

Geneva Music Background Questionnaire (GEMUBAQ)

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Abstract

This report describes work carried out by the authors in preparation for the development of a Music Background Questionnaire intended to serve as a standard instrument to measure important background variables such as music activities, music abilities and attitudes, and frequent music listening experiences. In the course of development we decided to join forces with Tan-Chyuan Chin and Nikki Rickard who had been working on individual differences in music engagements. The result of the joint work is published as *MUSEBAQ: A Modular Tool for Music Research to Assess Musicianship, Musical Capacity, Music Preferences and Motivations for Music Use*. The purpose of this brief report is to document the work performed in the context of the Music and Emotion project of the Swiss Center of Affective Sciences in 2014.

Introduction

Much of the steadily increasing interest in emotional power of music (Cochrane, Fantini, & Scherer, 2013) is focused on the emotions induced by music in listeners. While a considerable number of studies have been published in this area, progress is impeded by a) atheoretical approaches, with little cumulativeness of findings, and b) lack of appropriate measurement instruments that are suited to the special nature of music induced emotions. On a) we have made a first effort, proposing the *Routes model*, which provides an inventory of the potential determinants or causal factors that may account for emotional effects of music, proposing a multiplicative relationship of the determinants (Coutinho & Scherer, 2013) - *Experienced Emotion = Effect of Structural features x Performance features x Listener features x Contextual features*.

While model has found much interest, to date there have been only few efforts for empirical work based on it (but see Coutinho & Scherer, submitted a).

On b) our group has developed the Geneva Emotional Music Scale (GEMS, Zentner, Grandjean, & Scherer, 2008), an attempt to create an instrument that is domain specific for this area. Recently, we have extended and adapted GEMS to the GEMIAC (GENeva Music-Induced Affect Checklist), extending it to other types of emotions and simplifying the administration for in situ use (Coutinho & Scherer, submitted b)

First studies have shown viability of this approach (Coutinho & Scherer, submitted a) This suggests that time may be ripe to envisage systematic attempt to empirically examine pertinence of routes model and attempt to isolate the determinants of the emotional power of music and the nature of their interaction. However, a central requirement is the systematic and reliable measurement of the determinants involved:

Structural features - Although there is some work to identify the musical structures that may produce emotional responses, this is a complicated matter and there is no standardized inventory or coding system in sight. Music structural features range from microstructural properties of the acoustic signal that very closely describe the features of emanating source and surrounding environment, to a much higher level of structural organization and abstraction, which can convey for instance form and style. The task is complicated because of differences between genres – and thus structural features may need to be determined ad hoc in each study. Furthermore, music structure can also convey meaning outside the auditory domain, as is the case of visio-spatial and motion (e.g., Eitan & Granot 2006), as well as tactile (Eitan & Rothschild 2010) metaphors. Such cross-modal interactions in the perception of music can have a strong influence on emotional responses to music, by conveying emotional meaning across multiple modalities which can lead to more intense and multi-faceted emotional experiences.

Performer features -- while treated in glowing detail by music critics, no established roster of judgmental criteria and no agreed upon vocabulary or assessment procedure currently exists. Also there are great differences between genres. Here we must also await progress in future research – and use ad hoc solutions until then. It is important to mention that performance features include two distinct, although intertwined, dimensions, both with a major impact on the perception and induction of emotion. One is intrinsic to the aural experience and corresponds to the way in which a piece of music is executed by a singer and/or one or more instrumentalists. The second dimension refers to the effects of iconic, indexical and symbolic information communicated during the performance. All these aspects, isolated or in combination, directly or indirectly, and in the context of a particular listening situation, affect the

emotional experiences of a musical performance (see Scherer & Coutinho, 2013 for more details).

Contextual features -- again, there are many hypotheses about importance of certain aspects of the performance and/or listening situation. The location of a performance and/or a listening situation may be a concert hall, church, party, street, car or home. The dominant material surrounding the listener/performer may be wood, glass, stone, metal or none. The particular event may be a wedding, a funeral, or a ball. The music may be transmitted through loudspeakers, headphones or without any technical support. The music may be heard without interruption or the sirens of an ambulance or the coughing of a concert visitor may disturb it. All these features can have an influence on the acoustics, the ambiance of the location, or the behavior of the audience, which in turn may lead to different emotional effects due to objective features of the situation or subjective perceptions of the listeners. So far no established classification system was developed.

Listener features – here we refer to the individual and sociocultural identity of the listener and the symbolic coding convention prevalent in a particular culture or subculture. These features can be summarized into musical expertise (acquired implicitly and/or explicitly), including cultural expectations about musical meaning, and stable dispositions (related or unrelated to music, such as age, inference dispositions based on personality, individual differences in memory or physiological reactivity, among many others – see Scherer & Coutinho, 2013 for a through list and supporting evidence). Also here, to our knowledge, no established inventories of musical expertise and relevant stable dispositions, especially the dispositional tendency to react with strong affect to listening to music. It is here that we believe it to be possible to develop a standardized instrument and this report describes the development of the Geneva Music Listener Background Questionnaire (GEMUBAQ).

Concretely, based on the literature we have identified the major dimension of importance, formulated concrete items to measure these and used the result questionnaire in several studies. The paper reports the results of these validation studies.

One of the central issues concerning the modeling of the causal factors that determine emotional effects of music is the relative importance of the different determinants. As the preceding discussion shows, an empirical answer based on a comprehensive study of all determinants in different genres will be a matter of years if not decades. In the interim, we propose to assess the subjective assessment of listeners in terms of their perception of the role of the different determinants on their emotional response. A first study in this direction has been published by Scherer, Schacht & Zentner (2002). Based on this model we have developed a brief checklist for the subjective perception of determinants also presented in this report.

Method

The aim of the empirical experiment was to obtain information about people's musical activities, habits, and skills. Participants were recruited via email and the study was made online. Each participant was asked to answer to a questionnaire containing 41 items organized in 3 question groups as shown in Table 1.

The first group of questions pertained to musical activities. Participants were asked to indicate how often they engage in various musical activities (see Table 1, Question group 1).

The second group of questions aimed at collecting information about musical abilities and attitudes towards music: *Please indicate for each statement how much this is true for you.*

The third question groups focused on the types of experiences (particularly of an affective character) that people live while listening to music: *For each of the items, please indicate how often you have similar feelings*

Four-point scales were used to allow participants to respond quantitatively to each question group: 1) *never or rarely - sometimes - often – frequently*; 2) *not at all – somewhat – much – very much*; 3) *never or rarely - sometimes - often – frequently*.

Table 1. Questions groups

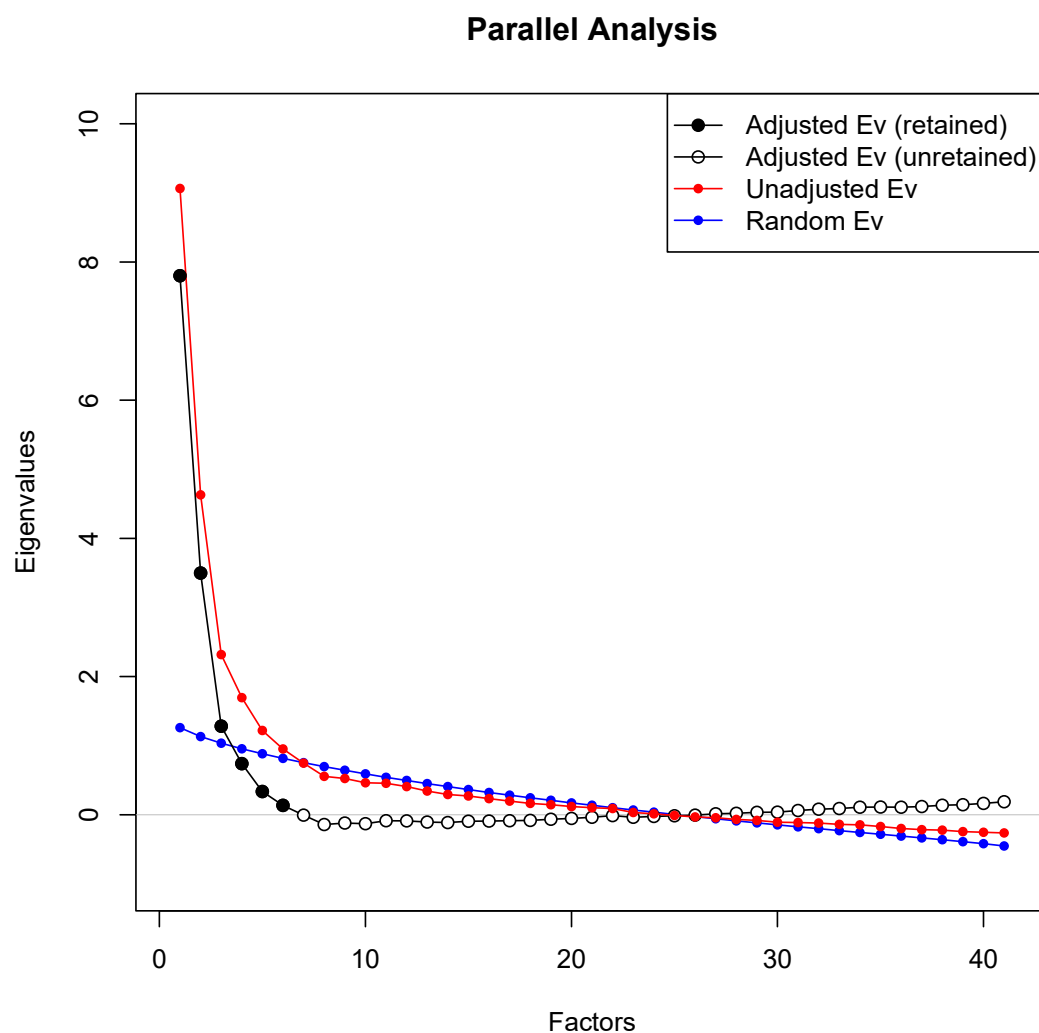
Question group 1 - Music Activities: <i>For each of the items, please indicate how often you engage in this activity (never or rarely - sometimes - often – frequently):</i>	Alias
Playing an instrument or singing at a professional level	MusicianPro
Playing an instrument or singing as a hobby	MusicianHobby
Studying to become a professional musician	MusicianStudent
Going to classical concerts	ClassicalMusicConcerts
Going to the opera	OperaPerformances
Listening to live jazz sessions	JazzConcerts
Going to popular concerts (pop, rock, techno, etc.)	PopConcerts
Listening to recorded classical music (radio/TV, CDs, DVDs, iPods)	ClassicalMusicListener
Listening to recorded popular music (radio/TV, CDs, DVDs, iPods)	PopListener
Listening to recorded jazz (radio/TV, CDs, DVDs, iPods)	JazzListener
Listening to music while doing other things	BkgrMusic
Question group 2 - Musical ability and attitudes: <i>Please indicate for each statement how much this is true for you (not at all – somewhat – much – very much)</i>	Alias
I love music	LoveMusic
Listening to music is one of my favourite activities	FavouriteActivity
I think I have a good musical culture	GoodMusicCulture
I find it difficult to concentrate without listening to music	NeedMusic
I have a musical talent	MusicalTalent
I have a good ear for music	GoodEar
I can sing	CanSing
I can play one or more musical instruments	PlayInstruments
I'm very focused when I listen to my favorite music	Focused
I do not understand people who listen constantly to music with portable players	WasteTime1
I think playing or listening to music is a waste of time	WasteTime2
Listening to music fills me with emotion	FeelEmotions
When I listen to music, I try to experience what the composer wants to transmit.	EmpathyWithComposer
Sometimes I compose music	ComposerAmateur
I can very well do things without listening to music.	NoMusic
What I like in the song is the musical expression of emotions conveyed by the singers	LoveExpressiveVoice
Question group 3 - Music Listening Experiences: <i>For each of the items, please indicate how often you have similar feelings (never or rarely - sometimes - often – frequently)</i>	Alias

When I listen to some music I experience strong emotions	FeelStrongEmotions
Music produces a feeling of awe and uplift in me	FeelUplifted
When I listen to music I calm down and relax	FeelRelaxed
Listening to music has a very energizing effect on me	FeelStimulated
Some types of music can make me aggressive or belligerent	Agression
I sway my body or tap my foot when listening to music	Entrainment
I have trouble to suppress my desire to hum along with music	HumAlongMusic
I have chills or gooseflesh when listening to moving music	StrongPhysRessp
Tears come to my eyes when listening to some pieces of music	Tears
I have to fight boredom when listening to music	FeelBored
Music produces extremely enjoyable experiences for me	FeelPleasure
Music moves me	FeelMoved
When listening to music my mood gets better	MoodRegulation
While listening to music I think about other things	Think

Results

We collected a total of 188 complete questionnaires. In order to investigate the underlying relationships between the various questions, we conducted an exploratory factors analysis (EFA) on the questionnaire data. We used the *fa* function from the *psych* (Revelle, 2016) package in R (R Core Team, 2014), with the minimum residual (*minres*) factoring method. We rotated obliquely the original solution using the *oblimin* method.

Horn's Parallel Analysis (PA; Horn, 1965) for common factor analysis was used to determine the number of factors to retain (using *paran* package in R; Dinno, 2012). The scree plot showing the eigenvalue for the unadjusted (original), adjusted (original less estimation bias) and random data sets are shown in Figure 1. PA results suggest retaining 6 factors, which explain 47% of the variance in the data. All item loading on each of the 6 factors in shown in Table 2 (those larger than .50 are shown in bold).

Figure 1: Parallel analysis**Table 2:** EFA – *minres* method – *oblimin* rotation - 6-factor solution

	F1	F2	F3	F4	F5	F6
Explained Variance	0.14	0.09	0.09	0.06	0.05	0.04
Cumulative Variance	0.14	0.24	0.32	0.38	0.43	0.47
Agression	0.354	-0.039	0.029	0.107	-0.200	0.024
BkgrMusic	0.043	-0.174	0.627	-0.230	0.141	0.053
CanSing	-0.008	0.705	-0.078	0.035	0.011	0.085
ClassicalMusicConcerts	0.063	0.075	0.016	0.727	0.148	0.163
ClassicalMusicListener	0.076	0.004	0.045	0.571	0.085	0.185
ComposerAmateur	-0.071	0.609	0.001	-0.228	0.184	0.047
EmpathyWithComposer	0.275	0.201	0.184	0.212	-0.012	-0.112
Entrainment	0.325	0.006	0.257	-0.322	0.084	0.196
FeelBored	-0.072	-0.096	-0.009	0.175	-0.079	0.260
FeelEmotions	0.525	0.136	0.174	0.094	-0.095	0.009
FeelMoved	0.795	0.035	-0.071	-0.010	0.074	0.089
FeelPleasure	0.574	0.016	0.137	-0.016	0.043	-0.012

FeelRelaxed	0.547	0.013	0.144	-0.106	0.094	-0.085
FeelStimulated	0.592	-0.055	0.235	-0.098	0.114	-0.111
FeelStrongEmotions	0.736	0.053	0.115	0.069	-0.045	-0.063
FeelUplifted	0.693	0.106	-0.073	0.133	-0.056	-0.155
Focused	0.467	0.204	0.107	0.168	0.001	-0.113
GoodEar	0.057	0.778	0.084	0.081	-0.046	-0.154
GoodMusicCulture	0.029	0.400	0.446	0.210	0.040	0.043
HumAlongMusic	0.458	0.117	0.106	-0.230	-0.070	0.003
JazzConcerts	-0.021	0.041	0.059	0.113	0.038	0.724
JazzListener	0.125	0.075	0.089	0.046	-0.091	0.687
LoveExpressiveVoice	0.461	0.141	-0.033	0.160	-0.065	0.049
LoveMusic	0.177	0.113	0.687	0.086	0.089	-0.008
MoodRegulation	0.531	-0.254	0.228	-0.098	0.114	-0.005
MusicalTalent	0.018	0.824	-0.035	0.055	0.069	0.053
MusicFavouriteActivity	0.121	0.173	0.687	0.044	0.038	0.077
MusicianHobby	0.094	0.558	0.026	-0.237	0.138	0.197
MusicianPro	-0.023	0.092	-0.010	0.095	0.800	-0.012
MusiciansStudent	-0.008	0.053	-0.004	0.106	0.825	-0.019
NeedMusic	-0.102	-0.010	0.514	0.175	-0.082	0.028
NoMusic	0.082	-0.054	-0.245	-0.021	0.181	0.025
OperaPerformances	0.050	-0.009	-0.026	0.709	0.278	0.000
PlayInstruments	0.006	0.614	0.065	0.006	0.162	0.081
PopConcerts	-0.160	-0.059	0.599	0.058	-0.169	0.187
PopListener	-0.020	-0.061	0.651	-0.137	-0.127	-0.054
StrongPhysRessp	0.792	-0.045	-0.047	0.013	-0.043	0.114
Tears	0.706	-0.030	-0.199	0.038	-0.004	0.215
Think	0.170	-0.087	0.240	-0.147	-0.170	-0.012
WasteTime1	-0.065	-0.083	-0.338	0.217	0.145	0.261
WasteTime2	-0.195	0.031	-0.148	0.042	-0.134	0.261

Table 3: EFA – *minres* method – *oblimin* rotation - 6-factor solution – Only strong loadings

	F1	F2	F3	F4	F5	F6
FeelMoved	0.795					
StrongPhysResp	0.792					
FeelStrongEmotions	0.736					
Tears	0.706					
FeelUplifted	0.693					
FeelStimulated	0.592					
FeelPleasure	0.574					
FeelRelaxed	0.547					
MoodRegulation	0.531					
FeelEmotions	0.525					
MusicalTalent		0.824				
GoodEar		0.778				
CanSing		0.705				
PlayInstruments		0.614				

ComposerAmateur	0.609	
MusicianHobby	0.558	
MusicFavouriteActivity	0.687	
LoveMusic	0.687	
PopListener	0.651	
BkgrMusic	0.627	
PopConcerts	0.599	
NeedMusic	0.514	
ClassicalMusicConcerts	0.727	
OperaPerformances	0.709	
ClassicalMusicListener	0.571	
MusiciansStudent		0.825
MusicianPro		0.800
JazzConcerts		0.724
JazzListener		0.687

As can be seen in Table 3, a clear-cut six factor structure emerged from the EFA (there are no cross-loadings; only loadings over 0.5 were considered).

The item loading on F1 clearly indicate an affective factor, that is, all the items loading on this factors describe some sort of affective response (e.g., *music moves me* or *listening to music fills me with emotion*), including strong emotional reactions (*I have chills or gooseflesh when listening to moving music* or *tears come to my eyes when listening to some pieces of music*) and emotional/mood regulation (e.g., *when listening to music my mood gets better* or *when I listen to music I calm down and relax*). This factor was labelled as “**Emotional involvement**”.

The second factor (F2) loadings include various indicators of self-assessed lay musicianship: musical talent, ear for music, capacity for singing and playing musical instruments, and music composition. This factor was labeled as “**Lay Musicianship**”.

Loadings on the third factor (F3) describe music lovers in general, as well as an omnipresence of music in everyday life, and particularly popular music genres.

Factor four (F4), with only three loadings, describes classical music and opera listening and performance attendance habits.

The fifth factor (F5) describes formal musicianship (i.e., explicit music training).

The sixth factor (F6) describes jazz lovers.

Table 4: Inter-factor correlations

	F1	F2	F3	F4	F5	F6
F1	1	0.28	0.37	0.13	0.14	0.16
F2	0.28	1	0.19	0.31	0.44	0.17
F3	0.37	0.19	1	-0.1	0.02	0.06
F4	0.13	0.31	-0.1	1	0.36	0.23
F5	0.14	0.44	0.02	0.36	1	0.13
F6	0.16	0.17	0.06	0.23	0.13	1

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