Analyzing the Chromatic Harmonica Pitch Set

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Discovering Your Instrument

What notes go where exactly and why would I play that note? Or chord? Or anything else for that matter? What do I mean to express and how do I mean to express it? These are all important questions in making music.

When you don't just want to play other people's tunes, but also write your own music, you probably don't want people to tell you, picking up their harmonica or guitar, placing their mouth or fingers in a particular position, "This is a C-chord." What is a C-chord? Without context, it doesn't mean much to me.

> **Coincidentally!** Not to annoy you and keep you hanging : When you have a standard twelve bar Blues progression, it consists of prime, quart, and quint offsets. The prime is the tonic, the quart raises it to the fourth note in the major scale, the quint to the fifth note in the major scale.
>
> The progression : I – I – I – I – IV – IV – I – I – V – IV – I – V (end of song: I)
>
> This means that when you're playing in G, the quart is a C, and the quint a D. When you play the most basic of basic supporting walking shuffles, this consists of the first, second, and third note of the respective chord (major prime, major third, and major quint), with an added major sixth. So if you hit the bar where the offset is quart, it's C — C - E — E - G — G - A — A.
>
> You can play chords melodically and harmonically, and you can also choose not to stick to them. Your main question should be, "What do I mean to express?" One example of a man breaking conventions was Robert Johnson, who to my knowledge came up with the use of the flat-seventh. (So, how do you use that one? Figure it out, later on. For a C-major chord it's A#.)

When you discover your instrument, since you play notes, the analysis should be based on pitch development and the position on the instrument. To analyze pitch, you will need to look at it in two ways : *absolute pitch* and *relative pitch*.

Most books only teach you to look at an instrument from the point of view of absolute pitch. On guitar you're taught to learn at least the first two strings by heart, but it also teaches patterns. The first two strings offer the absolute pitch, but the patterns relative pitch.

Did you know that on the guitar, if you imagine that for *all of the strings* the relative note distance is 2½ (or 5 frets), instead of also one note distance of 2 (or 4 frets), you can make it

easier for yourself learning scale patterns like a Blues scale pattern? Officially on the guitar, the low to high transition from the fourth to fifth string is only a relative note distance of 2 (or 4 frets). Yet, you only have to learn one scale pattern!

When you know the consistent 2½ note distance or 5 fret pattern, you can start on any string, and just remember that the default pattern shifts toward the body one fret, raising the tone with half a tone, for the two highest pitched strings! When you know the top two strings and the relative pitch development for a consistent 5 fret increment, you can easily determine your pitch and melodic scale pattern.

If I'm not mistaken, for chords, you have different scale patterns based on the regular guitar layout. Maybe looking at it melodically also will still offer a new perspective?

The chromatic harmonica, although it looks relatively easy to play, when you don't learn relative pitch patterns also, will prove elusive to play. Especially when you want to compose your own songs, understanding both absolute and relative pitch are important.

Absolute Pitch

I have a Hohner 64 Chromonica, which I'll be using to illustrate the analysis, but other chromatic harps typically follow the same pattern, so the analysis here provided most likely applies to those as well. Look it up, just to be sure. If you have a different note spread, just go through the same steps I go through here, and you should be fine.

Who knows, maybe it will work for the diatonic too, if you apply this kind of analysis? If you don't try, you don't know.

Table 1 illustrates the basic pitch set of my harmonica. As you can see, every hole has a pitch based on the C-major scale, meaning that the relative pitch in terms of tone distance is actually irregular. This makes it difficult when you look at it from an absolute pitch point of view, to determine the relative scale differences starting in different keys.

> **Note!** Instruments that don't look like a piano and have multiple tones associated with one picking position, typically seem to have a chordal arrangement. This means that you can easily discover chord patterns to play folk tunes on them.

Only use the absolute pitch chart to determine your key, not your relative scale steps.

B+s	*C#*	*F*	*G#*	*C#*	*C#*	*F*	*G#*	*C#*	*C#*	*F*	*G#*	*C#*	*C#*	*F*	*G#*	*C#*
B	C	E	G	C	C	E	G	C	C	E	G	C	C	E	G	C
	1*	**2***	**3***	**4***	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
D	D	F	A	B	D	F	A	B	D	F	A	B	D	F	A	B
D+s	*D#*	*F#*	*A#*	*C*	*D#*	*F#*	*A#*	*C*	*D#*	*F#*	*A#*	*C*	*D#*	*F#*	*A#*	*C*

Table 1 – The chromatic pitch layout of the Hohner 64 Chromonica

When you look at the table, you should note that the number indicates the hole number. The action is determined by the very left column, to identify the provided pitch by the harmonica. 'B' means blow. 'D' means draw. With an added '+s', you should do so while pressing the slide button.

When you look at the note spread while not pressing the slide button, every four holes offer you an octave from C to c, one octave higher. With the slide button pushed in, every four holes can actually go up to c#. Some of the notes can be approached using different holes and different button actions, namely : C, C#, and F.

The same pattern repeats every four holes. This means that when you understand the absolute and relative pitch set of the first four holes, you know them for all of the others as well in terms of the key you're playing in and how to approach your particular scale.

Although the four hole pattern repeats itself four times on my harmonica, it introduces definite irregularities based on the major scale pitch sequence :

ø *whole* **1** *whole* **2** *half* **2½** *whole* **3½** *whole* **4½** *whole* **5½** *half* **6**

Notice how the tonic has ø tone distance to itself, with the last note being exactly one octave higher. A scale always ends one octave higher.

The major scale, since it doesn't always have a one whole note distance between consecutive notes, but also half-note distances – contrary to whole note-scales, that only use a one whole note distance – doesn't provide for a regular blow-draw with or without the slide pattern when you're not playing in the key the chromatic is tuned to.

The four hole pattern does repeat itself, but its structure seems a lot more irregular than it will turn out to be, when you regard relative pitch.

Without the slide, playing the C-major scale only, from low to high, the first three holes you first blow than draw. Start on the lowest hole and move to the next after a blow and a draw. The fourth hole for the C-major scale has the draw note as the low note and the blow note as the high note.

The slide operates in the same way on all holes, in that for all holes when pressed it raises the pitch by a ½ step, which you can also label as that it "adds a sharp".

When you look at the four hole pattern, to play the chromatic scale, you attack the notes as follows, with multiple overlapping options for some of the notes :

1B 1B+s 1D 1D+s 2B 2B+s/2D 2D+s 3B 3B+s 3D 3D+s 4D **4D+s/4B** [4B+s]

Notice how I placed brackets around the last (thirteenth) note : it's not the 'c' that's one octave higher, but actually its sharp counterpart, the 'c#'. The attacks printed in boldface actually represent the tonic for the C-major scale.

When you look at it like this, it isn't easy to see the relative pitch pattern that the chromatic harmonica does house. There is a pattern. Based on that it's more difficult to see, due to the fact that the action of the holes, producing the notes you wish to play, isn't classified and grouped clearly, the absolute pitch chart just won't do by itself.

How do you analyze the harmonica's relative pitch set?

Relative Pitch

When you look at the absolute pitch distribution of the harmonica, you can tell that generically, as noted, the same relative pitch pattern appears every four holes. Now we should look at what the non-generic but specific relative pitch set looks like for every set of four holes.

Previously we looked at the note spread based on hole and slide action. Table 1 showed what hole with what action on the button produced the particular pitch based on blowing and drawing. Since this doesn't allow for a relative pitch set analysis, what I'm now going to do, is reverse this process, to see if a different pattern emerges.

Instead of looking at the hole and button as a cause for a tone, I'm going to look at all of the separate tones of the C-chromatic scale and see how that relates to the different holes, identifying the action on that hole. This actually provides us with the relative pitch pattern we're looking for. *Table 2* illustrates this.

When you look at table 2, a very clear pattern emerges : the first and the third hole provide the same pitch development, but for the second and fourth the pitch development is reversed, also due to overlap. To indicate the tonic, I've colored the actions that provide the tonic yellow.

Note 🗣 **Hole** ☞	**1**	**2**	**3**	**4**
c#				B+
c				B [D+]
B				D
A#			D+	
A			D	
G#			B+	
G			B	
F#		D+		
F		D [B+]		
E		B		
D#	D+			
D	D			
C#	B+			
C	B			

Table 2 – Relative note spread pattern

Also note that the relative pitch result of the fourth blow note without a slide, the 'c', can also be produced through a blow note on the next first hole. This pattern repeats itself.

If you just switch to the next four holes for the next tonic, you don't even have to reverse any action. The pattern is just [1] B B+ D D+ [2] B D D+ [3] B B+ D D+ [4] D [5 = 1] B. By using the above table as a visual aid, you'll learn to internalize it through the classification it provides. If you don't see it in theory : look for a way to visualize it!

When you learn the above pattern by heart, focusing on picking particular options for the 'F' and 'c' note, you should still remind yourself of the fact that the other option is available too, in case you want to repeatedly play just this 'F' or this 'c'. What option you pick may be personal.

> **Coincidentally!** Little Walter on the diatonic harmonica made use of the overlap between the 2 *draw* and *3 blow* to beat out a steady rhythm using that one tone for prolonged periods of time, without running into problems breathing. The same can in some places be done on the chromatic harmonica as well, as indicated.

As soon as you know your half-step chromatic scale by heart, you can pick any scale that you mean to employ and given the tonic, the key you're playing in, it should become easier and easier to determine the specific scale degrees and the associated holes and actions to play the notes these represent.

The whole point is that now you don't have to write down the scale and what holes and actions you have to hit to get those notes. After practice, you should be able to do this by heart. Try it : here's the sextonic Blues scale (note the two consecutive half steps instead of one whole step like in the pentatonic Blues scale a.k.a. rock scale) in relative scale degrees.

ø *whole-and-a-half* **1½** *whole* **2½** *half* **3** *half* **3½** *whole-and-a-half* **5** *whole* **6**

Start on any tone as a tonic and figure out the scale degrees and the holes and the actions in Table 2. Do so repeatedly for different keys, and you should internalize the chromatic scale pattern a lot better than when you don't.

Conclusions and Recommendations

When you look at your instrument you need to figure out two things : theory and technique. Feeling you do need to have, but when portraying experiences outside of yourself, empathy through character creation, as in acting, might also help. Either way, to truly understand both theory and technique, it's important that you understand the embodiment principles of both your instrument as well as your own body interacting with it.

Embodiment allows you to master the instrument, overcoming the highest degrees of resistance with minimal effort, rather than taking the path of the least resistance and not learning to master the instrument at all. Anyone can put on a record, run a tape, or pop in a CD right? Or play an audiofile?

Using minimal effort takes great determination in terms of meditation and practice, in that you need to learn to let go first. That way in order to overcome outer obstacles that offer maximal resistance with minimal effort, you first need to remove the resistance you find within yourself. Yet, you don't smash through it, but learn to let go.

As illustrated with the guitar before and also with the relative note spread pattern on the harmonica, it's important that you find yourself patterns that are easy to memorize, and pitch-independent. Relative pitch may be relative to the tonic, but the scale degrees are always the same for the consecutive notes.

Figure out the pattern behind the half scale degrees or how to simplify memorizing them. Just look at how easy it is to understand the one-fret-shift on the guitar as illustrated before

for the highest pitched strings. Understanding the theory will become a lot easier to you, with minimal analysis. The same goes for the chromatic harmonica, the piano, and so forth.

You still need to practice – and yes, you do need to practice a lot – but you should never practice without understanding. When you practice without understanding you can practice all your life, but never fruitfully understand, master, and play the instrument. Maybe you'll be able to reproduce songs, but you won't be able to write them.

Always answer the question : what's the best way to look at relative pitch, in such a way that it's easy to memorize? The answer lies in the structure of the instrument and finding the emerging patterns.

Once you've figured out the theoretical embodiment of your instrument, including what chord progressions present themselves according to what patterns, you might want to take a look at playing technique and embodiment. Playing technique should also be molded in such a way that using minimal effort you produce maximal effect.

On the guitar for instance, slender fingered people especially will run into problems with barre chords. They will simply miss the string if they keep their finger flat and with the guitar horizontal, barre chords to some will be virtually impossible to play closer to the body of the guitar.

Some people would say your index finger needs to be bent and relaxed, but what's the cause and what's the effect? When I bend my index finger, it automatically tenses. So, keep it relaxed, turn it sideways slightly toward the tuning knobs, and use the bigger muscles of your arm to gently press it against the strings and fretboard : it automatically bends!

When you play closer to the body of the guitar, keep the guitar diagonal like classical guitar players or go full-throttle Rock'n'Roll and keep it vertical. Otherwise you'll probably find that your index finger creates a hollow for the high-pitched E-string to fall into, and you can't play barre chords anymore.

In the same way, when addressing the mouth harp, how do you tongue block or tongue slap? It depends also on how you're built. Do you fare better as a cat, pressing the tip of your tongue against the holes you mean to close, or are you more of a dog with a tongue with a swagger, slapping it sideways against the harmonica, blocking the appropriate holes?

Ironically, people with small tongues will turn out to be dogs and people with larger tongues cats. How's that for an ode to joy? Anyway, playing your instrument is a personal endeavor, quite possibly also in terms of how you look at it. When you look at it, be honest. What's your make and what's your take? How do you function mentally and physically?

When you're the kind of player that only plays other people's songs, don't tell people that want to write songs themselves what to do or how to approach an instrument. If you don't answer the why first, the motivation for doing something, they aren't going to listen and won't be motivated to learn.

Analyze, analyze, analyze : structure, patterns, technique, and expression. Have fun!