

Frequencies, Water and Experiments

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This set of slides serves as an outline for the theoretical basis and the experimental protocol for the experiments we would like to do.

- [Marc Henry's Theory](#)
- Geesink and Meijer's Papers
- The Augmented Pythagorean Scale
- More Geesink and Meijer's Papers
- Lab Bench Protocol: The Meditation
- The Seven Independent Variables
- Lab Experimental Protocol
- Experiment 1
- Data Analysis
- Experiment 2 Sketch

Marc Henry: Quantum Mechanics and Density

- Quantum mechanics matters as soon as density of solvents or concentration of solute species becomes higher than a characteristic threshold
- Reformulate the problem in terms of density
- For water, this density threshold is approximately $.322 \text{ grams/cm}^3$
- Solute concentrations higher than 100 mM
- The usual approach is to work things out using hydrogen bonding above this critical density threshold
- Classical physics with ad hoc models with water molecules of fixed size
- But quantum mechanical effects must be considered in the high-density region

Marc Henry, *Hofmeister series: The Quantum Mechanical Viewpoint*, **Current Opinion in Colloid And Interface Science**, Vol. 23, 2016, pp. 119-125.

Characteristic Frequencies

- Crude Derivation of Characteristic Frequencies
- Mass Energy Equivalence
 - $E = m * c^2$
- Planck-Einstein Relation
 - $E = h * f$
- $m * c^2 = h * f$
- $f = \frac{mc^2}{h}$

Characteristic Frequencies

$$f = \frac{mc^2}{h}$$

Henry uses this relation for a molecule of water. The atomic weight A_W of H_2O is 18. By the definition of mole, one mole of water has N_A , Avogadro's number, of molecules, and weighs 18 grams. To compute the mass m of one molecule of water in the units of kilograms

$$m = \frac{A_W}{1000 * N_A}$$

Characteristic Frequencies

Using the following values for the constants

$$N_A = 6.02214076 \cdot 10^{(23)}$$

$$c = 2.99792458 \cdot 10^8 \text{ m/s}$$

$$h = 6.62606954 \cdot 10^{(-34)} \text{ J} \cdot \text{s}$$

he derives

$$f = A_W \cdot 2.25234293 \cdot 10^{(23)} \text{ Hz}$$

Finally, he translate this frequency down by 76 octaves to bring it to audio range. This means he has to divide by $2^{(76)}$

$$\begin{aligned} f_{translated} &= A_W \frac{2.25234293 \cdot 10^{(23)}}{2^{(76)}} \\ &= 2.98095 A_W \text{ Hz} \end{aligned}$$

[Marc Henry](#), *Hofmeister series: The Quantum Mechanical Viewpoint*, **Current Opinion in Colloid And Interface Science**, Vol. 23, 2016, pp. 119-125.

Characteristic Frequency

For water, $A_W = 18$, so there results

$$\begin{aligned}f_{translated} &= 2.98095 * 18 \text{ Hz} \\ &= 53.65712 \text{ Hz}\end{aligned}$$

[Marc Henry](#), *Hofmeister series: The Quantum Mechanical Viewpoint*, **Current Opinion in Colloid And Interface Science**, Vol. 23, 2016, pp. 119-125.

Symphonic Relationships

"Viewing chemistry or biology as symphonic relationships between electrons and nuclei and not as localized pairwise interactions between molecules and ions, may well be the mandatory quantum key towards a better comprehension of matter behavior under high density or concentrations situations."

Marc Henry, *Hofmeister series: The Quantum Mechanical Viewpoint*, **Current Opinion in Colloid And Interface Science**, Vol. 23, 2016, pp. 119-125.

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Coherent Frequencies

- Geesink and Meijer (2016) surveyed 175 articles (1950-2015)
- Identified a universal electromagnetic (EM) principle that underlies life sustaining effects
- In *in vitro* and in *in vivo* life systems
- Discrete coherent frequencies of EM waves stabilize cells
- Other frequencies cause a destabilization
- The coherent frequencies are organized beginning in a tempered Pythagorean acoustic scale
- Whose harmonics continue to the Terra Hertz range

Hans Geesink and Dirk K.F. Meijer, *Quantum Wave Information of Life Revealed: An Algorithm for Electromagnetic Frequencies that Create Stability of Biological Order, with Implications for Brain Function and Consciousness*, **NeuroQuantology**, Vol 14, Issue 1, 2016 pp 106-125.

See the bibliography for a partial list of the remarkable papers of Geesink and Meijer.

Water: Cradle of Life

- Geesink, Igor and Meijer (2020) analyzed 500 biomedical studies
- Published from 1950 though 2017
- Dealing with EM oscillations in tissues, cells, and biomolecules
- They did a meta-analysis of 700 measured frequencies
- Water with various solutes were present
- The solutes change the weight per mole
- The weight per mole is related to its characteristic frequency.
- Water has a characteristic frequency of 54 Hz

They inferred that the resonant frequencies were organized as a 12 tone tempered Pythagorean chromatic scale over 48 octaves, from 1Hz to THz.

These are the coherent electromagnetic field bands for fluid assemblies in living cells.

Geesink, Jerman and Meijer *Water the Cradle of Life via its Coherent Quantum Frequencies*. **Water**, 2020, pp. 78-108.

More Evidence

- 200 Cancer Inhibiting Frequencies are Life Beneficial Frequencies
- 150 Cancer Promoting Frequencies are Life Detrimental Frequencies
- The mass of each Bosonic particle when converted to frequencies has one of the Life Beneficial Frequencies
- The Mass of each Fermionic particle when converted to frequency has one of the Life Detrimental Frequencies
- Topological Constants Chern Numbers have Life Beneficial Frequencies

[Dirk K.F. Meijer and Hans Geesink](#), *Favourable and Unfavourable EMF Frequency Patterns in Cancer: Perspectives for Improved Therapy and Prevention*, **Journal of Cancer Therapy**, Vol. 9, 2018, pp. 188-230.

[Hans Geesink](#), *Theory to Calculate Masses of Elementary Particles According to a Toroidal Quantum Wave and Chern Equations*, **Research Gate**, 2022.

[Hans Geesink and Dirk K.F. Meijer](#), *Electromagnetic Frequency Patterns that are Crucial for Health and Disease Reveal a Generalized Biophysical Principle: The GM scale*, **Quantum Biosystems**, Vol 8, Issue 1, 2017, pp. 1-16.

Comments

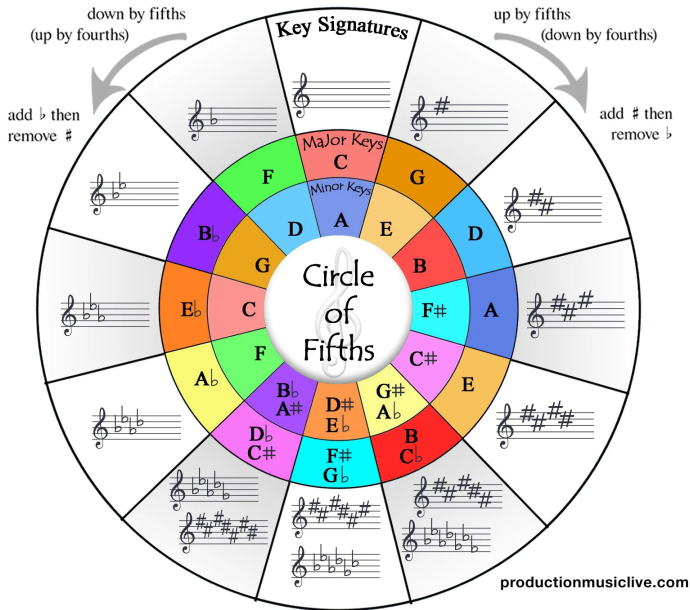
- Each of the 500 papers treated people with one or more frequencies
- For each of the frequencies tried in a paper, the paper made an evaluation whether the frequency was Beneficial or Detrimental
- Geesink and Meijer divide each frequency f by 2^N , where N is chosen to make the reduced frequency $x(f) = \frac{f}{2^N}$ satisfy $.949220 \leq x \leq 1.923327$
- Then if $x(f)$ has been labeled Beneficial, it is compared to
 - each of the 12 center frequencies for the Beneficial class
- If $x(f)$ has been labeled Detrimental, it is compared to
 - each of the 12 center frequencies for the Detrimental class
- And the relative difference between $x(f)$ and the closest center frequency of the equivalence class of f is computed and recorded.
- The relative difference is almost always less than 1.6%

Comments

- Geesink and Meijer do not claim that if a paper labels f as Beneficial, then for every $n > 0$, $\frac{f}{2^n}$ is also a Beneficial frequency
- Likewise if the paper labels f as Detrimental, there is no claim that for every $n > 0$, $\frac{f}{2^n}$ is also a Detrimental frequency
- The only claim is that if f is a Beneficial frequency, then $x(f)$ will be relatively close to its closest Beneficial center frequency
- Likewise, if f is a Detrimental frequency, then $x(f)$ will be relatively close to its closest Detrimental center frequency.
- Sonderkamp, Geesink, and Meijer did a statistical analysis, matching each of the 12 beneficial centers with the 12 detrimental centers
- The probability that their results could have happened by chance (the P-value) was less than .00025 for each of the 12 pairs

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Circle of Fifths



Pythagorean Tuning Going Up by Fifths (Clockwise from C)

Major 7th	<i>B</i>	$(\frac{3}{2})^5$	$\frac{243}{32}$	$\frac{1}{4}$	$\frac{243}{128}$	1.89844
Major 3rd	<i>E</i>	$(\frac{3}{2})^4$	$\frac{81}{16}$	$\frac{1}{4}$	$\frac{81}{64}$	1.26563
Major 6th	<i>A</i>	$(\frac{3}{2})^3$	$\frac{27}{8}$	$\frac{1}{2}$	$\frac{27}{16}$	1.68750
Major 2nd	<i>D</i>	$(\frac{3}{2})^2$	$\frac{9}{4}$	$\frac{1}{2}$	$\frac{9}{8}$	1.12500
Perfect 5th	<i>G</i>	$(\frac{3}{2})^1$	$\frac{3}{2}$	1	$\frac{3}{2}$	1.50000
Unison	<i>C</i>	1	1	1	1	1.00000

Pythagorean Tuning Going Up by Forths (Counter-clockwise from C)

Augmented 4th	G^b	$(\frac{4}{3})^6$	$\frac{4096}{729}$	$\frac{1}{4}$	$\frac{1024}{729}$	1.40466
Minor 2nd	D^b	$(\frac{4}{3})^5$	$\frac{512}{243}$	$\frac{1}{2}$	$\frac{256}{243}$	1.05350
Minor 6th	A^b	$(\frac{4}{3})^4$	$\frac{256}{81}$	$\frac{1}{2}$	$\frac{128}{81}$	1.58025
Minor 3rd	E^b	$(\frac{4}{3})^3$	$\frac{64}{27}$	$\frac{1}{2}$	$\frac{32}{27}$	1.18519
Minor 7th	B^b	$(\frac{4}{3})^2$	$\frac{16}{9}$	1	$\frac{16}{9}$	1.77778
Perfect 4th	F	$(\frac{4}{3})^1$	$\frac{4}{3}$	1	$\frac{4}{3}$	1.33333
Unison	C	1	1	1	1	1.00000

Pythagorean Chromatic Scale

Unison	C	1	1	1	1	1.00000
Minor 2nd	D^b	$(\frac{4}{3})^5$	$\frac{512}{243}$	$\frac{1}{2}$	$\frac{256}{243}$	1.05350
Major 2nd	D	$(\frac{3}{2})^2$	$\frac{9}{4}$	$\frac{1}{2}$	$\frac{9}{8}$	1.12500
Minor 3rd	E^b	$(\frac{4}{3})^3$	$\frac{64}{27}$	$\frac{1}{2}$	$\frac{32}{27}$	1.18519
Major 3rd	E	$(\frac{3}{2})^4$	$\frac{81}{16}$	$\frac{1}{4}$	$\frac{81}{64}$	1.26563
Perfect 4th	F	$(\frac{4}{3})^1$	$\frac{4}{3}$	1	$\frac{4}{3}$	1.33333
Augmented 4th	G^b	$(\frac{4}{3})^6$	$\frac{4096}{729}$	$\frac{1}{4}$	$\frac{1024}{729}$	1.40466
Perfect 5th	G	$(\frac{3}{2})^1$	$\frac{3}{2}$	1	$\frac{3}{2}$	1.50000
Minor 6th	A^b	$(\frac{4}{3})^4$	$\frac{256}{81}$	$\frac{1}{2}$	$\frac{128}{81}$	1.58025
Major 6th	A	$(\frac{3}{2})^3$	$\frac{27}{8}$	$\frac{1}{2}$	$\frac{27}{16}$	1.68750
Minor 7th	B^b	$(\frac{4}{3})^2$	$\frac{4}{9}$	1	$\frac{16}{9}$	1.77778
Major 7th	B	$(\frac{3}{2})^5$	$\frac{243}{32}$	$\frac{1}{4}$	$\frac{243}{128}$	1.89844

In the tempered or augmented Pythagorean Tuning, Geesink and Meijer use $\sqrt{2} = 1.4142$ instead of 1.40466.

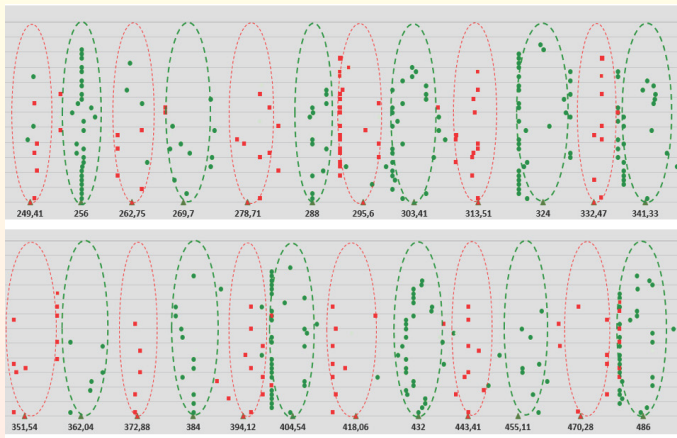
Chromatic Scale Low Audio Range

Octaves						
1	5	6	7	8	9	10
$\frac{1}{1}$	32	64	128	256	512	1024
$\frac{256}{243}$	33.71193	67.42387	134.84774	269.69547	539.39095	1078.78189
$\frac{9}{8}$	36	72	144	288	576	1152
$\frac{32}{27}$	37.92593	75.85185	151.70370	303.40740	606.81481	1213.62963
$\frac{81}{64}$	40.50000	81	162	324	648	1296
$\frac{4}{3}$	42.66666	85.33333	170.66666	341.33333	682.66666	1365.33333
$\sqrt{2}$	45.25483	90.50967	181.19336	362.03867	724.07734	1448.15469
$\frac{3}{2}$	49	96	192	384	768	1536
$\frac{128}{81}$	50.56790	101.13580	202.271605	404.54321	809.08642	1618.17284
$\frac{27}{16}$	54	108	216	432	864	1728
$\frac{16}{9}$	56.88889	113.77778	227.55556	451.11111	910.22222	1820.44445
$\frac{243}{128}$	60.75	121.5	243	486	972	1944

Life Beneficial Frequencies

Interval	5th Octave	8th Octave	1st Octave
Unison	32.00000	256.00000	1.00000
Minor 2nd	33.71200	269.69600	1.05350
Major 2nd	36.00000	288.00000	1.12500
Minor 3rd	37.92608	303.40864	1.18519
Major 3rd	40.50016	324.00128	1.26563
Perfect 4th	42.66666	341.33248	1.33333
Augmented 4th	45.25504	362.03867	1.41422
Perfect 5th	48.00000	384.00000	1.50000
Minor 6th	50.56800	404.54400	1.58025
Major 6th	54.00000	432.00000	1.68750
Minor 7th	56.88896	455.11168	1.77778
Major 7th	60.75000	486.00064	1.89844
Octave	64.00000	512.00000	2.00000

Life Sustaining: Life Detrimental



Green Life Sustaining, Red Life Detrimental
Shown from factor $m = 8$ Octaves

Geesink, Jerman, and Meijer, *Water the Cradle of Life via its Coherent Quantum Frequencies*, **Water**, 2020, pp. 78-108.

Life Detrimental Frequencies

Interval	8th Octave	1st Octave	Ratio
Unison	249.41	0.97426	1.00000
Minor 2nd	262.75	1.02637	1.05349
Major 2nd	278.71	1.08871	1.11764
Minor 3rd	295.60	1.15469	1.18512
Major 3rd	313.51	1.22465	1.25701
Perfect 4th	332.47	1.29871	1.33026
Augmented 4th	351.54	1.37320	1.40949
Perfect 5th	372.88	1.45656	1.49368
Minor 6th	394.12	1.53953	1.58021
Major 6th	418.06	1.63305	1.67620
Minor 7th	443.41	1.73207	1.77784
Major 7th	470.28	1.83704	1.88557
Octave	498.82	1.94852	2.00000

Absolute Difference between the Ratios of the Detrimental Frequencies to those of the Beneficial Frequencies is around .01

Need For Frequency Equivalence Classes

- We have discussed Beneficial and Detrimental frequencies as single frequencies
- Suppose we want to replicate Geesink and Meijer's research
- Assume that a paper states that experimental treatment with frequency f is one of the elements in the set $\{Beneficial, Detrimental\}$
- But that frequency f differs from every center frequency of the augmented Pythagorean scale for class *Beneficial* and class *Detrimental*
- We might suppose that we should determine the closest beneficial or detrimental frequency to f
- But frequencies in music are ultimately described in a log scale
 - This means that nearest cannot mean closest in terms of Euclidean distance
 - We suggest determining by equivalence classes

The Equivalence Class For Frequency f

- Each equivalence class is defined by its lower and upper boundaries
- The equivalence classes define a total order
- The overlap between adjacent equivalence classes can only be their common boundary
- Each equivalence class has a center frequency, which is associated with the label *Beneficial* or *Detrimental*
- The equivalence class for frequency f is determined by whether f is located between the upper and lower boundaries of the equivalence class
- Each boundary b between center frequency g and adjacent center frequency h is determined by $b = \sqrt{gh}$
- Given any frequency f we determine its equivalence class by determining
 - Adjacent boundaries $b_1 < b_2$ such that $b_1 \leq f \leq b_2$
 - The center frequency c such that $b_1 \leq c \leq b_2$
 - The label of frequency f is the label of the equivalence class center frequency

The Beneficial and Detrimental Frequency Equivalence Classes

First Octave Equivalence Class Centers And Boundaries In Herz

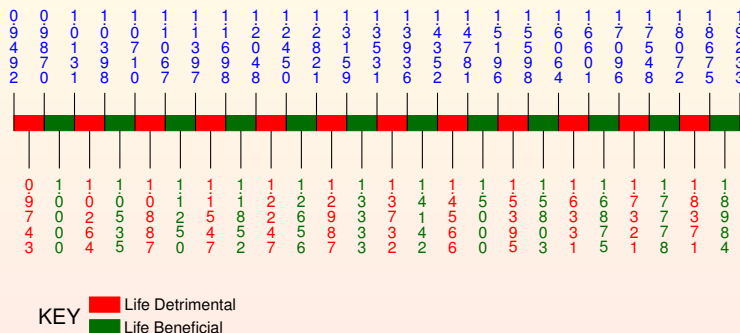


Figure: This figure portrays the boundaries between the life beneficial frequency equivalence classes and the life detrimental equivalence classes in blue. And it shows each life beneficial frequency equivalence frequency class in dark green and each life detrimental frequency class in red.

Life Beneficial Frequencies

$$E = hf$$

$$f = 2^n 3^m 2^p \quad \begin{aligned} n &\in \{0, .5, 2, 4, 5, 7, 8\} \\ m &\in \{-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5\} \\ p &\in \{-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, \dots, 54\} \end{aligned}$$

$$2^{54} = 1.801439 \times 10^{16}$$

Life Detrimental Frequencies

$$E = hf$$

$$f = .97426 * 2^n 3^m 2^p \quad n \in \{0, .5, 2, 4, 5, 7, 8\}$$

$$m \in \{-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5\}$$

$$p \in \{-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, \dots, 54\}$$

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This protocol is for experiments that might include weak quantum entanglement effects or experimenter consciousness effects.

- First step is a meditation
 - Express appreciation to the Creator
 - Move the experimenter's conscious state to a positive state
 - Explain the reason for the experiment
 - Ask permission to do the experiment
 - And set the conditions that no harm is done

Experiment Preparation Meditation

*Holy One of All Being,
All Encompassing Cosmic Consciousness,
We Bless You with all our hearts,
With all our bodies and souls,*

*We are thankful
For all that You have created,
For all that You have given,
And for all your daily miracles.*

*We are about to embark on a subtle energy experiment,
To search out and reveal some of your mysteries:*

This protocol is for experiments that might include weak quantum entanglement effects or experimenter consciousness effects.

- First step is a meditation
 - Express appreciation to the Creator
 - Move the experimenter's conscious state to a positive state
 - Explain the reason for the experiment
 - Ask permission to do the experiment
 - And set the conditions that no harm is done

Experiment Preparation Meditation

Mysteries about energy, consciousness, aliveness, and memory;

*Mysteries about one consciousness communicating to
And influencing another consciousness;*

*Mysteries about how liquid and solid crystals are conscious,
Have memory and are alive;*

*Mysteries about how liquid and solid crystals
Can participate in helping humans*

To have greater health and be better people;

Mysteries of how we can participate in helping

Liquid and solid crystals fulfill their purpose for being.

Experiment Preparation Meditation

*Our collective intent is use the knowledge
Obtained by the experiment
To help improve the lives and health of humanity.*

Choose one:

*We want the experiment not to depend
On the consciousness of the experimenter.
We ask that the observer consciousness effect be deactivated.*

*We want the experiment to depend
On the consciousness of the experimenter,
We ask that the observer consciousness effect be activated.*

Experiment Preparation Meditation

*With deep respect,
We ask permission to do the experiment.
We ask permission from all the experimental apparatus,
Including the involved liquid and solid crystals
For your participation in the experiment.*

*We activate our intention to clear any noisy imprinting
For all items that might be on the experiment table.
We ask that all life nurturing and beneficial energies
That affect us, and everything involved in the experiment
Increase and be enhanced.*

Experiment Preparation Meditation

*We ask that all life negative and detrimental energies
That affect us and everything involved in the experiment
Decrease and be diminished. No one shall be harmed.*

*For now, and into the future,
For as long as appropriate.*

*With deep gratitude,
Thankyou for receiving our good intentions and prayer.
We remain your loving helpers.*

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Seven Independent Variables

- 1. Type of Instruments

- Kyoto Electronics RA-620 Refractometer
- Ocean Optics/Insight Spectrometers (250nm-1500nm)
- Rheosense Viscometer (4 digits)
- Anton Paar 5001 Densitometer (6 digits)
- Kyoto Electronics Densitometer (4 digits)
- TA Instruments Differential Scanning Calorimeter 2929
- Krüss K100 Force Tensiometer
- Tektronix TTR506A Vector Network Analyzer
- HP 8194 Impedance Analyzer
- Serge Kernbach's Electrochemical Impedance Analyzer
- Hanna Instruments pH, ORP DO, Conductivity
- Amscope Dark Field and Phase Contrast Microscopes

Experiment: Seven Independent Variables (con't)

- 2. Choice of Water Type
 - Deuterium Depleted Water
 - Double Distilled Deionized Water
 - RPG Filtered Water
 - Spring Water
 - Vivo Water
 - ETC
- 3. Choice of Treatment Waveform
 - Sine Wave
 - Square Wave
 - Pulse wave
 - Triangular Wave
 - Sawtooth Wave

Experiment: Seven Independent Variables (Con't)

- 4. Selected Octave of Frequencies
 - Octave $\in \{1, 2, \dots, 54\}$
- 5. Amplitude of the AC magnetic field treating the water
 - 25 mG
 - 50 mG
 - 75 mG
- 6. Treatment time for the water on the IC Pad
 - 12 minutes
 - 20 minutes
 - 30 minutes
- 7. Type of IC Pad
 - Circuit IC Pad From infopathy.com
 - Glowing IC Pad From infopathy.com
 - Specially Made Shielded Toroid

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Lab Protocol: Untreated Water

Untreated Water Measurement

- Water source is kept far away from experiment table
- The Beaker is cleaned and rinsed
- Beaker's magnetic memory and electric is cleared
- Beaker is put in 120 degrees Celsius steam autoclave for 20 minutes
- Beaker is dried by turning it upside down on a paper towel
- Untreated water source is poured into the dried beaker
- The measurements are made with the untreated water

Treated Water Measurements

- Water source is kept far away from experiment table
- Beaker is cleaned and rinsed
- Beaker's magnetic memory and electric is cleared
- Beaker is put in 120 degrees Celsius steam autoclave for 20 minutes
- Beaker is dried by tuning it upside down on a paper towel
- Untreated water source is poured into the dried beaker
- Water in beaker is treated
- The measurements are made with the treated water

Clearing The Memory Of A Borosilicate Glass Beaker

- After treating water in a borosilicate beaker, the beaker retains a memory of the treatment
- To reuse the beaker, the beaker has to be cleared of its magnetic and electric field memory
- Clearing the memory of a beaker
 - Clear any magnetic field residual in the Beaker by slowly moving the beaker on to 250 gauss 60 cycle flat surface demagnetizer and slowly moving it away
 - Clear any electric field residual in the beaker by putting the beaker on a five layer sandwich
 - Copper tray is put on the bottom and connected to ground
 - Bottom layer of Shungite powder, 4mm thick
 - Middle layer of Selenite block 10.25 inch x 10.25 inch x 2 inch
 - Top layer of Shungite powder 1/2 inch thick in a 10 inch by 10 inch layer
 - The top layer of Shungite powder is covered by nitro-cellulose paper
 - For 20 minutes, the beaker whose electric field memory is to be cleared sits on the nitro-cellulose paper
- Put the beaker in a steam autoclave set at 120 Celsius for 20 minutes

In his experiments, Loren Zanier used the five layers of Copper Tray, Shungite powder, Selenite block, Shungite powder, and Nitro-cellulose paper design to clear the memory held in the electric field of the beaker

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Experiment 1 Phase 1

- Instruments
 - Kyoto Electronics Refractometer
 - Kyoto Electronics Densitometer
 - Rheosense Micro Viscometer
 - Krüss Force Tensiometer
- Type of Water
 - Deuterium Depleted Water
- Type of waveform
 - Sine Wave
- Octave
 - 8
- Strength of Magnetic Field
 - 50mG RMS
- Treatment time
 - 30 minutes
- IC Pad Type
 - Glowing IC Pad

Litewater: Deuterium Depleted Water

- Most waters have about 150ppm - 180ppm *HDO* instead of H_2O
- Litewater has about 10ppm *HDO*
- Made using massive distillation columns
- Deuterium and Health
 - Deuterium slows down energy production
 - Interferes with mitochondrial function
 - Increases damaging free radicals

Litewater: Deuterium Depleted Water



Experiment 1 Phase 2: Equivalence Classes

- For Each Octave
- Group Measurement Tuples by 12 equivalence classes
- Null Hypothesis: The population means of the 12 equivalence classes are equal
- Alternative Hypothesis: There are some population means that are not equal
 - Unison
 - Minor 2nd
 - Major 2nd
 - Minor 3rd
 - Major 3rd
 - Perfect 4th
 - Augmented 4th (Tritone)
 - Perfect 5th
 - Minor 6th
 - Major 6th
 - Minor 7th
 - Major 7th

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- Formulation of Problem
- Determine Analysis Method
- Perform the Analysis
- State the Conclusions

One Way Analysis of Variance

- There are I variables
- Each Variable has J observations
- The J observations of variable x_i are $x_{ij} = \mu_i + \psi_j$
- μ_i is the population mean of the i th variable
- $\psi_j, j = 1, \dots, J$
- Are the independent random perturbations
 - $E[\psi_j] = 0$
 - $V[\psi_j] = \sigma^2$
- We test the hypothesis $\mu_1, \dots, \mu_I$ are all equal
- Against alternative that some of $\mu_1, \dots, \mu_I$ are not equal
- Using a Permutation Test

Permutation Test

- Hypothesis: All groups have the same mean
- Define a test statistic T_0
 - T_0 measures the degree to which the hypothesis is false
 - $T_0 = \max_{i=1}^I \max_{q=i+1}^I |\bar{x}_i - \bar{x}_q|$
 - $T_0 = \sum_{i=1}^I \sum_{q=i+1}^I |\bar{x}_i - \bar{x}_q|$
- Randomly Shuffle the data Z times
- For each $z \in \{1, \dots, Z\}$, there is a test statistic T_z
- Empirically Estimate $p - value = \frac{|\{z \in Z \mid T_z > T_0\}|}{Z}$
- Report P-value
- Or Choose the Level of Significance S
 - The fraction S , e.g. $S = .01$
- Reject the Hypothesis at Significance Level S if $p - value > S$

- There are four independent variables
 - Treatment Time
 - Treatment Frequency
 - Treatment Waveform
 - Type of Water

Analysis of Variance

- Fix Three of the Four Independent Variables
 - Do a One-Way Analysis of Variance
- Fix Two of the Four Independent Variables
 - Do a Two-Way Analysis of Variance
- Fix One of the Four Independent Variables
 - Do a Three-Way Analysis of Variance
- Do a Four-Way Analysis of Variance

Clustering

- Fix Power and Time of Treatment
- For Each Frequency and Each Water Type
 - There are N numerical measurements
 - Each is a point in an N -dimensional space
 - There are M different frequencies
 - There are M different N -dimensional points
- The points can be clustered
- Use different ways to measure within cluster covariances relative to between cluster covariances
- Use data visualization methods to show clusters
- Analyze the visualizations and clusters to understand what they mean

- Use machine learning methods to classify the data
 - How accurate can the water type be determined
 - How accurate can the frequency (as a label) be determined

Dimensionality Reduction Techniques

- The higher the number of variables
 - The more difficult it becomes to visualize the relationships
 - The greater the number of dependencies
- Principal Component Analysis
- Non-negative Matrix Factorization
- Linear Discriminant Analysis
- Random Forest Classification

Local Environmental Influence

The following Variables will be Automatically Logged and Time Stamped every 60 seconds.

- Air Pressure
- Humidity
- Air temperature
- CO_2

Distant Astrological Influences

- The Moon
- The Planets
- The Sun spots
- The Zodiac

Analysis of Environmental Factors

- Choose Values for the Seven Independent Variables
- Measure the Treated and Untreated Water with N instruments
- Measurements will include day, date, and time.
- Measurements are the dependent variable
- Longitudinal Study for 30 days
- Do a Regression Using the Environmental Factors
- And the Astrological Influences as Independent Variables
- To Measure the Degree to Which the Independent Variables
- Can Explain The Pattern in the Dependent Variable's values

Optimizing Water Treatment

Suppose we know what J measurement values, $V_1, \dots, V_J$, we would like for the results of treating water with K treatments $T_1, \dots, T_K$.

- Which K treatments to use?
- In what order to use the treatments
- To make the resulting measurement values $v_1, \dots, v_J$ closest to $V_1, \dots, V_J$

- Marc Henry's Theory
- Geesink and Meijer's Papers
- The Augmented Pythagorean Scale
- More Geesink and Meijer's Papers
- Lab Bench Protocol: The Meditation
- The Seven Independent Variables
- Data Analysis
- Sketch of Experiment 2

Experiment 2 Sketch, Frequency Pairs

- Assume all frequencies are from the chromatic scale in an octave
- A frequency pair consists of a lower frequency and a higher frequency
- Since the frequencies come from a chromatic scale we can speak of them as notes
- From the lower frequency note to the higher frequency note is an interval
- The intervals can be broken into two groups, based on how they sound
 - Consonant
 - Dissonant

Consonant and Dissonant Intervals

Ratios are the ratio of the higher note to the lower note
The lower note is the first note of the octave

Name	Ratio	Cons. or Diss.
Unison	1	Strongly Consonant
Minor 2nd	256/243	Strongly Dissonant
Major 2nd	9/8	Weakly Dissonant
Minor 3rd	32/27	Consonant
Major 3rd	81/64	Strongly Consonant
Perfect 4th	4/3	Consonant
Augmented 4th; Tritone	$\sqrt{2}$	Strongly Dissonant
Perfect 5th	3/2	Strongly Consonant
Minor 6th	128/81	Mildly Dissonant
Major 6th	27/16	Consonant
Minor 7th	16/9	Mildly Dissonant
Major 7th	243/128	Consonant
Octave	2	Strongly Consonant

Experiment 2

- From the octave 1 Hz to 2 Hz
- To the octave 8192 Hz to 16384 Hz are 13 octaves
- For each of these octaves we experiment with the 12 intervals
 - From the first note of the octave to the other notes in the octave
 - And to the first note of the next octave
- $13 \times 12 = 156$ treatments for the life beneficial frequencies
- $13 \times 12 = 156$ treatments for the life detrimental frequencies
- For each experiment we make N analytic measurements
- We do a data analysis for each of these experiments
- What kind of relationship is there between the N -tuple measurements and the consonant - dissonance label?