

ANALYZING MELODY PERCEPTION EXPECTATIONS OF INDIVIDUALS
FROM DIFFERENT CULTURES WITH THE HELP OF NOISE TESTS

A Research Proposal

by
Mehmet Umut Ermec

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Introduction

Understanding the effects of cultures on any phenomenon from any given discipline that explores the aspects of human society such as musicology, psychology or sociology with the help of empirical material is a tough task. Due to its nature, empirical research should have objective causation. To achieve objective causation, a researcher should conduct unbiased observation, induction, deduction, testing and evaluation processes. Since there are no verifiable formulas or facts that can be applied in social sciences, most of the research material that measures the effects of a social factor comes from subjective evaluations. This does not automatically mean that social sciences cannot use objective measurements. In fact, subjective and objective evaluations are essential sources for much social science research, especially in psychoacoustics.

One may claim that the change in melody perception expectancies between different cultural groups can be measured by evaluating the responses of subjects to the same program material, if the subjects have adequate musical background to reflect their perception.

Evaluating the Effects of Culture on Melody Perception

Every culture has a different way of perceiving stimuli. The same gesture, action or attitude may take on multiple meanings in diverse social groups. However, some stimuli have universal content. Crying refers to being sad; laughing refers to being happy. Correlatively, we

know that there are some specific combinations of pitched sounds that are accepted as dissonant or consonant by the majority of social groups, thanks to subjective evaluation tests.

An individual from a specific social group may perceive a set of pitched sounds differently because that individual's auditory repertoire does not normally include this set of consecutively perceived pitches. Therefore, the original melody may be manipulated to fit the expected registry which is defined by the information in the lexicon of the individual.

According to gestalt theory, an individual tends to perceive the whole form (melody) before the collection of its parts (notes). Diana Deutsch (1999, 300) assumes that any individual who is exposed to a set of musical stimuli tends to manipulate or frame them to fit what he or she acknowledges and *expects* as a whole in the light of his or her previous experiences. Isabelle Peretz (2000, 522) underlines that recognition of *familiar* music is immediate and easy for every human being. Needless to say, the information in the lexicon of individuals is shaped under the influence of their culture. In consequence, there is a great possibility that individuals with varying cultural backgrounds can perceive a set of pitched sounds as relatively different melodies, as a result of the manipulation in question. In these cases, the listeners are usually unaware that they hear an altered version of the original melody.

Referring to Color Blindness Diagnosis

It is scientifically proven that the colors red and green have different frequencies. Thanks to some medical tests, we also know that some people cannot identify them, or in another words, they cannot *see* them as the same. The diagnosis of such a deficiency is based on the research of Ewald Hering, who invented a device that reveals color blindness ("Hering's Colour Blind Apparatus.").

Frequencies of musical notes are also measurable scientific facts. On the contrary, the way different cultures exercise musical notes or pitched sounds are not measurable scientific facts.

When a subject is exposed to a color chart for a visual test, we are obliged to the subject's description of color in order to understand what green is for him or her, even though we can diagnose that he or she is colorblind. There is no other way to understand perception of the subject. Therefore, it is very hard to analyze the perception. Moreover, because we are dependent on what the subject states, the expression abilities of the subject may affect the results of the test remarkably. This becomes an even bigger issue when the subject is being asked to express his or her perception of a characteristic, which needs a special set of skills, knowledge, and vocabulary to do so.

For instance, it is relatively easier to define what color he or she sees for a painter, since he or she is knowledgeable on the matter, has had more experience in describing colors and employs the right terminology. However, an electronics engineer may not be able to describe a color as well as a painter does, even though he or she is not aware of it. So, despite the fact that they perceive the same color, two individual subjects of the same test may give substantially different descriptions, based on their educational/ professional backgrounds.

Melody Perception Tests vs. Color Blindness Tests

It is presumably more complicated when it comes to music. Some persons cannot even whistle a melody of a song or clap their hands rhythmically whilst some can play an instrument well on the first try. Musical talent, experience, and knowledge play a big role in describing what we hear and understand from a musical piece. The results of a possible test, which asks its

subjects to repeat given musical passages by performing, may not be one hundred percent descriptive of what the subjects actually perceive, especially if the subjects have considerably different musical backgrounds. Still, a good amount of knowledge may be gained by subjective listening tests regarding any musical, psychoacoustical, psychological or sociological phenomenon, if the musical backgrounds of subjects are chosen carefully and have similar characteristics in terms of knowledge and skill.

On the other hand, subjective evaluations may not tell us if a music piece is perceived accurately. If a person is having problems in recognizing the colors of traffic lights from a distance, we should suspect that there is a chance that the person is not able to distinguish some colors. Since we speculate that the individual in question does not sense (and therefore perceive) a specific color with a specific frequency and intensity as how the majority does, we apply a method to reveal that anomaly. We perform medical visual tests and then we come to the conclusion that the subject is color blind if he or she cannot address a green number or shape specially placed in red material (Indiana University News Room).

However, we cannot know how the patient perceives *color* with the help of this test. We can only come to the conclusion that the subject cannot identify the difference between red and green. For all we know, the subject cannot distinguish red and green. We cannot even prove that the subject does not perceive both colors as yellow, since we do not have enough test information to prove against it. It would be possible if we could apply a test in which the subjects could paint what they perceive by being able to mix different colors, which is theoretically impossible due to the paradox that they would be seeing what they paint in an affected way as well.

Unlike color blindness, a similar test can be used to understand melody perception. A musically qualified subject who is previously exposed to a melody can be asked to play or sing what he or she hears. One may claim that melody perception tendency differences between different cultural groups can be measured by evaluating the responses of subjects to the same program material, if the subjects have the proper training and/or fairly similar musical ability to reflect their perception.

Project Istanbul aims to analyze and evaluate the production approaches of musicians from different cultures to the same musical material, to understand possible perception and expression differences between cultures by reaching competent musicians via schools, institutions, organizations, media and internet (Ermeç, 2010). Similarly, the same approach can be used to analyze a simpler part of the topic; melody perception differences between cultures.

Usage of Noise for Listening Tests

As different scales are used in different social groups, we may expect to observe an adaptation process when an individual from a specific culture is exposed to a melody that belongs to different culture that uses completely different structure by using different scales. The adaptation process mentioned may include manipulation of perceived pitches, duration of notes, time signature, and accents. To observe such sets of manipulation, we have to make sure that the material being used in a music perception test does not belong to any culture. Broad noises might be very good sources for such tests since they are random signals. Unfortunately, noises do not have pitch; and, it is impossible to perceive pitched sounds while listening to them continuously. Despite this, I have discovered that listening to short loops of recorded noise highlights some pitches and therefore melodies due to random focusing on random frequencies, especially after

listening to them repeatedly. Concentration on random frequencies changing in time provides a good source for melody perception tests. Moreover, a random melody generator can also be used to apply the same idea in a more feasible way if random noise melodies are found too complicated for the subjects to detect.

Method

In this research, loops of band-filtered pink noise sounds ($f_l=250$ Hz, $f_h=8$ kHz, slope=12 dB/octave) will be used as it reveals the most pitch-intelligible part of the signal. The loops will include eight repeated one or two second long noise samples with one or two seconds of silence in between. The subjects will be asked to playback those noise loops and then to play an instrument, sing or write down the notation to describe the melody they hear. They will also fill out a short questionnaire in order to provide essential information regarding their country of origin, location, ethnicity, sex, age, musical background and any other necessary information.

The test will be done through *Project Istanbul* website to provide the highest participation with the widest cultural diversity, which will also assure the randomization of subject selections. The data may be collected through a website or a link at ww.projectistanbul.org via simple record and upload tools. The subjects will be free to choose any expression method they want (notation, singing, playing an instrument). All the audio uploaded will then be transcribed into notes to be analyzed with the help of pitch recognition software programs such as Melodyne, with no manipulation. The analysis process will focus on the similarities between the inputs from the same cultural group and contrasts between different ones.

The need to have a set of critical listening skills in order to be able to hear a set of pitched sounds in a noise signal is one of the biggest limitations of this research. However, ensuring that critical listeners such as professional musicians, music and audio scholars and students contribute as subjects and using random melody generators to provide easy-to-detect melodies may help to overcome this issue.

Outcome

Results of the study may clarify if there is a cultural effect on melody perception, which would provide foundation for further research regarding music perception and its relationship with culture. It may also help us to understand how perceiving and registering a musical piece affect musical taste of individuals from the same social group who usually like or dislike similar musical pieces. In conclusion, this study may let us understand if it is possible to hear things differently just because of the culture to which we belong.

Consequently, the study may provide necessary information to researchers who are working on performance, composition, and improvisational analysis. It will also contribute to modeling for specific social groups, music personalization algorithms, virtual instrument design, optimization of the use of music for target groups in advertising, and custom digital audio encoding system designs for different communities.

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