hopping, jumping, or leaping locomotions.

There are several ways to express this Gender Agreement Rule. Williams' deep structural 'rule of alternating stress' can be simply Labanotated or expressed in a phrase-structure rule.



PS 14. $F \rightarrow X + X' + X + X' + \ldots$

PS 14a. $F_m \rightarrow 1 + r + 1 + r \ldots$

PS 14b. $F_f \rightarrow r + 1 + r + 1 \ldots$

But, two subsidiary phrase structure rules would be needed to differentiate the male and the female rules. This solution can be cumbersome to apply and unnecessarily awkward to express. It can also be confused with PS 9. Therefore, PS 9. was left intact and T_5 was created as a Chomskyan type of transformational rule that is informed by Williams' 'rule of alternating stress'.

T_5:

	SD	X	-	F_1	-	X	-	F_2	-	X	-	F_3	-	...
				{r,1}				{r,1}				{r,1}		
	SI	1	-	2,3	-	1	-	2,3	-	1	-	2,3	-	...
M	SC	1	-	Ø,3	-	1	-	2,Ø	-	1	-	Ø,3	-	...
F	SC	1	-	2,Ø	-	1	-	Ø,3	-	1	-	2,Ø	-	...

This transformation establishes proper foot (F) assignments at the terminal elements; it can be applied safely once the rhythm/foot position relationship is established by T_4.

The last two transformations were developed to establish the subordinate relationship within the foot position structure between F, D, and T. They were separated originally for the purpose of clarity and simplicity. The initial structures, otherwise, would have been visually incomprehensible.

T_6: Direction / Turning Junction (obligatory)

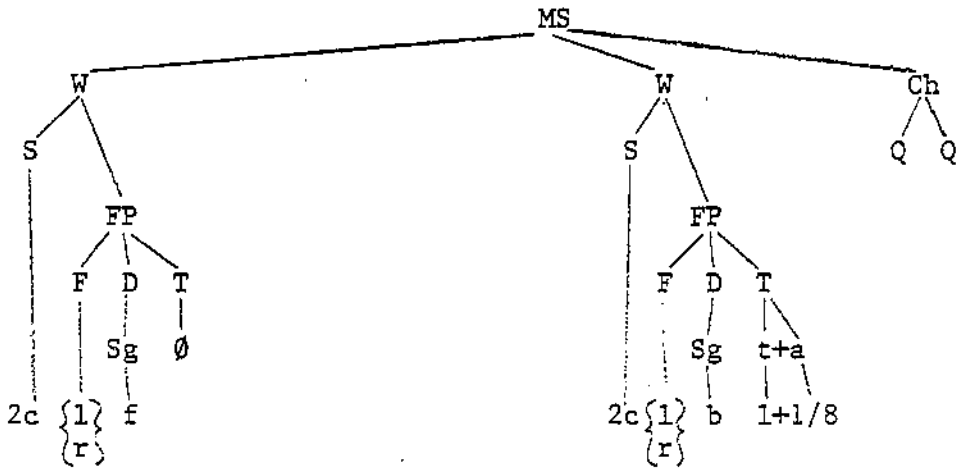
SD	X	-	D	-	T
SI	1	-	2	-	3
SC	1	-	2#3	-	Ø

T_7: Foot/Direction Junction (obligatory)

SD	F	-	D
SI	1	-	2
SC	1#2	-	Ø

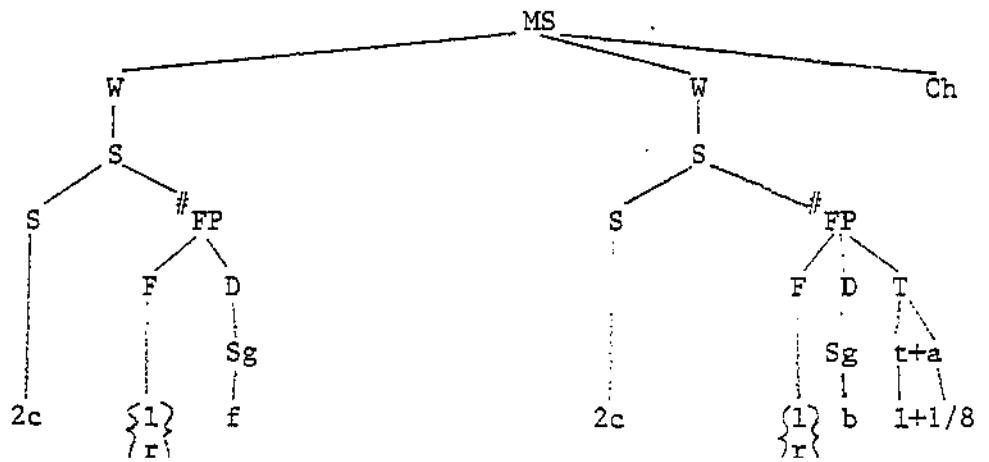
To illustrate the application of these last four obligatory rules let us look at two walking steps from a Magic Left Turn (see Appendix II or III, sample phrase 1, meas. 4). The application of the phrase-structure rules to the two steps will produce the deep structure shown below.

DS:



T_1, T_2, T_3 do not apply here.

T_4 S-Rhythm/Foot Position Junction

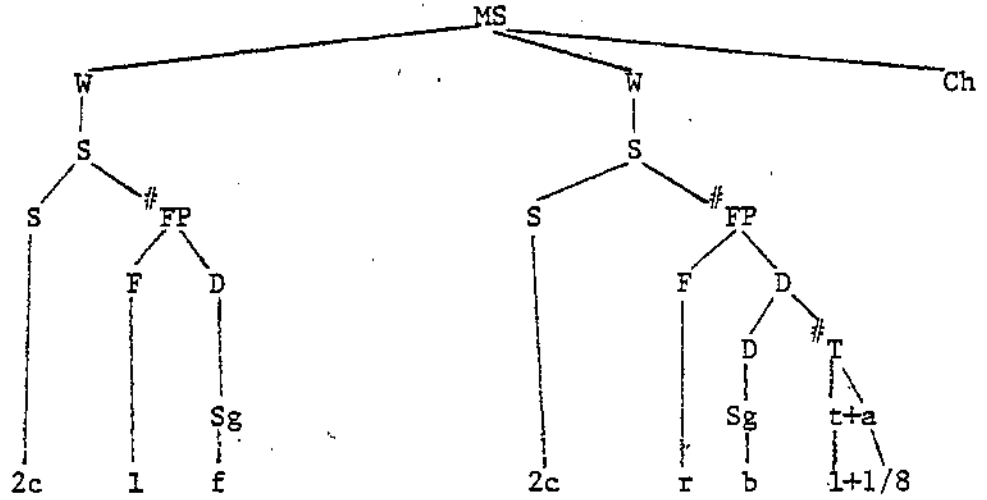


For brevity both T_5 and T_6 rules will be applied together, remembering that these are the man's steps:

T_5 Gender Agreement Rule

T_6 Direction/Turning Junction

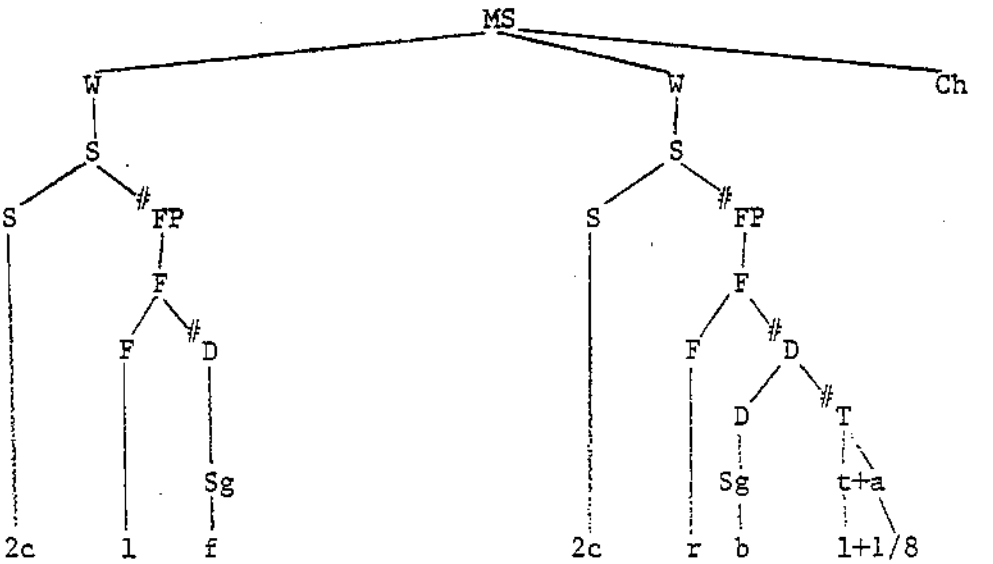
T_6:



T_5:

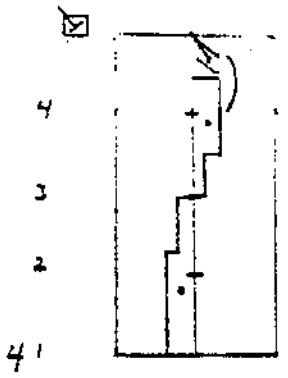
With the application of T_7 Foot/Direction Junction, we arrive at the Surface Structure:

T_7:



This final surface structure does two things: (i) it accurately describes the movement to be performed through the terminal elements; and (ii) it preserves the subordinate relationships that occur in the underlying structure, while allowing for a relatively clear rendering of (i). If translated into verbal language the bottom line of T_7 would read: move for two counts the left foot forward; then move for two counts the right foot backwards, turning left 1/8 of a turn.

Below is the notated version of these steps:



Sample phrase 1, measure 4

Figure 10

Conclusion

Many aspects of this investigation are still in progress; some of them revolve around applications of more sophisticated linguistic generative models to more subtle areas of concern. One area of investigation may generate some rules similar to 'phonemic' transformational rules that could explain how the same step such as the Box Step can be transferred from one dance to others by utilizing the different stylistic elements of different idioms of dance, such as Rhumba, Samba and Waltz. Another interesting line of enquiry involves the proposition of the generative semanticists that the meaning of the sentence lies in the deep structure, and is transmitted to the surface structure. For example, in the term 'Magic Step' is embodied all the techniques and rules that generate that step. Upon hearing that name anyone who has trained in the Foxtrot immediately understands what is required to perform it.

At this point one might well ask 'So what?' What is actually happening here? There are a few important points of explanation. This kind of description of Foxtrot not only describes the step, but is an explanation of some of the rules, conventions and logical relationships that generate the total danced action. The tree diagram that was explained earlier can generate and account for all the grammatical possibilities for any Foxtrot step combination performed at the level of general social dancing. A comparison of such rules with those of other idioms may illuminate just what cognitive elements dances are really made of.

Also, this type of description raises questions with regard to exactly what a body language is, and what part rules like this might play. Gell (1979:29) states that the Waltz (or in this case the Foxtrot) is a specialized form of walking, and therefore the language of dance would draw its elements from the repertoire of general motor skills as well as from gestural language, facial expressions, and the like. He then would like to find the explanation of that which is

expressive in dance in the neuro-muscular mechanisms. Although it is true that the vocabulary of the language will draw its repertoire from motor skills, I propose that we might better understand the body language of dance if we focus on the specialized forms these externally motivated systems take. In one sense, we can say what differentiates the Foxtrot from 'regular walking'[8] are precisely such rules as have been discussed here and that are imposed on walking by an externally motivated system.

One might ask in how far these kinds of rules form the structure of body language. I would go so far as to say that it is the rules themselves that define just what a Foxtrot step is because these few rules can generate all the Foxtrot steps one can produce. I close with a statement from Malcolm Crick:

> It is precisely the conceptual structures which contain the syntax of those events which the investigator can actually observe. It is the semantic structures which are generative, behaviour merely being the linear realization of these constitutive programes. ... Human action is a semantic fabric, so any social investigation must be a conceptual inquiry. Any other starting-point will make a nonsense of scientific method (1976:96).

Edward A. Myers, Jr.

NOTES

1. Ardener (1973) speaks of events as being more than simple output. We are here interested in the 'structures of realizations' (s-structures) as they are observable as the 'stream of (danced) events'.

2. See Appendix II for the notated examples used in this analysis. Phrases 1 through 4 are grammatical utterances while 5 and 6 are ungrammatical. The phrases in Appendix III describe in verbal terms the notation in Appendix II.

3. For further explanation of the use of Klein groups in mathematics I refer the reader to the Barbut article in Lane (1970:367-88). For an application of Klein groups in semasiological theory, see Williams (1976a).

4. In an unpublished letter, Taylor (1977) delivers the kinds of criticism that can emerge when the transformational rules formulated by both Chomsky and Williams are conflated. Also, it presents a case where too strict an application of a linguistic model to movement data weakens both the data and the importance of the linguistic analogy.

5. Executing more than eight quick steps in a row may be grammatical, but is unacceptable. Such an execution has been described by female dancers as being 'boring'. Another instance of this occurs in phrase 6, measures 2 through 4. Though unsubstantiated to date, one plausible explanation for this is rhythmically tied. The utterance exceeds the two measure rhythmic length for a basic step in Foxtrot. Further clarification on this issue must await further study.

6. The ungrammaticality of phrases 5 and 6 in Appendix III is explained as a case of incorrect rhythmic structure, improper foot usage, and/or being off-time with the music.

7. 'Junction' is employed in transformations T_4, T_6, T_7 to establish a relationship between two elements in the structure of a step. The Chomskyan adjunction is used to identify the dominate element in that relationship. Transformational rules in spoken language make similar usage of the adjunction. In a 'contraction transformation' the negative element is linked subordinately to the verbal element of the auxiliary. Likewise in a 'passive transformation' the preposition 'by' is linked to the NP of the Indirect Object.

8. The term 'regular walking' is in inverted commas because there is really no such thing. Some people are identifiable at a distance from their walk, as if it were their signature. This is true of people from different cultures or groups as well. I think that we may find, eventually, that the semantics of everyday movements may be better understood in the light of the formal systems of movement within the culture.

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APPENDIX I

PHRASE-STRUCTURE RULES FOR THE FOXTROT

PS 1.	$Ph \rightarrow 32c[...MS + BX + MS...]$	A Foxtrot phrase is 32 beats of music comprised of combinations of Magic Steps and Box Steps; order is not important.
PS 2.	$MS \rightarrow W + W + Ch$	A Magic Step consists of two Walks and a Chassé in that order.
PS 3.	$BX \rightarrow W + CH + W + Ch$	A Box Step consists of four parts in the following order: Walk, Chassé, Walk, Chassé.
PS 4.	$W \rightarrow S + FP$	A Walk consists of a Slow rhythm component and a Foot Position component.
PS 5.	$Ch \rightarrow Q/FP + Q \begin{bmatrix} -F \\ P \end{bmatrix}$	A Chassé is composed of two Quick steps; the first with its own FP subordinate to it, and the second whose FP is contingent on the first and closing next to it in place.
PS 6.	$S \rightarrow cc$	A Slow rhythm component is two beats (counts) of music.
PS 7.	$Q \rightarrow c$	A Quick rhythm component is one beat (count) of music.
PS 8.	$FP \rightarrow F + D + (T)$	Foot Position consists of a Foot choice, a Direction, and optionally, its Turning component.

PS 9. $F \rightarrow \begin{Bmatrix} r \\ l \end{Bmatrix}$

A Foot choice can either be right or left.

PS 10. $D \rightarrow \left\{ \begin{matrix} (Sg) \\ p \end{matrix} + (H) \right\}$

Direction will either include movement in the Sagittal plane and/or the Horizontal plane; or in place, but not both.

PS 11. $Sg \rightarrow \begin{Bmatrix} f \\ b \end{Bmatrix}$

Movement in the Sagittal plane is either forward or backward.

PS 12. $H \rightarrow \begin{Bmatrix} r \\ l \end{Bmatrix}$

Movement in the Horizontal plane is either to the right or the left.

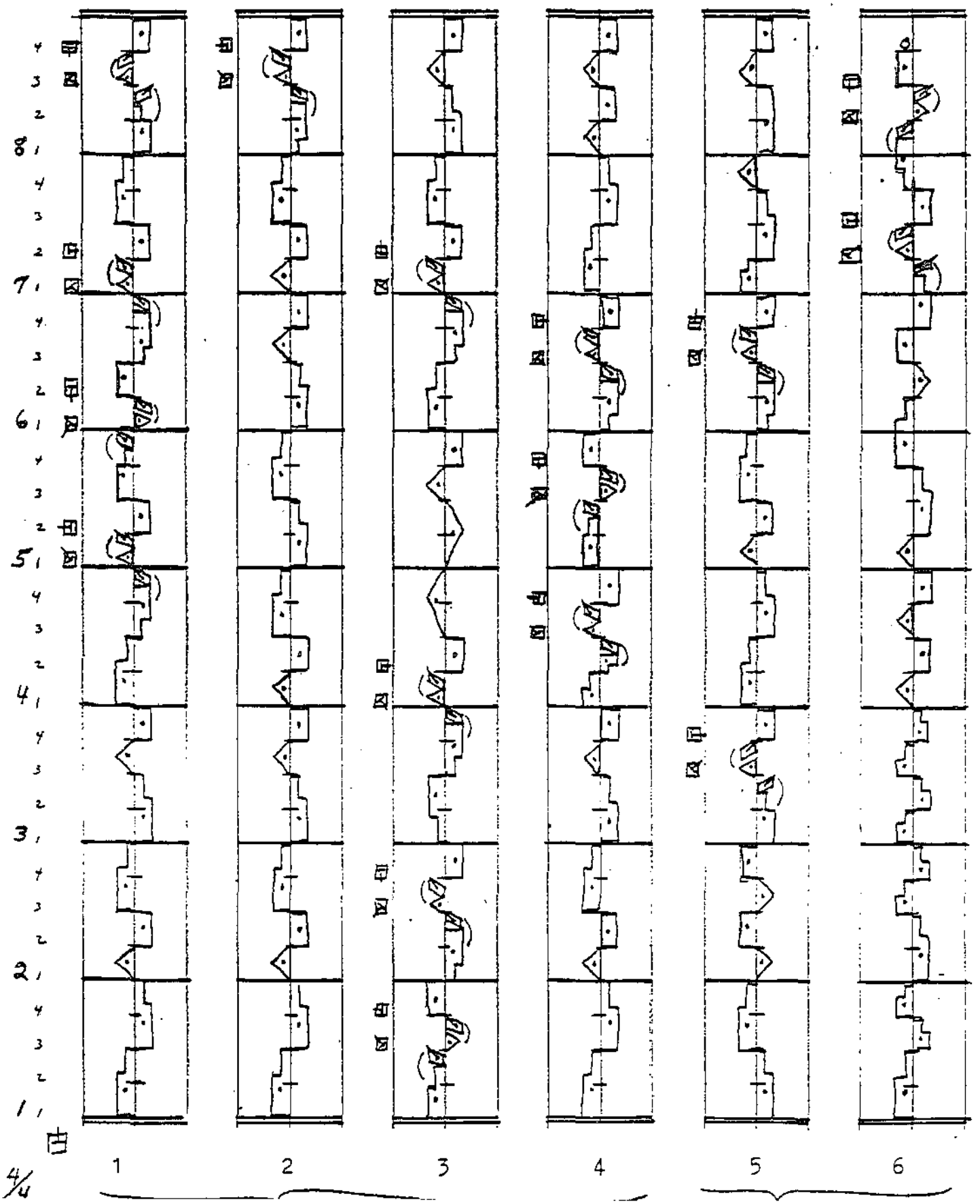
PS 13. $T \rightarrow t \begin{Bmatrix} r \\ l \end{Bmatrix} + a \begin{Bmatrix} 1/8 \\ 1/4 \end{Bmatrix}$

The Turning component will include up to a 1/4 turn either to the right or left.

APPENDIX II

These six phrases of Labanotated Foxtrot movement will serve as

THE DATA



APPENDIX III

In this Appendix the Labanotated phrases are described in words used by teachers of social dance. Read this notation from top to bottom.

	1	2	3	4	5*	6*
11	Magic step	Magic step	Left box turn	Magic step	Magic step	Running steps
2						
3						
4						
21						
2						
3	Magic step	Magic step		Magic step	Chassé	
4						
31			Back magic step turning left		1/2 Right box turn	Fwd steps quick timing (x4)
2						
3						
4						
41	Magic left turn	Chassé		Advanced Magic left turn	Magic step	Chassé
2						
3		Walk	Swing step			Chassé
4						
51		Walk		Left box turn		Side step Magic step
2						
3	Left box turn	Magic step			Magic left turn	
4						
61			Magic left turn			
2						
3						
4						Right box turn
71		Chassé		Magic step	Magic step	
2						
3	Magic step	Magic left turn	Magic step			
4	(turning right)					
81						
2						
3				Chassé	Chassé	
4						

*Ungrammatical phrases explained

(5) 1,1-2,2 wrong foot choice
2,3-3,4 this action puts dancer back on proper foot
4,1-6,4 grammatical
7,1-8,2 FP ok, but wrong rhythm (i.e., QSQS)

(6) 1,1-2,4 grammatical
3,1-3,4 grammatical, but unconventional
4,1-4,4 grammatical but unconventional after so many quicks
5,1 incomplete chasse
5,2-6,3 SSQQ rhythm ok, but wrong foot choice, off time to music
6,4-8,3 SQQSQQ rhythm and foot choice ok, but off time to music