INTRODUCTION TO COMPOUND INTERVALS

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July 2015, revised July 2020

Background
After achieving progress with the identification and production of intervals within an octave towards a reasonable state of fluency, it is recommended that the student include intervals between one and two octaves in size.

Compound intervals are defined as intervals larger than an octave. They follow the same naming convention as *simple intervals* within an octave, though in theory we tend to cease naming intervals in this manner after the perfect 15th.

Here is a table of the simple intervals with their compound equivalents:

Simple intervals	Compound intervals
Min 2nd	Min 9th
Maj 2nd	Maj 9th
Min 3rd	Min 10th
Maj 3rd	Maj 10th
Per 4th	Per 11th
Aug 4th	Aug 11th
Per 5th	Per 12th
Min 6th	Min 13th
Maj 6th	Maj 13th
Min 7th	Min 14th
Maj 7th	Maj 14th
Per 8ve	Per 15th

It is apparent that the addition or subtraction by 7 yields the compound or simple version of the opposite interval type, respectively. This measure of 7 degrees (not 8) seems logical when you realize that our interval nomenclature is derived from the heptatonic (7-note) diatonic scale.

Just as with simple intervals, the correct identification of any compound interval requires its prefix (i.e. major, minor, perfect, augmented, diminished).

Intervals and Colour

Compound intervals create a different "colour"[1] than their simple counterparts. The fundamentals of compound intervals is more divergent, and this change in proximity of the fundamentals effects the manner and extent to which the fundamentals and their overtones interact. Intervallic colour then is a function of proximity as well as the nature of the compatibility/relatedness of harmonic content of each fundamental.

For example, in the following simple interval there exists an intimate compatibility by virtue of the corresponding pitches in the two fundamentals' harmonic series. This is why the perfect fifth is considered a perfect consonance. This compatibility is supported by the interval's ratio of 3:2, which is simple and low-order.

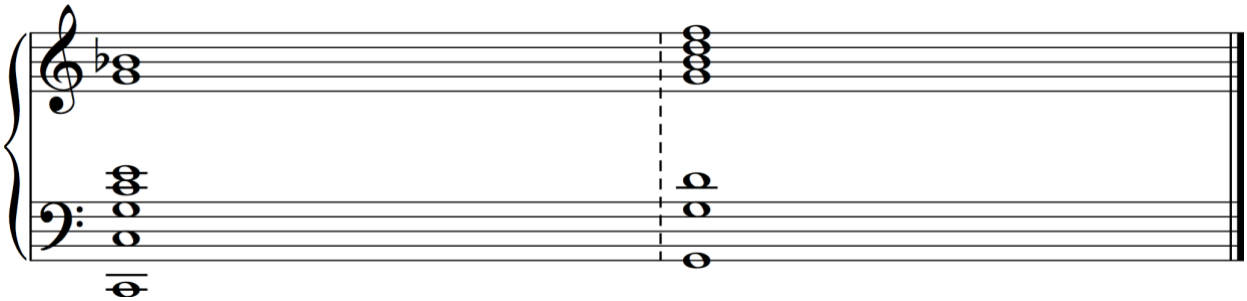

Fig.1. The first seven harmonics of the harmonic series for a P.5 interval. In this key, 5 pitches of G exist, which are hierarchically important as the tonic of the second and the fifth of the first series.

An interval's consonance is not necessarily increased if the fundamentals are further apart, as the harmonic incompatibility may overshadow the divergence in fundamental proximity. The minor 7th is a dissonance (albeit a mellow dissonance) with ratio of 7:4 (if just intonated). The following diagram reveals the harmonic incompatibility compared to the perfect fifth in the previous diagram.

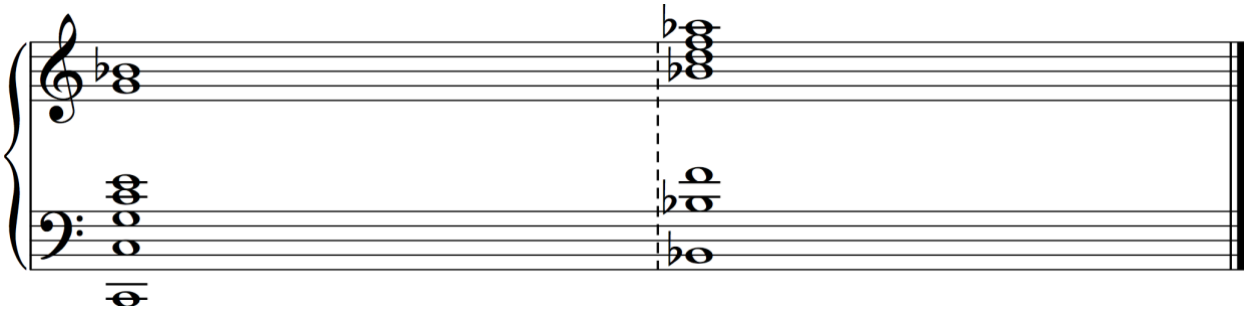

Fig.2. The first seven harmonics of the harmonic series for a min.7 interval. In this key, 4 pitches of Bb exist, and whilst hierarchically important as the tonic of the second series, is a pitch of minimal importance as the seventh harmonic (or flat 7th) of the first series.

[1] By "colour" I am using a visual analogy for the quality arising from the combination of fundamental frequencies. Whilst not meant to be taken literally (because there exists no consistent or scientifically-verifiable basis for the colour analogy in musical pitch neither in synaesthetic nor acoustic fields), the analogy of colour can help us perceive sonic differences.

Colour of compound intervals

The proximity effect truly becomes perceptible when dealing with compound intervals.[2] In order to try and express this, it is helpful to adopt some basic colour theory. I propose that compound intervals possess the same *hue* as simple intervals, but with a change in *lightness*.

- *Hue* is defined as the colour, also defined as the dominant wavelength, which is a physical analogy to the perceptual attribute of hue.
- *Shading* involves the addition of black – resulting in a darker chroma.
- *Tinting* involves the addition of white – resulting in a lighter chroma.

With musical intervals, I associate *tinting* with the act of placing pitches octaves apart – the transformation of simple into compound intervals. The addition of "white space" means a corresponding reduction in the interaction between the fundamentals, whilst still being perceived as the same interval quality overall (the "hue").

Conversely, I associate *shading* with the act of placing pitches octaves closer together – the transformation of compound into simple intervals. The removal of "white space" – or the darkening of the space if you prefer – means a corresponding increase in the interaction between the fundamentals, whilst still being perceived as the same interval quality overall (the "hue").

In this manner, one can associate *pitch class*[3] to the colour (hue) of an interval that remains unchanged regardless of octave placement, whilst the quality of lightness changes as a function of octave placement.

This colour analogy may also be used for single isolated pitches – darker for lower registers, and lighter for higher registers.

Application of compound interval skill

The skill of identifying compound intervals fluently may relate to and increase skill in the following areas:

- Ability to identify tessitura of a range of instruments
- Ability to fluently and appropriately orchestrate chords and melodic lines across ensembles with multiple-octave ranges
- Ability to identify pitch frequencies as acoustic phenomena (in studio recording, mixing, audio reinforcement and production, etc.)

Practicing compound intervals

Commence by experiencing the effect of *tinting* and *shading* though multiple octave-spacings of a single interval, such as a minor 2nd. Then incorporate simple intervals with their compound counterparts in recognition tests. Start with harmonic (simultaneous) intervals before proceeding to melodic intervals in both directions. Then mix together intervals of similar degrees of consonance or dissonance (such as P.4, P.5, P.8, P.11, P.12, P.15) and practice discriminating between them.

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[2] Schillinger has supported such a phenomenon experimentally, whereby even trained musicians confused dissonances for consonances when multiple octaves of separation were present. See Schillnger p.699.

[3] Pitch class is the term that considers octave equivalence of all notes of a corresponding letter name, e.g. C#3=C#4.