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Conclusions

I hope this research is valuable to others. It provides many perspectives, some of them left open for the readers themselves to link.

I think that this thesis contributes with 5 main points:

- An argument for microtonal harmony useful beyond microtonal specialists
- To put Tenney’s and Barlow’s ideas on the map a bit more
- Acknowledge the tools that psychoacoustic and cognitive research can bring to music as well as a critique of some of their approaches: psychologism – everything happens in the brain, something I argued is not completely defendable for intervallic ratios – and the fact that they use traditional theory – equal temperament, functional harmony – in order to prove it in a circular way. I think composition can suggest research which is less based on existing theories and can actually open up to new insights.
- To show my artistic research process. It embraces experimental music understood as:
  - Cage: music whose outcome is unforeseen
  - Tenney: one experiment leads to the next one, as in the sciences
  - Me: experimental in the sense that it might be able to make contributions to the field for others to expand, beyond my specific applications of the ideas and through music
- To be able to use this theorization of harmony and recollection of information regarding its uses, history, metaphysics, etc., in order to make more music. Both in my case and hopefully for others too. Concerning me, and as already mentioned, there are many avenues left open to pursue: Augusto Novaro, Erv Wilson, object-oriented metaphysics, further developments to DissonanceLib, to name the ones that stand out most at the moment.

On the other hands, I should mention my specific contributions in order to differentiate them from the ideas of Barlow and Tenney which are very close to my approach. Regarding harmonic duality, my point of departure has been Barlow, although hints of this duality are also present in the writings of Johnston and Tenney. What I have done is to delve into the details of this two features in order to extract and detail the many nuances behind them, characterizing each side and showing how they intertwine. The different functions that derive from this are not immediately obvious nor do they map neatly into each side of the duality. The functions were described both through the evidence provided by the psychoacoustic foundations of pitch and its neurological perceptual path, as well as through the historical route that connects present day concerns with Greek harmonics, both in their mathematical and empirical, almost phenomenological, approach. I have found lots of detailed substantiation for renewing a harmony from a broader perspective than is usually the case, even if this has not led to a full-blown and systematic theory. Another outcome to this extension of the senses in which harmony can be compositionally dealt with has been relating it at various levels of scale as well as in abstract terms such as discreteness/continuity, flux/stasis, and so on. I think this work opens up further investigation and compositional uses of these ideas, some of which are still not completely formulated and developed, especially those that required the more abstract uses of object-orientation and multilevel duality (eidos-sonos, logos-morphe, nomos-drama) and which will be pursued.
more fully in the future.

Perhaps where my approach diverges mostly from the aforementioned composers is in that much of the theoretical development has been done through my implementation and use of dissonance curves. These curves are analyses of timbral and continuous features of pitch, and the fact that they lead to and intersect with proportionality gives a very specific slant to my examination of harmonic topics. Harmonic duality has been developed from this departure point, intersecting with the compositional process. Harmonic space has been approached from the practical and algorithmic requirements of analyzing the wide variety of intervals produced by dissonance curves in conjunction with instrumental and computer generated music. Applications of dissonance curves such as dissonance chorales and the derived pieces have also benefitted from the multilevel considerations of harmony and have proven to be quite particular to my research, unrelated to the usual spectral routes of relating features of sound to electronic resynthesis methods.

Regarding harmonic space, most of the ideas were already there, but my specific way of implementing them brings independent approaches such as functional representations, degrees, tempered approximations, nomenclature and correct use of accidentals, together, also incorporating visualizations and pursuing strategies for navigating the pitch sets. I also put quite more emphasis than any of the treated authors in the importance of prime numbers in harmony as well as using this notion to produce separations and mixtures of pitch sets in composition. For all that, I think more could have been written regarding adaptations and transcriptions for instrumental settings, although this has been accomplished through some of the compositions and some traces of it are attested in section 3.1.6 and Appendix III.

Another independent line of inquiry was the development of harmonic fields, even though it shares some premises with Barlow’s methods in his software Autobusk, that is, to regard harmonicity as a basis for the statistical selection of pitches. Nevertheless, my implementation is more textural than his metric approach, and, as a consequence of initially having been based on dissonance pitch sets, has led to new areas discovered through the musical and algorithmic development, notably the region of antitonality, a genuine contribution of this study (more a discovery than an invention) as well as the ‘atonic’ mode of selection, which has a sound very much of its own. The fact that it is based on a real time programming environment has also guided it towards live interactive behaviors and electronic sound synthesis, installations as well as algorithmic improvisations with live coding.

The section on Pythagoreanism was meant to give emphasis to a line of thinking that is enormously influential throughout Western history and has fallen into relative obscurity in recent times. I consider that the use and understanding of pitch ratios in music is very important and this approach cannot afford to ignore the ideas stemming from this tradition. This is where some ideas from Archytas, Galileo, Kepler, Leibniz and Euler, among others, have resonated with my investigations. Finally, the other theoretical section that deals with harmony in different registers than the purely technical and compositional mode is the review of atonality and modernism as a liberation of continuous forms at many levels, especially concentrating on how the musical materials could be understood as filling the gaps of discrete structures. This makes an analogy with the mathematical continuum in order to show how most contemporary music today is saturated with continuous forms at all levels, suggesting that proportionality and discreteness should be reassessed and re-approached from within this situation.

Much more is still to be pursued, both on a technical as well as a conceptual/aesthetic level, and I hope this work has been an important stepping stone in my development as a composer, more a beginning than a conclusion, the herald of much more music, theory and software to come.