

Quiz for March Lesson

Barbara Crowe's Lecture on the Video Streams – this is a study guideline as well as containing quiz questions. The guidelines are in black and the quiz questions are in Green – You will find the questions listed at the end where you can copy and paste them into your own document to post on your user account or send to your mentor.

PART 1 OVERVIEW of Psychoacoustics (Human Reaction to SOUND)

Room acoustics and the Harp itself.

The tool we use is music with patients.

1. What is the Definition of Music?

2. What are the building blocks of music?

The term Sound is a term of perception. Sound is a human projection to report the aural.

3. What are 4 things that need to be present for Sound to be projected for reception?

Acoustic Vibration

4. What is a vibration?

Simple Sound

Refer to the 1st page of the handouts

Periodic means that it repeats at regular intervals

5. What is a cycle?

Measurement of Sound

How many cycles happen in one second? CPS? i.e. A Hertz – frequency

The slower the vibration, the lower the pitch.

Pitch is related to frequency. Pitch is a term of perception.

Human Range of Hearing – average change of pitch is 3 cps. Trainable

Part 2 AMPLITUDE

How Big the Wave is moving

Loudness -intensity (not volume – that is bigness and smallness - harps has a lot of bigness)

In music it is called Dynamics.

Frequency is independent of Amplitude. Can play A440 really loud or really soft.

Pitch discrimination is good – our loudness perception is not so good.

Logarithmic Scales go up by powers of 10. .10 to .20 means 10×10 .10 to .30 means $10 \times 10 \times 10$ - What is the upper reaches the threshold of pain and damage? 120 decibels.

Masking pain, damage and deafness –

Masking is where one set of sounds is interfering with another set of sounds.

6. Can an unamplified harp or any unamplified acoustic instrument reach 120 decibels?

A full orchestra reaches about 90 decibels.

Vibratory Mediums - elasticity

It needs momentum in order to vibrate.

Transmission /propagation - the sound needs to travel to where it needs to go from the vibrating source to the receiver. Air for example. We are surrounded by air molecules – the molecules can be excited and moved. 360 degrees multidimensional are being activated. The voice, a harp string is moving in all the direction.

Density/Elasticity – The less dense the medium, the more elasticity, the easier the propagation.

Beats or Rarefactions or air pressure change – air pressure change

Reflection – sound will travel unimpeded outside. In a room propagation will go until it hits something. It then bounces back to us – reflection.

Frequency is independent of amplitude. The loudness is being supported in a room like a bathroom because there are many walls to bounce off from.

Diffusion – loss of sound amplitude over distance. Over distance the amplitude decreases.

Decay – When you pluck your string and you just sit there – you don't replay it. It will get smaller and smaller. Over Time the amplitude decreases.

Sound Decay page.

Timbre – Tells the sound of the instrument.

Absorption – carpet – acoustic tiles – sound stops

PART 3 - Sound is Complex

Fundamental

Harmonic Series/Overtones The mixture of sound has all the overtones – The overtones are the complex vibration characteristic.

Timbre – Important in determining the Timbre of the music. Each instrument deals with the overtones in a unique way. How many overtones and the distribution – their relative loudness – how the sound builds up.

Noise – noise is a full spectrum sound – all the frequencies being produced as once. It is not as organized and has a wide spectrum

Tone quality – related to timbre is tone quality – timbre is characteristic sound of the instrument. But there are good and bad goodness of sound quality in the timbre.

Non-bright end for dying people versus performance.

7. What instrument does Barb feel is the most effective?

The concert harp produces more fundamental tones than any other instrument. It is unique but not better.

Craft and Intention – craftsmen developed an intuition – tapping the board, the types of varnish – the porousness of the wood. Element of the person who created it – his mental state, intention, maybe the maker prayed before making the instrument.

PART 4 Resonance

Resonance – whenever a system that can vibrate with a certain frequency is acted on from the outside, by another periodic disturbance that has the same frequencies, vibration of larger amplitude can be produced in the system.

Bridge at Puget sound - watch this amazing clip:

<http://www.youtube.com/watch?v=j-zczJXSxnw>

Sympathetic vibrations – some material is vibrating in the instrument – the larynx/ vocal chords – sinus cavities, chest cavities, the bone the flesh into vibration.

Anything that can vibrate with a certain frequency – string or piece of piece wood.

The singers voice is outside of the crystal glass.

How people use resonance aesthetically – the person can resonate. Hit the resonant frequency of the body or a specific part of the body. Doing this with hypersonics – kidney stones and gall stones – determine the resonance frequency of each stone and bombard it.

How can the body have one tone? Cannot simply say that everyone responds to C below middle C – each person is different. The greatest joy, the greatest bane of our existence is that it just isn't that simple. Therefore, you cannot say one sound is going to resonate the whole body. Maybe we are touching the pineal gland. This warrants more research.

Complexity is about intention!!! (Good time to start reading Barb's book).

So when they say music has not been proven - We have to break away from the strict medical model. Is everything in medicine proven?

Complexity of their lives, mental lives, genetics, food, water, thoughts, hormone matter. Musical preferences, life experiences – mode of music, type of music.

Non-verbals do not lie – they can lie with the verbals but not the non-verbal. Fidgeting with bed clothes. That is what we cannot quantify

Medicine is an art. We can't always prove the outcome.

Caring Intention – listen to your patient.

Effectiveness Research – languaging is so helpful – but it doesn't prove. We need not to fight among ourselves.

8. Why are recordings never true representations of the real instruments now that they are digital?

GIM uses recordings but a full spectrum of voices and used in psychiatric units.

PART 5 - More Characteristics of Sound

NOISE

Noise is sound that has aperiodic – irregular occurrence and non-harmonic overtones

9. What is Diffraction? The ability of sound waves to bend around objects

Environment affects sound – sound also affects other sound.

Beating to tune. When 2 sound waves exist in an environment, it does not affect the frequency. Many sounds played together – the frequencies are not interfered with in a room but sound waves occurring in a room at the same time does influence the amplitude. When they interact, they do impact each other. The amplitude will react and increase or decrease. That is what the beats are when we are tuning.

The wa wa wa is the rising and falling of the molecules – it is mathematical.

SCALES: Equal Temperament

ROOM ACOUSTICS

How our instruments sound in hospital rooms. They are usually stark, designed for sanitation and the sound bounces creating a lot of noise.

The harp will be amplified by a reflective room – therefore, we will need to play more quietly (needing more finger control!)

Our harps are specifically designed and recommended for therapy work.

An echo in music is very distressing to the listener.

10. What is music less jarring and more pleasant to listen to through the left side (ear) of the listener?

PART 6 - THE EAR

(Refer to the next page of the diagram of the ear in your support papers.)

The primary sensory channel that we use to process sound is the ear. Hearing is an amazing process of transducing the mechanical energy of sound waves – that are changed to electro-chemical processes.

The ear receives sound.

11. What are the 3 parts of the ear?

The Cochlea

This is where hearing actually happens.

(Turn to the next page)

unrolled Cochlea – it is a tube within a tube.

Basilar Membrane – organ of corti

Consists of hair cells – 30,000 hair cells projecting cilia

(Turn to the next page)

Basilar Membrane – vibrates and resonates – remarkable membrane because it has differential vibration – every section has its own resonance frequency so that if a A440 comes in at one band and C comes in at another band. When that frequency comes in that band vibrates to that frequency.

Rudolf Steiner and intervals (Christina)

PART 7 - Loudness

Abrupt change gives you more perception than gradual change

Amplitude perception is not so good. Loudness is coded by the total number of impulses sent to the brain.

12. At what age does the cochlea become full and complete in a human?

Hearing – Primary sense of survival.

We take in the world through hearing – vision takes out into the world.

Nerve cells summarized

The Brain – auditory nerves to the brain

We are hard-wired to create and respond to music!

Brain Stem
(See picture of the brain)

If you have no activity in the brain stem, you are clinically dead.

The Coma Patient
Coma patients are impacted by sound
They can often hear people talking and hear music

The harp can be associated with death so be sure to introduce yourself and what you are doing.

13. What does the Cerebellum do?

Physiological effects
Be careful about claims that music will effect the body.

Arousal factor
When you want to go to sleep you cut down your sensory input. Certain music will quiet people down. We learn to relax to certain types of music – it is learned behavior.

PART 8 - Entrainment

Phase-locking does exist in physics – discovered in 1560 by a physicist.

Energetic Medicine - Subtle Music

Mid-Brain
Limbic system – basic function – it is the seat of emotion. Memory, motivation, learning, auditory nerve connects into the mid-brain area.

Upper-Brain
4 auditory nerves running to the brain. It impacts different parts of the cortex.

Right Left Hemispheres
Pure hearing tones is below the thinking level. An ability that we share with animals.
Reading timbre – tone quality.

Loudness discrimination is right hemisphere – comparison.

14. Is Rhythm left or right hemisphere?

Melody is right hemisphere – we perceive melody as a series of tones – shapes.

People who are not trained in music tend to use the right hemisphere – those trained tend to use both.

The brain always works as a whole unit. It is so complex – it works in a wholistic manner.

Sensory Channels

Sound waves impact more than just our ears.

Sound pressure waves affect our skin. One can feel the vibrations. We are activating a person's sense of touch.

Body resonance – another impact of sound on us.

Energetics of the body are also affected by sound.

PART 9 - The Power of Intention

Healers can wind and unwind DNA with intention

Electrical charge coming off healers hands has been measured.

Boundary of intention separates subtle energy from Medical Science

Our intention is CRITICAL

Intention's light and dark side. Is it good or not to resonate certain parts of the body? Fabien Maman has done research to show that certain frequency can alter DNA.

It is always important to do your work with intention – without it, you may be doing harm. There is enough evidence to show that intention is powerful. We do not know if sound will have positive or negative effects but we do know that intention can influence outcome.

15. What is Haptics?

Performing music uses skilled motor behavior. Highly refined developed motor ability. When you play an instrument you have the same physical characteristics – using the same brain activity.

Use fine motor skills, small muscles – the small muscles require more of the brain to control than large muscles. If you are “doing” music you are activating more of the brain.

Serial skill – a sequence of movements to complete.

Hierarchy of skills employed

Space – spacing of playing the harp

Timing of movement

Neurologists like to study musicians for behavior. What is being engaged in the brain mechanism.

Phases of motor skill acquisition

First – Cognitive Phase – have to think about it – how to do it – it is awkward until you practice it well – to embed it, you must physically replicate the pattern, exercise over and over - practice, practice, practice

Start practicing slowly. Once you have it into your body, then you can up the tempo.

Second – Immediate Phase – refining skills

Autonomous phase – if you think about it, you short circuit the experience.

Complex inputs - be aware of this as it impacts people.

Harp acoustics

(last page of your download papers)

Plucked instrument – stretched string – sounding board – strings are not damped (unless manually done). Sound board – the multi resonating surface – it radiates the sound out

16. What are the 3 components to the design of the harp?

PART 10 - Tone quality of the harp.

One string has all tones – all overtones

Psycho-acoustic affects of music on people
Emotional response to music
Research on physiological responses to music

Brain wave speed – certain combination of sounds may promote alpha state

When we are being highly creative we are likely combining beta and theta brain waves.

Children are usually in theta waves.

Verbal reports

2 ways of looking at emotional response – the music is creating the emotion or the person is able to report (label) the emotion.

17. What was the greatest musical element that affects the mood of the listener?

What was the key factor of the listener? Their existing mood. Match their mood – then change gradually they may follow you.

The second factor is the familiarity with the music. Quite broad, i.e. Western music – their genre preference for music.

The following questions are from the video streams under Alzheimer's Disease.

ALZHEIMER'S - here is the resource for the clip:

http://www.alz.org/alzheimers_disease_what_is_alzheimers.asp

1. What is Alzheimer's?

2. What are the 10 signs of Alzheimer's?

HOW THE BRAIN WORKS – here is the resource for the clip:

<http://www.mayoclinic.com/health/brain/BN00033>

1. What is the largest part of the brain?
2. What is the corpus callosum?
3. What are the 4 lobes of the brain?
4. What is the function of the hypothalamus?

CAUSES OF ALZHEIMER'S DISEASE – here is the resource for the clip:

<http://www.mayoclinic.com/health/alzheimers-disease/DS00161/DSECTION=causes>

1. What are the causes of Alzheimer's Disease?

AUTISM – here is the resource for the clip:

<http://www.youtube.com/watch?v=i1XMSPfNyiA>

2. Autism is a spectrum disorder. What are the 3 areas that are affected by Autism?

Working with Seniors – clip by Christina at the Assisted Living Home

1. What are two ways of working with seniors to make music?

Working with Special Needs – clip by Orla Busted and Christina

1. What is an effective way to engage young adults with Special needs?

Working with Jordan with Cerebral Palsy – clip by Christina

1. In working with Jordan, his cognitive facilities are in place (as with those with Cerebral Palsy – it is their motor skills that are affected). There is that fine line of showing them how to do something and then letting them do it on their own versus doing it for them. You have seen 6 sessions from the beginning of introducing the instrument to Jordan to the beginnings of using his left hand and beginning to comprehend that his fingers can create a melody. What do you think will be the next step in his harp experience?

**List of Questions that you can copy
into your own document.**

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16. What are the 3 components to the design of the harp?
17. What was the greatest musical element that affects the mood of the listener?

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From THE CAUSES OF ALZHEIMER'S DISEASE

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