Pattern Acquisition: Linear Sequences
in Dancing, Music, and Language

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Abstract

Dancing, music, and language have much in common. They consist of linear sequences generated by the human brain to express feelings and emotion. This paper explores their commonalities and the implications that they raise for language teaching in the hopes that a more artistic approach may increase student motivation.

Preface

It is often said that life is a marathon. I have never run a full marathon (42.195 km), or even a half marathon, but I was a long-distance runner (3.2 km) for one season in high school. What I learned was that you must pace yourself at the beginning of the race, but as you approach the finish line, you should run as hard as you can. Thus with about 8 years left until retirement, I have decided to work as hard as I can to get my Japanese students to actually communicate in English—not just fill-in blanks, choose between four possible answers, or memorize short dialogs that will soon be forgotten. I am determined to get my students to express *their own thoughts, feelings, and knowledge* in English— their own English, at their own level.

A couple of years ago, in order to underscore this determination, I gave the *conversation practice* in my oral classes a new title: *English Only Time.* My goal became to keep my students communicating in English for 30 minutes. I have yet to reach that goal. Their determination breaks down within a week or two. Why? Well, they say that English is difficult. Even after six years of lectures and intensive grammar practice in high school and junior high, the overwhelming majority can only form simple sentences, very slowly and painfully. Their approach to language seems extremely *mechanical*, based on a hodge-podge of rules that they cannot quite remember.

I believe that a more flexible approach to language patterns, with emphasis on the *basic* ones and a program that progresses *step-by-step*—with extensive practice at each step along the way may remedy this situation. Students need to start talking right from the beginning. Communication is not a science, to be studied and reduced to a set of mechanical rules; it is an art that needs to be practiced—like music or dancing. In this paper I would like to expound upon these two metaphors.

Dance, music, and language—all three are made up of *linear sequences.* Dancers move their feet, hands, shoulders, and hips in sequence usually to a count of four or eight beats. During each such cycle a single "*step*" is completed. A piece of music consists *at a macro level* of a sequence of *chords*, while *at a micro level* the melody—and possibly one or more lines of harmony—are produced as a sequence of *single notes*. Linguists analyze languages at multiple levels: phonemes make up syllables, which in turn form *words*, that are put into noun *phrases* and verb clusters (my term for combinations of verbs and their modals), which make up *sentences*. At each level the constituents come out of the mouth one by one in well-ordered *sequences*.

Order is fundamental to any linear sequence. Sometimes it is preserved in written notation or committed to memory. Dancers will spend vast amounts of time learning dances *by heart* so they can perform them in front of large audiences. Classical musicians learn to *read* musical notation so that they can practice songs and play them at concerts exactly the way they were written. Politicians read speeches from teleprompters in front of TV cameras. Some of the most famous and moving speeches and scripts will then be *memorized* and *recited* by students and actors. These are *performances*, meant for an audience.

Show dancers and social dancers

Real-life conversations, however, are not *scripted, rehearsed* performances. They are *spontaneous social interactions*. They cannot be memorized and perfected, like the routines of *show* dancers. Normal communication involves partners, not audiences. The skills of conversation must, therefore, be learned like *social* dancing. Dance students start dancing on their very first day with some basic steps, which their teacher talks them through. Each step is broken down into smaller parts usually corresponding to four or eight beats. They soon move on to short routines with the teacher calling out the steps. Explanations are kept short and simple. The music is a little slow. The beat is kept simple and clear.

Lessons are typically followed by a free dance party … free, because there is no extra charge for people who have taken the lesson and because the dancers are on their own, without anyone to guide them through the steps. Some people at the party have taken that day's lesson, some have not. Some may not have taken any recent lessons or have taken lessons some place else. New dancers must *interact* with all these people, so that their movements will be in *harmony*.

On the dance floor they are free to use dance steps in any *order* they want and with whatever *variations* they choose to use. They have *choices* to make, freely, choices which they must communicate to their partners.

Free dance time can be scary for new dancers, but is essential to their progress and for them to retain what they have learned in lessons. In theory, the men *lead*. They select the steps, string them together in unique, unpredictable combinations, and non-verbally communicate each step along the way to their partners. Women need to develop *sensitivity* and *quick reactions* in order to follow these leads. All this is done in time to music which is typically faster than the music used during lessons and has a more complex rhythm that disguises the beat. Despite the pressures that independence and real social interaction bring, however, even novice dancers can manage to relax and have fun.

Many students at Japanese universities seem to have adopted a *show dance* attitude towards English. To them English is a performance that needs to be memorized, performed, and forgotten when the show is over. A large number of students feel like they are being interrogated by their teachers and scrutinized by their peers (see McVeigh, 2002, 106–111 and 180–187). As a result they often clam up or avoid expressing any thought that is original and might be considered "incorrect". A *social dance* attitude—emphasizing *freedom, interaction, and fun*—could increase the motivation of demoralized students that have lost all interest in foreign languages and help them relax. They have been *studying* English for six years. It is high time they started *speaking* English. On the first day of class I call on individuals and ask them to *say something*, anything, in English. Some produce *single words*—step one. There is not much communication involved at first. One can not do much more with isolated words than point at physical objects or drawings and say their names. Next I ask students to *tell me something*. That usually requires a

verb in a full sentence. *Isolated, vague sentences* represent the next step, step two. Step three—I ask them to produced *connected sentences*. They might all start telling me what they *like* or what they *have*. I call this a happyo-kai (発表会), where everyone goes around in a circle giving short answers to the same question: what do you like? OR what do you have with you? There is very little elaboration and no change of direction in the topic.

With continued prodding these short sentences can be expanded into conversations: I like strawberries. (… How do you like to eat them? I put condensed milk on them. It's delicious.) I don't like studying English. (… How did you study English? We had lots of lectures about grammar rules. Oh, yuck.). Teachers need to demonstrate and students need to learn to take over responsibility for the prodding that will lead to real conversations. As early as possible, teachers should move them away from fixed routines (show dancing) to spontaneous personal interaction (social dancing).

Dance steps are invariably broken down into sequences of *four or eight beats*. This makes the explanations of dance patterns easy to understand. Grammatical explanations of English can also be simplified by breaking sentences down into sequences of *four parts*. Simple explanations, however, are not sufficient. Declarative knowledge needs to be activated in order to achieve linguistic skill. Let me demonstrate with the metaphor of musical theory and training.

Reading music and *improvisation*

Music is another fine art with similarities to language and its acquisition. From the fourth grade of elementary school through high school I played the trumpet. I was supposed to practice thirty minutes a day at home alone. It was *boring* and *mechanical* and hardly ever lasted more than five minutes.

I was never able to just sit down and play along with my favorite records. I could only try with a great amount of effort to follow the notes written in the musical scores in my textbook, mechanically pressing down the corresponding combination of valves: 1–2, 1–3, open, 1–3, 1–2 three times, 1–3 three times, 1–2, open twice.

It was not until I began to play the guitar that I could understand musical patterns and learned to improvise. Although music has *a dual system* of patterns, trumpets can only play *single notes*—elements of the *micro pattern* of music— Furthermore the change in pitch is not visually obvious. Different pitches are produced by pressing down on three valves, which add one, two, and three units of length to the trumpet's tubing. There is no physical sense of skipping over Eb (valves 2–3), for example, when a trumpet goes from D (valves 1–3) to E (valves 1–2). On a trombone the player would pull the slide from position 5 back to position 3 and be quite aware that they were moving through position 4. A piano player moves up the keyboard, and a guitarist moves up the fret board *or* from one string to a string of higher pitch.

C	C	G	C
EDCD	EEE-	DDD-	EGG-

C	C	G	C
EDCD	EEEE	DDED	C—

Figure 1. The dual system of music: chords above, singles notes below.

Guitars and pianos, unlike trumpets and most other musical instruments, are able to play musical triads, known as major and minor chords—elements of the *macro pattern* of music—as well as single notes. Whereas a song's melody is invariably a long and complex sequence of single notes, the chord pattern is much simpler, often just three or four chords. Take, for instance, a common first song like "*Mary Had a Little Lamb*" (see Figure 1). All measures except the last

one have three or four notes, often going up and down among the four pitches used. The two chords, on the other hand, are simply alternated. The strumming pattern is relatively free. The guitarist can strum once, twice, or four times during each measure *or* just hit various strings of the chord in an appropriate rhythm. In many popular songs there are only a *few chords*—three or four—and their relationship to each other is quite predictable.

This dual system of musical patterns—(1) the pattern of single notes that make up major scales and (2) the pattern of chords that make up a circular array (see Wales et all., 2013 for the closely related array of major and minor scales) called the Circle of Fifths—dominates Western music. With a practical knowledge of these two patterns and a guitar that is in tune, you can play along by ear with many of the songs you listen to. Step one is to figure out what key (the target key) the song is in, because only seven of the twelve possible pitches fit into a major scale.

The pattern of intervals between ascending notes is the same for any key. The key of C makes a good example, because the piano keyboard was designed to highlight notes in that particular key. The seven long, wide white keys (A through G) are *in* the key of C. The five short, narrow black keys (sharps and flats) are *out*. One black key lies between five of the seven intervals between the white keys. A guitarist skips these notes as he goes up or down the fret board. Violinists, who do not have frets, call these "wide intervals" (D. Dunkley, personal communication, December 2013). The two remaining "close intervals" are easy to spot on pianos—two white keys lie next to each other. Thus "sweet notes" (if there is such a term) and sour notes alternate within each octave, except for these two spots, where two adjacent notes fit the scale.
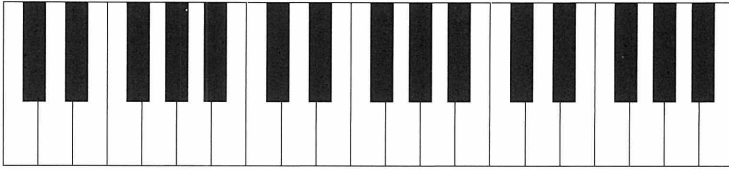
Figure 2. The piano keyboard illustrates the pattern of major scales. The white keys represent notes in the scale, while five black keys in each octave represent notes that are skipped over, because they fall outside the scale.

Such a pair of adjacent sweet notes can be used to identify the key of any song a guitarist may wish to play. The higher note provides a candidate for the root note of the target key. A guitarist can simply try playing one of the two candidate scales on the three top (high pitch) strings of their guitar. With the index finger placed on the G string at the candidate root note (assigned as fret 1), the fret patterns in ascending pitch are 1–3 on the G string, then 1–2–4 on the B string, and finally 1–3–4 on the high E string. If this pattern fits they have a winner. If not, they can try the other candidate scale.

Once they know the key, they are ready to predict the three or four chords most likely to be used in the song that they want to play along with. Major and minor chords are combinations of three notes—triads—repeated across octaves. (Guitars have six strings with a range of two octaves across the strings.) We can use a C chord as an example of a major chord. A triad of the first (C), third (E), and fifth (G) notes of the C scale make up a C chord. There are two wide intervals between the C and the E notes (2+2=4), but one wide and one close interval (2+1=3) between the E and the G. On the piano keyboard a C chord appears as three alternate white keys—C (no D), E (no F), and G.

Now let's take a look at what happens when we move this pattern of white keys (first, third, and fifth) to the right. If we go two keys to the right, we will get a triad that begins on E and also has G, but the C note has been replaced by a B. Notice that the pattern has changed from the major chord pattern. The

first interval (between E and G) is 3 (one wide and one close, as described above), while the second interval is 4 (two wide intervals). This is the minor chord pattern. Since the chord starts on E, it is called E minor (Em). If we move the 3-key pattern two white keys to the right again, the next chord is a major chord—G.

The Em chord shares two notes with the C chord and two with the G chord. This is important to keep in mind, because we might find that G (or C) works pretty well in the song, but still does not sound quite right. Then we should try a chord which is close to it, like Em. If we move the 3-key pattern to the left from the C chord, we get Am, F, and Dm. The major chords can be arranged in a circular array (called the Circle of Fifths)—a pattern that indicates the relationships of chords to each other. The minor chords can be placed between the major chords as shown in Figure 3. Notice that the sequence of minor chords is simply a displaced version of the major chords.
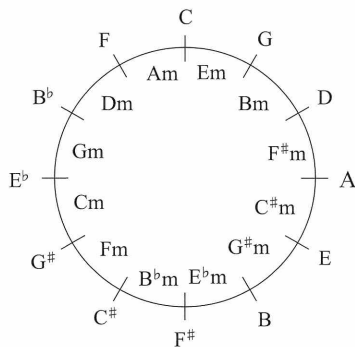

Figure 3. This enhanced Circle of Fifths illustrates the pattern of both major and minor chords and their relationship to each other. Three adjacent major chords are commonly used in three-chord songs. Four-chord songs usually add the minor chord to the left (counter clockwise) of the middle major chord.

The sequence of minor chords is simply a displaced version of the major chords. Interestingly, this enhanced diagram actually shows the single notes that

make up each of the twelve major and twelve minor chords. Starting on any chord and ignoring the "m" of the minor chords, the chord itself and the next two in a clockwise direction are the names of the triad of notes that produce that chord. The overlap in adjacent chords explains why they sound so much alike[1].

With the Circle of Fifths we can explain which chords are most likely to appear in any key. Again we will use the key of C as an example. The C chord is almost certain to occur. In 3-chord songs the major chords on either side—F and G—will, with great certainty, appear with the C chord. The fourth chord in a 4-chord song will most likely be Am.

At the micro-level of music, an A minor scale contains the exact same notes as the C major scale, but begins on A rather than C. Therefore, when you determine a song to be in the key of C, it may actually be in the key of Am. The chord that is certain to appear in a 3-chord song in the key of Am will be Am chord (the relative minor of C major) instead of C, and the last note of the song is most likely to be an A note rather than a C.

A great majority of songs are made up of combinations of three adjacent major chords and the relative minor chord. Full songs or isolated chord progressions can easily be transposed from one key into another simply by displacement on the Circle of Fifths.

You may wonder why I have given such a detailed description of musical theory. I have several reasons: (1) like sentence structure in many languages, musical structure is best described as a *dual system* of patterns, (2) the basic musical patterns can be explained quite simply in just a few pages, and (3) the road to mastering a musical instrument, a language, or dancing is the same. It takes more than a simple understanding of the patterns. It requires *practice in tandem with continued attention* to those patterns. Guitarists need to *continue* listening to music (getting musical input) and strumming their guitars (practicing) to improve their skill. By mastering the macro and micro patterns

of music, they can play along to most any song they hear. Using these patterns they are able to improvise and their music fits in smoothly. Notice that there is no attempt here or anywhere at a complete scientific description of all possible music, nothing comparable to the heroic attempt to describe all possible sentences in the English language using a few phrase structure rules and some basic transformations (see Jannedy, Poletto, and Weldon, 1994, 170–175, 192–201, and 204–207).

Let us turn our attention now to linguistic communication. It is not governed by unbreakable rules, like the laws of physics (Blair, 2013). Rules are products of the human mind, not its driving force[2]. The brain uses patterns. Patterns are made to be bent and broken. People break them out of sheer boredom or just for the fun of it. Perhaps that is why grammar rules always seem to have exceptions … because they are NOT rules at all, they are patterns. Artists consciously change the patterns they employ and their art evolves. Languages evolve, too.

Language, somewhat analogous to music, seems to have patterns at two distinct levels: micro and macro patterns. English sentences can be broken down at the *macro-level* into a pattern of four zones—S, V, O, and A. Japanese sentences have a similar pattern—S, A, O, and V—with the zones in a different order. Within the three noun zones (S, A, and O) reside noun phrases[3], which can be further broken down at the *micro-level* into four parts.

Musical scales begin with *do-re-mi*. English noun phrases can be broken down into *1–2–3* and a fourth part, four zones (⊠).We utilize two kinds of adjectives[4] to describe the objects (or metaphorical objects) that we call nouns[5]. Here are a few examples:

1 区	2 区	3 区	4 区
my		brother	(whose name is) Bob
some	delicious	sushi	
	two	friends	from high school
a	small	restaurant	near our house

Framework 1. English noun phrases in a micro frame.

Like dance steps there is a fourth part[6]—embedded noun phrases (and clauses) that function as adjectives. This kind of embedding has no analog in dancing or music.

Noun phrases attach at the macro level to a verb to form sentences— independent clauses, which can also be embedded, as dependent clauses, into other sentences or even into noun phrases. Here is a sample English sentence, with noun phrases (in italics) embedded into other noun phrases:

S 区	V 区	O 区	A 区
My brother Bob	ate	some delicious sushi	with two friends *from high school* at a small restaurant *near our house.*

Framework 2. English sentence in a macro frame.

Japanese sentences can also be analyzed at these two distinct levels. First the noun phrases (simplified to exclude embedded noun phrases):

1 区	2 区	3 区
		兄
	美味しい	寿司
	二人の	友達
	小さな	restaurant

(7)

Framework 3. Japanese noun phrases in a micro frame. There is no system of articles, and determiners do not appear so often. Embedded noun phrases and clauses (not shown here) come in front of the modified noun.

When these are attached to the verb in the Japanese phrase order, the same principle of dual patterning is clearly exhibitted:

S 区	A 区	O 区	V 区
兄が	二人の友達と 小さな restaurant で	美味しい寿司を	食べた。

(8)

Framework 4. Japanese sentence in a macro frame.

Conclusions

Learning to speak a language is like learning to *improvise* on a musical instrument. It's *NOT* about *memorizing* the right words in a fixed order. Speakers have to be able to manipulate a *few basic patterns* in the target language spontaneously. Nor is a large vocabulary required. Like guitar players, who manage to play dozens of songs using only 4 chords, language learners should use the words *already in their vocabulary* and incorporate new words as they find them to be useful.

Repetition is an essential part of the practice. It allows slow, mechanical

delivery to become smooth, quick, automatic, and expressive. Changing chords on the guitar is painfully slow at the beginning. Only when it becomes automatic can the student begin to focus on the larger pattern of chord progressions. Language learners need to become fluent with the phrases they use in order to concentrate on the larger meaning of sentences.

Pattern acquisition in dancing, music, language, and a host of other skills consists of direct *observation*, a little explicit *instruction* to accelerate the process, and a large amount of *practice*. The brain needs constant input and output to acquire and retain these skills.

Lectures are not a suitable format for language classes. Grammatical knowledge is not the goal, communication is. Yet communication without any grammar is impossible. *Word order* and the *grouping* of words into phrases is an essential ingredient of communication. If a speaker simply strings words together in some random sequence, it is unlikely that their message will be clearly understood.

An explicit *framework* of slots at two different levels can be used to break down word order and grouping within sentences, making the structure visually clear and easy to understand. Written practice becomes quite simple. Students just fold their paper in half and again in half—basic origami. Dividing both Japanese and English sentences into four parts forces students to reflect on the macro patterns of the two languages—to notice the *great similarity in structure* and the *slight difference in phrase order*.
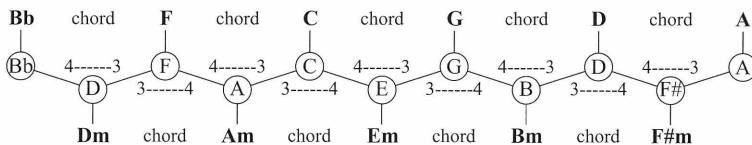
Acknowledgments

This paper is dedicated to the people (the songs I identify them with in parenthesis) who shared their interest in playing guitar with me, thus putting me on that path and inspiring me to continue to this day: Freddy Lutz (House of the Rising Sun), Jay Miracle (In the Early Morning Rain), and Shane Hurley (The Ballad of Jeff and Yoko). I would also like to express my appreciation for the people who put up with my albeit short practice sessions on the trumpet: my brothers Mick, Russ, and Greg and my parents Rita and Robert Blair. Trumpets are loud and I like to blare.

Points of Contact

Notes

(1) A closer look at a segment of the Enhanced Circle of Fifths reveals how the reversed intervals allow the major and minor chords to fit together in this alternating pattern.

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Bb    chord     F     chord     C     chord     G     chord     D     chord     A
(Bb)  4------3  (F)  4------3  (C)  4------3  (G)  4------3  (D)  4------3  (A)
 (D)   3------4  (A)  3------4  (E)  3------4  (B)  3------4  (F#)
Dm    chord     Am    chord    Em    chord    Bm    chord    F#m
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(2) Actually, at a basic level the laws of physics drive the entire universe, but at the level of complexity of the human brain they are unable to make any useful predictions.

Music, too, at a fundamental level is based on precise mathematical ratios. This can be demonstrated with a guitar string (low E works best). Gently touching your finger exactly in the middle of the string makes it vibrate with a node at that point. The string vibrates at exactly twice the frequency, producing a pitch one octave above the pitch of the full string (the root note in a chord, do). Touch the string one fifth and then one third of the way down the length of the string. The string

vibrates five times and three times the frequency, producing the other two pitches of the major chord (mi and so respectively). Touching the string one fourth of the way down produces the root note (do), two octaves above the full string.

Adjacent major chords in the Circle of Fifths express related ratios. Starting with an open chord, (E, for example) move up (in pitch) the fret board. Press down, forming a barred chord, at the fifth (3/4 of *each* string's full length), and then the seventh fret (2/3 of each full length). Factors of two in the ratios can be ignored, because they produce the same note, just in different octaves. First you get at A chord, then a B chord. The remaining factors are 1/3 and 3, going in opposite directions around the Circle of Fifths.

The mathematical paradox of the Circle of Fifths is that twelve moves— all involving factors of three—bring you back to the same note or octave equivalent—which, mathematically, must be some power of two. I guess, the mathematics breaks down at some point and gives way to *art*.

(3) In English, subjects, objects, and complements have no connecting particles (prepositions). With few exceptions, all other (shall we call them miscellaneous?) nouns require prepositions to mark their relationship to the verb. In Japanese, with few exceptions, all nouns except complements require particles (joshi=助詞). In class I use the symbol "+" to emphasize the presence of these connecting words and the fact that they are dependent on, but distinct from their noun partners. Thus the zones in Japanese sentences become S+, A+, O+/C (complements reside in the same zone as objects); in English sentences the equivalent zones are then S, O/C, and +A.

(4) The class of adjectives in zone one [1区] is a closed set of adjectives, often called *determiners*. Only one can go in this position. They include the articles (a, an, some, the), possession pronouns (my, your, his, her, its, our, their), and a few other words (this, that, these, those).

The other class, in zone two [2区], is the regular open set of adjectives that include number, size, color, and shape.

(5) The noun is located in zone three [3区].

(6) Embedded noun phrases and clauses can function as adjectives. They are located in zone four [4区] along with their connecting words.

(7) Ani = my older brother. Oishii sushi = delicious sushi. Futari no tomodachi = two friends. Chiisa na restaurant = small restaurant. (I have used the English

spelling for "restaurant", in place of katakana and in place of the Romanized spelling that reflects the katakana form of foreign loan words.)

(8)   Ani ga futari no tomodachi to chiisa na restaurant de oishii sushi wo tabeta. = My older brother ate delicious sushi with two friends at small restaurant. (I have omitted articles that would appear in native-speaker English. As above, I have used the English spelling for "restaurant".)

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