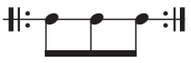
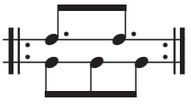
Introduction

Let your right hand tap this figure on your thigh:



Now, with your left hand, tap two beats in the time it takes your right hand to play a cycle of three beats.



This is polyrhythm – in its simplest form.

A polyrhythm is the texture that results when two or more independent layers of rhythm or tempo are played simultaneously.

This book makes a journey from this starting point all the way to highly complex rhythm patterns. It explains how polyrhythms are constructed and how you can learn to master them.

Why?

As a percussionist who plays primarily contemporary music on a daily basis, I am constantly challenged to solve very complex rhythm patterns. For several years I used my knowledge of basic polyrhythms combined with a little intuition and guesswork when I had to play very difficult polyrhythms. The result was usually acceptable, but never extraordinary. I clearly experienced that, despite my in many ways flawed ability to play polyrhythms, what I did intuitively had potential. But I also realized that it would be appropriate to try to develop the purely intuitive into a method: an approach that does not depend on one's personal intuition in the moment but can be learned from others and establishes a solid grip on all the difficult stuff.

Professional musicians spend their entire lives pursuing something that is better than good. To become better at all aspects of their profession. Why is it, then, that polyrhythms are generally a rather neglected area? Are polyrhythms more difficult than other aspects of music? The answer is no. Polyrhythm is about being able to execute relationships. In other words, to understand the precise relation between rhythms – and musically to be able to "account for" the relationship by implementing it in sound. Implementing relationships is a key concept for music in general. An interval is a relationship. A harmony consists of relationships. A scale consists of relationships. And a polyrhythm consists, in the end, only of relationships. Even so, polyrhythm is rarely taken as seriously as other elements in music.

I had an intuitive idea of a method that might be able to shed light on this nebulous area of music. I began in-depth research, collaborating with mathematicians, engineers and physicists, among others. The crucial piece of the puzzle that caused my method to fall into place came to me in my sleep. It came to me with such force that it tore me from my slumber. I rushed straight to my notepad, where I spent the rest of the night scribbling away. The theory I had been working on until that point was based on the idea that there are two sources of rhythm, condensed essences, which form the basis of more complex polyrhythms. What fell into place for me that night was how these condensed rhythmic structures exist in all polyrhythms. How one can understand and execute even the most difficult polyrhythms with the wave of a magic wand, by understanding just two essential rhythmic structures. How one can see the connection and the relationship between all kinds of rhythms in a very simple manner.

What?

Polyrhythms are used in virtually every culture throughout the world, from Polynesian folklore to Beethoven symphonies, from avant-garde to jazz, pop and electronica. But what is it about polyrhythms that people find so alluring? The answer to that question is as complicated as the definition of polyrhythms is simple. At the most basic level, a polyrhythm occurs when two or more tempi are played at the same time. The result of these tempi can be heard as a single independent rhythm. Two tempi = one rhythm. The word *polyrhythmic* is therefore a bit misleading. *Polypulse* or *polytempo* would perhaps more precisely describe the essence of the concept. Purely musically speaking, polyrhythm has many faces. It can create suspense and tension, but also calm and relaxed moods. It can expand a sense of dimension in music. It can hypnotize and intoxicate. It can make you want to dance, but also put a spoke in the wheel of everything that is danceable. In other words, its ways are inscrutable.

Who?

This book is for all instrumentalists with a desire to boost their polyrhythmic ability. In terms of genre, it is primarily intended for interpreters of 20th and 21st century classical works, but it will be an eye-opener for musicians working in any genre where polyrhythms are used. Although it starts with the most fundamental polyrhythms, it advances in level relatively quickly and as such is not suitable for beginners. In addition to addressing musicians, it is also relevant to composers and musicologists, as the method reveals rhythmic possibilities that I personally have never come across before. Finally, the book may also be read by music students, conductors, music teachers and anyone with an interest in music.

How?

The method described here combines an intellectual and a physical understanding of the deeper structure of polyrhythms. When it comes to feel and swing, thinking is not necessarily enough. They must come from within; the rhythm must be felt and not intellectualized. Having said that, precision, clarity and transparency is often lost under the pretext of following one's inner feeling. In becoming completely aware of the exact relationship between the different layers of rhythm, a sparkling clarity can

be achieved that will make the rhythms shine. Therefore, use both heart and mind when you maneuver in the polyrhythmic battlefield.

Some of the rhythms that you will encounter in this book may look hopelessly complicated at first glance. With the Hildebrandt Method you will be able to execute such complex rhythms and see them in a new and simplified light. Perhaps you will suddenly be able to play polyrhythms that you never dreamed of and that you rarely encounter in the repertoire. Dealing with rhythms that are out of the ordinary will sharpen your general level of rhythmic performance and make most other rhythms seem like child's play.

To think or not to think …

In this book, theoretical knowledge about the structure of rhythms is combined with practical exercises. The theoretical part, which comprises the first half of the book, is based on geometrical and mathematical insight into rhythmic structures. Understanding the theory will be a great advantage when tackling the practical part. A recommended cocktail is to enjoy the theoretical and practical parts side by side. Although the theory can be cumbersome at times, persist with it. You will have plenty of opportunities to just play away. As your muscle memory begins to take over, you can also slowly disconnect the analytical part of your brain. But before autopilot is engaged, let your logical sense control the course of action.

On the use of mathematics in this book

Although this book is written for musicians and not scientists, I have chosen to use the language of mathematics to present selected phenomena clearly and unambiguously. I believe that polyrhythm is a field that is handled with far too much guesswork and haphazardly groping one's way.

If you are terrified by mathematics, the book can still be read and understood without referring to the underlying mathematics. The mathematical sections are simply a service to those readers who find them interesting and beneficial.

Many refer to music as a language; remember that mathematics is a language too. It is a man-made language that helps us understand the laws of physics. And although many musicians don't like this idea, music wouldn't exist without physics. Instead of seeing the two as separate phenomena, why not accept the fact that physics is a condition for music's existence, and that mathematics can help us perceive music from a broader and clearer perspective?

One of the greatest differences between mathematics and music, in my opinion, is the unambiguous versus the ambiguous. Mathematics always seeks the unique, definitive proof: a sublime truth that cannot be contended. In music, we crave the ambiguous. We adore anything that can be interpreted in multiple ways. Nothing delights us more than song lyrics that can be understood on many levels. Modulations where a harmony has one function in the previous key, and an entirely new function in the context of the next key. A rhythm that can be perceived in several ways, depending on where we choose to hear the stressed beats. The examples are endless. But the unambiguity of mathematics can help us musicians clarify the ambiguity we want to express. Unambiguity can promote ambiguity. For example, in the world of rhythm, we have a musical counterpart to the famously ambiguous image of the vase and the

two faces (Rubin's Vase). It is when you create this alluring effect that doubts arise as to whether a rhythm should be perceived as a:b or b:a (in principle the same result, but a world apart in feeling). The lines below can be read as a polyrhythm, either 4:5 or 5:4. There is no indication given as to which it should be:

If these lines are implemented in sound, the brain must make a choice as to how the rhythm is to be perceived. In the example below on the left, five pulse-defining units have been added, which in practice sends a message to our brains that the rhythm is a 4:5 cycle. In the example on the right, four pulse-defining units are added, that makes us register this version as 5:4.

But without the pulse-defining notes under the illustrations, it would be entirely up to the individual what he or she experiences when the lines are implemented in sound.

The drawing thus contains a certain amount of ambiguity. But to achieve this ambiguity when the rhythm is perceived in practice, it is imperative that both rhythmic layers are played with absolute mathematical precision and balance.

Now let's compare this with the vase and the two faces. If this illustration is not constructed with the utmost precision, the illusion will never occur. And that is exactly my point. As musicians, we are illusionists. We must enchant, fascinate and surprise, and that is exactly what mathematics can help us do. If we let it.

What do you see?

What do you hear?

1 About Polyrhythm in General

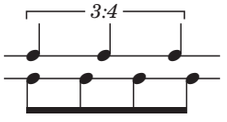
How is a polyrhythm defined?

What exactly is the stuff that this book deals with? What is this power in music that is said to create the most fascinating illusions?

What precisely is a polyrhythm?

A polyrhythm is the product of two or more independent layers of rhythm or tempo being played simultaneously.

Like when 3 evenly spaced units are played over 4 evenly spaced units:

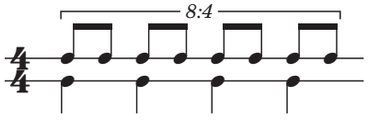


A two-part polyrhythm consists of two tempi – a and b – where a and b are not divisible by each other, and where there is no integer greater than (>) 1 by which both a and b are divisible (i.e. *a:b* cannot be reduced). A two-part polyrhythm is notated *a:b*, pronounced "*a* over *b*".

In polyrhythms in which a and b are not divisible by each other, but both are divisible by the same integer >1, we have a cycle consisting of several polyrhythms.

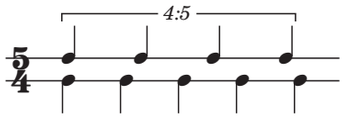
Examples

Not a polyrhythm:



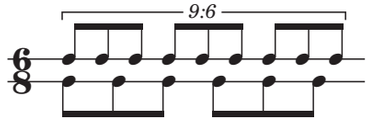
8:4 can be reduced to 2:1, and is therefore not a polyrhythm, but in this case eighth notes played over quarter notes.

A polyrhythm:



4:5 cannot be reduced and is therefore a polyrhythm.

A polyrhythm played three times:



9:6 can be reduced to 3:2 by dividing the two numbers by 3. 9:6 is therefore a polyrhythm played three times.

Tempo and meter

$a : b$

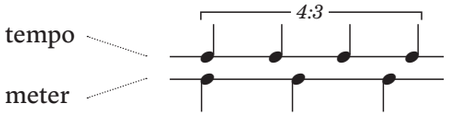
When a two-part polyrhythm is implemented in sound, it is a consequence of two numbers set against each other. I use the letters *a* and *b* to express these two numbers in a general sense. To avoid the empty-sounding expressions *a* and *b*, I also call these two components *tempo* and *meter*. The word *meter* is used in a musical context to describe how time signatures are constructed. For instance, when the time signature consists of three beats, and we want to play a polyrhythm over those three beats (meter 3), the addition of a *foreign* tempo is needed. When I use the word *tempo* in this context, it is derived from the expression *foreign tempo*, and refers to the layer that creates polyrhythmic tension. If the meter is 3, the counterrhythm could be tempo 5. From a hierarchical perspective, meter stands above tempo because it creates a rhythmic foundation, on which tempo is allowed to be foreign tempo.

Meter (b)

Meter can be considered a ticking clock. In polyrhythms – and possibly in music in general – the most important ingredient is time. Time may be considered a linear direction of movement in which anything can happen. Mankind subdivides the constant passage of time into years, months, weeks, days, hours, minutes and seconds. But in the world of music, it is often impractical to deal with minutes and seconds. Here, time is therefore divided into something more human: pulses or beats, which can be added together into measures. Time division, pulse and beat fall under the concept of meter. In the case of polyrhythms, the metric layer is always the primary one, because other layers are categorized based on the pulse established by the meter.

Tempo (a)

The tempo layer is a foreign element added on top of the metric layer that creates the characteristic tension of polyrhythms. The human ear will always try to find a primary and a secondary layer when exposed to a polyrhythm. Tempo is the secondary of the two – though it is absolutely equal in importance to meter, since the tempo layer creates the rhythmic tension we desire. Tempo and meter are deeply dependent on each other if polyrhythm is to occur. A septuplet will, for example, only be a septuplet if it has a meter (a divided timeline) to which it relates. Otherwise, it will just be seven units evenly distributed over time. And if the metric layer is not set against another tempo layer, it is nothing more than a static tape measure.



For the sake of clarity, in this book the metric layer will always be notated with its note stems pointing down, and the tempo layer with its stems up.

How is a polyrhythm played?

The tempo values are distributed evenly in time across the metric note values, with the beginning of each rhythm cycle being the only point of conjunction.

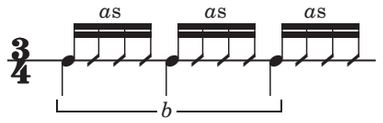
In practice:

Divide each of *b*'s values into the number of *a*s and play every *b*th subdivision.

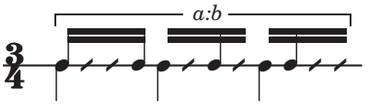
In the following example, 4 tempo units are to be played over 3 metric units.

4:3

1. *b* (3) is devided into *a*s (4s):

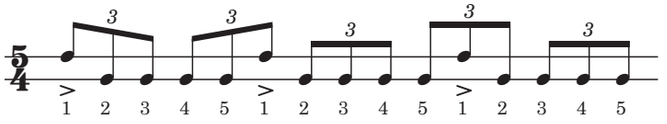


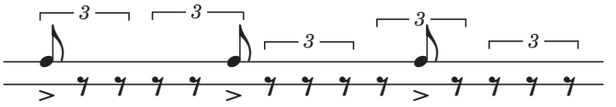
2. Every *b*th (3rd) subdivision is played:



Tuplets

As a consequence of the rule on the previous page, *a* will always define how the pulse is divided. For example, 3:5 is generated by dividing the pulse into triplets (and playing every 5th triplet beat).





Similarly, the pulse in 5:4 will be divided into quintuplets (playing every 4th quintuplet beat). 7:3 is divided into septuplets, and so on. All basic polyrhythms are thus based on subdividing. Therefore, the first step on the road to mastering polyrhythms is to feel completely at home with all types of pulse subdivisions.

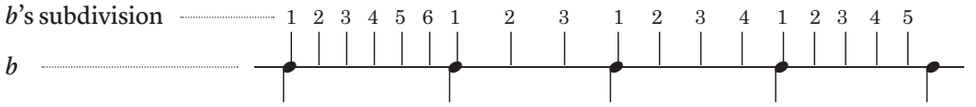
A tuplet can be notated 2:1, 3:1, 4:1, 5:1 – and so on – and is not in itself a polyrhythm (because 1 adds up to all integers – see the definition on page 11).

etc.

Before or at the same time as you tackle the actual polyrhythmic exercises, I recommend practicing tuplets from 1 to 9 units per pulse beat. They should be practiced with a metronome to achieve the best possible accuracy. The slower the practice tempo, the more challenging precision becomes. As the rhythmic stability of your playing improves, practice alternating between two different types of tuplets, such as quintuplets and septuplets. Work your way through all possible combinations until you can jump from tuplet to tuplet without the slightest wobble. Remember to pay extreme attention to precision. The metronome should not just be a guide here; consider it an indispensable partner if you want to achieve true precision.

No matter how skilled you become in the art of polyrhythm, it's helpful to go back and tend to your tuplets from time to time.

If *b* can be considered a *division* of time, tuplets can be seen as a *subdivision* of this division.



Below, the most common tuplets are presented.

- Play, sing or clap each tuplet with the metronome.
- How slow can you go? Practice gradually decreasing the bpm, preferably all the way down to 30 bpm.
- Start by practicing the rhythms in numerical order. Then randomly jump around between them.
- Learn the different grouping options in each tuplet and switch freely between them (a few possibilities are shown below).
- Keep going until you can freely and fluidly bounce around between all the tuplets and nail the tick of the metronome each time.