CHARTISTIC

A new non-verbal measurement tool towards the emotional experience of music

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UNIVERSITEIT TWENTE.

SusaGroup

Creating meaningful experiences

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Preface

Writing a master thesis is a long process. When I look back, I have a good feeling about it. I really enjoyed it and I learned a lot. Reasons for that were the inspiring and highly interesting topic, and the people I worked with and who surrounded me during that time. There are a lot of people I want to thank.

First of all, I want to give my regards to Marco van Hout and Lars Rengersen, who came up with the ambitious idea to try to create a hit potential prediction tool for songs and gave me inspiring ideas. They made it possible to develop the scale, which turned out to be a very interesting and enjoyable process with a pleasing result. Furthermore, I want to thank Thomas van Rompay and Joost Verhoeven from the University of Twente for good advice and feedback. I am glad that we got along very easily. I want to thank everyone else from SusaGroup and Monito with whom I spent a lot of time while writing my thesis, and who helped me with programming my online surveys. They always provided a good atmosphere. I certainly want to thank my parents for their never ending support. And of course, I want to thank my Jos, who always provided me with emotional support, advice, motivation, confidence and who had a lot of patience. I am thankful to my friends Jutta, Marlene, Koen, Gerben and Nicole, who spent time reading my thesis, gave me advice or helped me with back translations. And also I want to give my regards to all other friends who are part of my trustful panel over the last five years and never got tired when I brought up another 'only 5 minutes - a very enjoyable questionnaire'. Finally, I want to thank everyone else who helped me during the process.

Enschede, july 2010
Maike Hedder

Abstract

The aim of the current studies is the development of a new, practical non-verbal measurement tool in order to capture the emotional experience of music. 33 emotions of the Geneva Emotion Music Scale have been reduced to five emotions in a pre-test. The five emotions: *love, sadness, tension, calmness* and *joyful action* have been translated into five male and five female characters. After validating the new scale in study 2, a third study has been conducted testing fifteen songs, divided into Dutch hits, Dutch flops and unknown hits from foreign countries. The songs represent five genres: pop, hip-hop, dance, rock and singer-songwriter. Results show that the new scale is capable of differentiating between hits, flops and different genres. The most important emotions that differ significantly between hits and flops are 'joyful action' and 'calmness'. Emotions predict 18% of the variance in hit potential. 'Joyful action' is the strongest predictor.

INTRODUCTION

"Music is what feelings sound like." (Author Unknown)

Music is all around us in our everyday life. People frequently listen to music to regulate their mood, for example when using public transportation. Some airlines even play classical music in their planes during start and landing, to keep passengers more relaxed. Imagine you are in a bad mood and you want to cheer up. Music would probably be a helpful tool to achieve that.

Keeping control over one's emotions is a crucial skill in today's society. People have to control, ignore and override their feelings in order to perform well (Gross, 1999). Media play an important role in regulating people's moods. Music is the most important medium for changing positive and negative mood, followed by television and magazines (Greenwood & Long, 2009). This is why a great deal of the music people listen to, is actively and consciously chosen. People have frequent emotional responses while listening. Furthermore, mood regulation, pleasure and relaxation are part of the main listening strategies (Laukka, 2007). Thus, music is a helpful tool for people to manage everyday life.

Because of its influential power, music is also widely used in marketing. Priming certain ideas in order to lead people's thoughts in a specific direction, is just one function which showed to be successful (Hansen & Hansen, 1988). As an example, people's buying behavior was unconsciously influenced by playing German or French music in a wine store. Clients more often purchased the wine type which matched the music and also denied that musical influence when they were confronted with their buying choice (North, Hargreaves, Mackenzie & Law, 2004). Furthermore, people can have strong associations with music. For instance, sensual perfume advertisements often go along with sensual songs. The creation of a strong brand image can be supported by using music in brand communication, which is called acoustic branding (Westermann, 2008). In sum, music has an enormous impact on people's cognition and emotions and can therefore have different functions in our life. The different functions of music are all depending on the particular situation (Juslin & Västfjäll, 2008), which makes musical emotions very complex and different from other emotion induction processes we know in our everyday life.

Regarding this important role of music in mood regulation and marketing strategies, measuring musical emotions has become a widely discussed topic over the last decades. But problems arise when it comes to measurement, because of a lack of proper music emotion scales. Using measurement tools which were originally created for non-musical emotions, proved to be unsuccessful in the past (Zentner, Grandjean & Scherer, 2008). There is little consensus about the emotion induction process and there are no systematic and empirically

tested guidelines (Zentner et al, 2008). As a consequence it is difficult to replicate results. This can be explained by the diversity of mechanisms that can evoke musical emotions (Juslin & Västfjäll, 2008). A comparison between a newly developed musical emotion scale and non-musical scales showed that the domain specific scale turned out to be better than a discrete emotion scale or a dimensional one (Zentner et al, 2008). Today, scientists all over the world have not yet reached an agreement about the extent to which musical emotions differ from everyday emotions (Zentner et al, 2008), which mechanisms play the most important roles behind emotion induction (Juslin & Västfjäll, 2008) and whether music induces emotions at all (Krumhansl, 1997). Notably, these studies only deal with the emotions which are subjectively felt by the respondents and not with the emotions expressed through the song. Both types of emotions can differ (Zentner et al., 2008). This difference can often be found in songs in which the singer expresses angriness, while the listener does not get angry himself when hearing the song.

Due to the shortcomings of emotion scales for practical use, the purpose of this study is to develop a new non-verbal scale which is capable of measuring the emotional experience of different music styles.

Besides the importance of a new scale for future research, there are several practical advantages of such a new scale. Visual attraction (Norman, 2003) and a reduction of complexity are crucial factors for an enhanced usability in real life settings (Reber, Schwartz & Winkielman, 2004). An easy to understand and visually attractive scale can be integrated in online tools and programs, as for example *last.fm*, an online music service. New musical filtering systems like social tags based on listening statistics of people, the variety of musical styles of songs and artists, are possible implementation areas (Eck, Lamere, Bertin-Mahieux & Green, 2007).

Another upcoming development is music analysis in order to predict the hit potential of songs (Dhanaraj & Logan, 2005). This analysis is often based on the technical structure of the songs. Due to the fact that emotions play an important role in the liking of songs and listening to music (Chamorro-Premuzic & Furnham, 2007), it is reasonable to assume that emotions influence the success chance of music. Measuring the musical experience of songs can also give new insights in the experience of different genres. Knowing the emotional profile of songs can therefore also be interesting for marketing usage, like in-store music selection or acoustic branding.

Finally, because mood regulation is an essential function of music, analysis of different songs and genres can reveal which emotions listeners feel the most, what they prefer and which genres are appropriate for changing certain moods.

For creating a proper tool, the differences between musical emotions and everyday emotions are discussed first. After the development of the new tool, the scale will be validated

and the musical emotions of several songs from different genres will be analyzed. Results of the validation test can indicate whether the new scale is capable of differentiating between successful and unsuccessful songs. In addition, we will test the quality of the scale, by looking at its capability to relate emotional profiles to predict hit potential. In this study, success is operationalised as high rankings in hit charts. Finally, the results will be interpreted in terms of theoretical and practical implications.

THE EMOTIONAL EXPERIENCE OF MUSIC

In the following part, we will discuss musical emotions, what the difference between musical emotions and the emotions evoked in everyday life is, and what the implications for the measuring process are.

Before discussing musical emotions, the term emotion will be defined. Over the past 200 years, many different definitions were developed, starting with evolutionary perspectives from Darwin (1890) and the importance of survival according to James (1884), to cognitive perspectives nowadays. The understanding of emotional goals is broader today, including not only survival goals, but also a relation with the whole environment (Frijda, 2005). An emotion can be summarized as a complex interaction between factors which generate affective and cognitive processes like arousal, pleasure/displeasure or appraisals that often, but not always, will lead to goal-directed behavior *(*Kleinginna & Kleinginna, 1981).

Emotions evoked by music are in several aspects different to other emotions we experience everyday. Firstly, emotions induced by music are not always goal-oriented. Secondly, the emotion repertoires are slightly different and thirdly, music can evoke emotions through several different mechanisms. Furthermore, more than one emotion can be induced at the same time, which is called mixed emotions.

To explain the difference, we will compare musical emotions to theories of everyday life emotions: emotions which have a relationship with the environment are related to actions and are acute (Frijda, 1994; 2005). In the case of product emotions, we analyze an object against our concerns and appraise it to be beneficial or harmful to these concerns (Desmet, 2002). For instance, seeing a chair and analyzing it against our personal concerns, which demand that it should be comfortable and fit to our furniture. If the properties of the chair are beneficial for these two concerns, we build up emotions based on these results.

Music does not always seem to enhance or harm our goals (Juslin & Västfjäll, 2008). We often listen to music without measuring its benefits for a certain goal. According to Krumhansl (1997), emotions are usually important for the physical preparation of actions, but musical emotions normally don’t have any effect on goal-directed behavior. There are situations when

music and behavior are combined, as with dancing or sports. In this case, music may facilitate the activity, but the action itself is not addressed towards the musical emotions. Scherer and Zentner (2001) add that music can produce physiological and behavioral changes, but these changes are not goal-oriented and do not serve action tendencies. Instead they are more diffuse and reactive. Goose pimples and shivers are some examples of bodily symptoms regarding music (Scherer, 2004). The emotions we get by listening to music are acute (Scherer, 2005), but music can also influence our mood (Scherer & Zentner, 2001), which is more long lasting.

Though music normally is not goal-oriented, regulating moods by using music is an example in which music listening is serving a goal. The most important functions of listening to music are mood regulation, pleasure and relaxation (Laukka, 2007). The theory about mood regulation of Larsen (2000) describes a current mood state and a desired one. The regulating mechanisms are called into action, when discrepancies between these states are detected. The mechanisms can be cognitive or behavioral and may affect the environment or the person itself. Listening to music could be described as a behavioral regulating mechanism that directly influences the mood of the person itself. But the effectiveness of the regulation also depends on the kind of mood or personal factors as sensitivity to the environment (Larsen, 2000).

Although the emotions we experience in music are not exclusively felt in music, but also known in everyday situations, there is a clear group of the most frequently felt musical emotions. This essential set is different from those emotions which are commonly experienced in everyday life (Juslin & Laukka, 2004). For example, negative emotions like guilt, shame, jealousy, disgust and fear are much less experienced while listening to music than in everyday life (Zentner, et al., 2008). Other important properties of musical emotions are mixed emotions. One could feel happiness because of the joyful content of the song, but at the same time feel unhappy, because of a sad event the song reminds one of. Different emotions at the same time are very common in musical experience (Juslin & Västfjäll, 2008). For these reasons it is not recommended to use only basic emotion sets for measuring musical experience (Scherer & Zentner, 2001).

Besides the case of mood regulation, where music clearly serves a goal, musical emotions can be induced through several mechanisms which do not necessarily involve cognitive processes. At this point there are different beliefs about the role of cognitive appraisal, or whether cognition is even a part of the process at all. Juslin and Västfjäll (2008) claim, that there are more important processes concerning musical emotion induction than only cognitive appraisal. They differentiate six mechanisms which explain the emotional experience of music. These mechanisms don't have to work all together and not all at once. They differ in several respects, like time of development, cultural influence, the consciousness and the induction speed. The mechanisms are called *evaluative conditioning, episodic memory,*

emotional contagion, the brain stem reflex, *visual imagery* and *musical expectancy* (Juslin & Västfjäll, 2008). 'Evaluative conditioning' happens through repeatedly pairing of the music with a certain feeling. If people listen to the same song more often when they are happy, joyful emotions will be matched to the song. When they hear the song in the future, the same joyful emotions will be induced. This process is very similar to 'episodic memory' in which music evokes memories which in turn evoke feelings. These two mechanisms play an important role in giving a familiar song a personal meaning to someone (Juslin & Västfjäll, 2008). Research has also shown a relationship between familiarity with a song and liking (Ritossa & Rickard, 2004). This can be explained by the mere-exposure effect (Zajonc, 1968). A person will appreciate a familiar stimulus more positive than a new one. The suppression of these mechanisms makes measurements more comparable. The use of unknown or rarely known songs in measurement decreases respondents' amount of nostalgic feelings or conditioned emotions. Another important mechanism is based on the sound itself. For example, one can get sad by listening to a sad, melancholic voice. This is called 'emotional contagion' and is based on the empathic mimicking of the voice (Juslin & Västfjäll, 2008). This mechanism depends also on cultural factors. Music from a culture which is foreign in the eyes of a person can cause another emotional experience compared to the experience of other people who are familiar with or belong to that culture. Western European and Asian listeners would probably not perceive the same emotions through the same song because emotion is conveyed through culture-specific cues and perceptual cues. If the tonal system is not familiar to the listener, he misses an amount of cues and can base his emotion only on basic perceptual cues as complexity or tempo (Balkwill & Thompson, 1999). This would also affect the processing fluency (Reber et al., 2004) and respondents would experience more cognitive effort, which in turn would be negative for the emotion measurement.

Because music is dynamic, a song can induce several emotions. Depending on different music styles, emotions can be perceived as a mix of feelings like for example activity and positivity called *joyful activation* (Zentner et al, 2008). Emotion scales which are developed based on one specific genre can therefore differ in their factors from scales which are based on other genres. Comparing Latin music and dance music to jazz or classical music, it seems that 'joyful activation' could be seen as one factor, but in jazz music it has to be split up into two different factors: 'joy' and 'activation' (Zentner et al., 2008). Rentfrow and Gosling (2003) reported a more complex, reflective factor for jazz and classical music, an energetic factor for electronic music as techno and a more rebellious factor for rock music. These results make clear why many voices claim that the measuring with dimensional scales just containing pleasantness and arousal is not sufficient (Zentner et al., 2008). Because musical emotions are very personal, analysis cannot result into an overall playlist for mood regulation.

The special properties of musical emotions, the differences in induction and emotion sets have consequences for the measuring process. Only an adapted scale and research design make it possible to get replicable and comparable results. Despite of the fact, that since the last ten years more researches have reached agreement about the most frequently evoked emotions in music (Juslin & Laukka, 2004), appropriate scales were still missing. This was the reason why Zentner et al. (2008) invented a scale which represented the most important musical emotions, taking into account the difference between perceived and felt emotions and which was also addressing the different factor divisions between genres. They invented the Geneva Emotion Music Scale (GEMS). Starting with a list of 515 terms, four studies were needed to adjust them to these conditions and to reduce them to a smaller set of 33 emotions within nine factors. The nine factors were called: wonder, transcendence, tenderness, nostalgia, peacefulness, power, joyful activation, tension and sadness. The scale was also tested against other scales and turned out to be the most capable one in differentiating between musical emotions. This makes it a solid scale and starting point for further musical emotion research. After the reduction of emotions and the non-verbal character development, the process will result into an excellent scale for musical emotion measurement.

STUDIES

In order to create the new non-verbal scale, the first step was to select the definitive set of emotions. Because the Geneva Emotional Music Scale was already successfully tested and valid for different genres (Zentner et al., 2008), it was appropriate as a basis for the selection of the emotion set. Study 1 was conducted as a pre-test to reduce the number of 33 items of the GEMS to a smaller number which could be divided in factors for the new non-verbal musical emotion scale. A limited number of items was necessary to reduce complexity and enable respondents to report their feelings quickly. Afterwards, the non-verbal characters were developed, each representing one of the five emotions which resulted from the pre-test. In study 2 a validation test of the new tool was conducted in order to explore whether all characters were good representations of the factors. Study 3 was conducted to test the new musical scale in a study on musical emotions. The aim was to find out whether the scale could differentiate between different music styles and to explore the hit potential of songs.

Study 1: Pre-test

Procedure

The experiment took place at the University of Twente. Thirty students (15 male, 15 female) from the University of Twente voluntarily participated in the pre-test. The average age was 22.11 years (SD = 2.36) ranging from 19 to 29 years. The students participated in two conditions. Each condition contained one song from each genre (pop, hip-hop, dance, rock, singer-songwriter and Dutch folk/pop). The genre Dutch folk/pop was later dismissed. Every respondent had to rate six songs, which resulted into 180 song measurements. Respondents used a computer on which they listened to the six songs through a headphone. The use of headphones provided better concentration and a more intense experience by also excluding surrounding noises. At first, respondents read the instruction that explained how to handle the playlist and reminded them first to listen to the songs and to use the verbal scale afterwards, not while listening. After listening to a 30 second sequence including the refrain, each song had to be rated on the Dutch version of the GEMS. Further, in an open question students were asked to write down any emotion which they felt was left out and to write down comments whenever they had any problems regarding the comprehension of the emotions. This was also recommended in other studies (Zentner et al., 2008). The participants were not able to get any relevant information from the track name in the playlist.

Material

All items of the GEMS were translated into Dutch and validated by a back translation by a Dutch/English native speaking student. The item *feeling of transcendence* was left out because its meaning was ambiguous. The item *angry* was added. It was an interesting basic emotion because it showed great differences between felt and perceived emotions (Zentner et al., 2008; Goldman, 1995).

The genres pop, hip-hop, dance, rock, singer-songwriter and Dutch pop were chosen, because they were the most frequent ones in the present Dutch music charts (Dutch charts, 2010). Two songs belonged to each genre in order to have a stronger genre representation. The genre Dutch pop was dismissed afterwards, because it was not usable for later studies when international equivalents were necessary. All songs were represented in the current Dutch music charts, and their highest peak position was seen as an indication for hit potential. The song selection can be found in Appendix A.

Results

Factor analysis with varimax rotation was calculated in order to sort out the main emotion groups. The Kaiser-Meyer-Oklin value was .85. Principal components analysis revealed the

presence of eight components with eigenvalues exceeding 1, as can be seen in Table 1 and 2. An inspection of the factors indicated a logical break after the fifth component, because items of the sixth, seventh and eighth factor did not match and contained less than three items. The five component solution explained a total of 58% of the variance. Four new factors were found which differed from the factors *wonder, transcendence, tenderness, nostalgia, peacefulness, power, joyful activation* and *tension* from the GEMS. This may be due to the different genre selections (Zentner et. al, 2008). The first factor was called 'calmness' (alpha=.89) and contained items of the former factors peacefulness and nostalgia. The second factor contained items of joyful activation, power and transcendence and was named 'joyful action' (alpha=.87). Factor 3 contained items of wonder and tenderness which could be related to 'love' (alpha=.82). The last two factors were the same as the original and were called 'tension' (alpha=.68) and 'sadness' (alpha=.77). Furthermore the emotions 'meditative', 'softened', 'serene' and 'triumphant' were eliminated because some respondents showed problems in understanding them. Open questions were only answered five times. As a result the open suggestions proved that a majority did not miss a special emotion. Therefore answers to open questions were not included in the set.

Table 1: Eigenvalues of factors

Factor	Name of factor	Eigenvalue	% of variance
1	Calmness	7.38	25.43
2	Joyful action	4.99	17.23
3	Love	3.11	10.74
4	Tension	1.43	4.91
5	Sadness	1.27	4.37

Table 2: Factoranalysis

Component	1 (calmn.)	2 (joy.a.)	3 (love)	4 (sadn.)	5 (tension)
soothed	.749				
melancholic	.746				
nostalgic	.739				
serene	.699				
calm	.685				
mellowed	.677				
sentimental	.671				
dreamy	.661				
meditative	.577				
moved	.513				
strong		.836			
energetic		.817			
overwhelmed		.734			
animated		.733			
bouncy		.693			
fiery		.681			
joyful		.567		-.548	
triumphant		.554			
admiring			.768		
In love			.724		
tender	.538		.657		
affectionate			.589		
allured			.542		
sad				.824	
angry				.719	
tearful				.677	
agitated					.800
irritated					.669
tense					.586

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Non-verbal measurement scale

In contrast to the GEMS, the new musical scale was supposed to be non-verbal. The reason for choosing a non-verbal approach was based on the idea that the recognition and report of emotions have to be easy and quick (Desmet, 2002). With a non-verbal character representing an emotion, one's own feeling can be recognized and compared to the character. Being able to identify with a character makes the process easier and more intuitive for the respondent, than by using a verbal scale (Desmet, 2002). Thereby, less conscious processing is needed, leading to less influence on the measuring of emotions. Another advantage of a non-verbal scale is the ability to represent mixed emotions (Desmet, 2002), which is very important for musical experience (Juslin & Västfjäll, 2008). Non-verbal scales also have no language barrier and can serve better in cross-cultural research in different countries. Besides this, people who are not linguistically sophisticated can also be involved in the study. Furthermore, an appealing scale could prevent respondents from stopping or loosing attention. There are even significant relations between the aesthetics of a product and perceived usability (Reber et. al, 2004; Norman, 2003). This will decrease problems for inexperienced respondents and make the scale appropriate for practical use in diverse situations. Together, these properties and the adjustment to the musical domain, make the new measurement scale unique and more advantageous than other verbal emotion scales.

The results of the pre-test served as the basis for the factors of the non-verbal scale. The new factors were called: 'calmness', 'joyful action', 'love', 'sadness' and 'tension'. A professional artist created five characters in a female and a male version. He was familiar with emotion drawing processes and could stick to former restrictions and signing-rules (Desmet, 2002). The idea to create a male and a female version had several reasons. Firstly, using a sex neutral figure would seem unnatural to the respondents. Research showed that male and female subjects have greater identification with same-sex characters (Potkay & Potkay, 1984). Males identified less with cross-sex comic characters than females did because females are less repulsed by the thought of showing cross-sex behavior than men. In the case of favourability, female characters were liked even more than male characters (Perry & Bussey, 1979). The new scale was called 'Chartistic' and the characters can be seen in Table 3. The character development process can be found in Appendix B.

Table 3: male and female characters

In love	Sadness	Tension	Calmness	Joyful action
				
				

Study 2: Measurement validation

To check whether the new characters formed a valid measurement instrument and measured the emotions which they were supposed to measure, an online validation test was conducted.

Material and Design

The respondents were confronted with all characters in an online survey and were asked which emotions every figure would represent. For every character people could choose from a list of the 33 emotions of the GEMS, which were also used in the pre-test. The survey was translated into four languages (Dutch, English, German and Spanish) and administered in four countries, in order to check whether the non-verbal scale could also be used in other countries. The translation of the scale was checked by respective native speakers.

Participants and Procedure

A number of 139 respondents (German: n = 87; Dutch: n = 37; Spanish: n = 15) participated in the second study. The average age was 24 years (M = 24.42, SD = 9.28) and 60.4% of the respondents was female (n = 84). After participants chose a language condition, they reported their age and gender. Every respondent rated the version of the character belonging to their own gender. After rating all possible matching emotions to the characters, they reported their appreciation of the characters and their identification level on a semantic differential scale from 1 to 5. This was an important check, because the identification with the characters was vital for intuitive emotion measurement (Desmet, 2002). Screen-prints can be found in Appendix C.

Validation results

Appreciation and identification

As shown in Table 4, appreciation and identification scores were slightly positive and thus sufficient for the identifying processes of the respondents. A one-way between groups ANOVA revealed no statistically significant difference between the three language groups in appreciation, $F(2, 135)= 1.03$, $p = .36$ and identification, $F(2, 135)= .13$, $p = .88$. Therefore the characters are appropriate for cross-cultural use in these countries.

However, there was a difference between the genders in identification. Men identified less than women did, $F(1, 138) = 4.20$, $p = .04$.

Table 4: Mean score of appreciation and identification

		M	*SD*
Appreciation	total	3.43	.95
Identification	total	3.20	.99
	male	2.98	1.02
	female	3.33	.96

Character interpretation

Percentages and frequency scores of the emotions of every character can be seen in Table 5. The strongest emotions describing the character 'Love' were: in love, affectionate, tender, dreamy, joyful and moved. 'Sadness' was interpreted as sad, tearful, sentimental, moved and melancholic. The character 'Tension' was seen as being irritated, agitated, tense, fiery and energetic. In the case of *'agitated'* Dutch respondents mentioned this attribute less often (*M* = 10.8%) than the German respondents (*M* = 52.9%) did. This could be explained by the different native languages of the respondents. It could further explain why 44 German respondents mentioned in the open suggestion space that the term angry was missing as an important description of the character. 'Calmness' was described by the emotions calm, soothed, serene, dreamy, meditative and mellowed. 'Joyful action' was interpreted as being energetic, animated, triumphant, bouncy, joyful and amused.

Despite of small differences in some items, all characters were interpreted in the same way in the three language conditions. As a result of the validation test, we concluded that all characters were interpreted with the emotions that were related to the concepts they were supposed to represent.

Table 5: Percentages and frequencies of emotions per character

Factor	Emotions	%	*n*
	In love	92.7	115
	dreamy	58.1	72
	affectionate	45.2	56
	tender	34.7	43
	joyful	33.8	47
	moved	27.4	34
	sad	96.0	119
	tearful	66.1	82
	sentimental	36.3	43
	moved	29.8	37
	melancholic	29.8	37
	tense	51.6	64
	agitated	40.3	50
	fiery	41.1	51
	irritated	22.6	28
	energetic	36.3	45
	calmness	69.4	86
	soothed	60.5	75
	dreamy	56.5	70
	serene	54.8	68
	meditative	33.9	42
	mellowed	27.4	34
	energetic	77.4	96
	triumphant	57.6	80
	animated	72.7	53
	joyful	62.9	78
	bouncy	32.3	40
	amused	27.4	34

Study 3: Musical emotion rating

Since the non-verbal scale was developed and its validity was confirmed in study 2, the aim of study 3 was to put the scale to the test and explore how respondents would rate the emotional content of songs on the new scale. First, it was explored whether hits had another emotional profile than unsuccessful songs. Secondly, differences between genres were explored.

In order to achieve this, three groups of songs were selected because of several reasons. For exploring the effects of familiarity, two groups with hits were selected. Group 1 contained known, Dutch hits and group 2 unknown hits from foreign countries. A third group

contained flops from the Dutch charts. This was necessary to find out whether there were differences between hits and flops.

Results from group 1 served as the emotion hit profile which gave insight in the experience of hits. Differences in emotions between group 1 and 3 would show which emotions were important for successful songs. Because group 1 and 2 both contained hits, differences could indicate familiarity effects, whereas great similarity would prove that foreign hits were also seen as successful, even when they are unknown. This would strengthen the idea that hits have a common emotional profile.

Song selection

Exploring whether hits had different emotional responses from flops, songs had to be selected carefully. All songs were introduced to charts not longer than six years ago, because they had to be comparable to the songs from the pre-test. Furthermore, all songs belonged to one of the five chosen genres. The song selection for every group and genre, including the chart position, can be found in Tables 4, 5 and 6 of Appendix D.

Group 1 contained well-known, high positioned hits from the Dutch charts. Songs that had been the first hit of an artist were preferred in order to lower the chance that the artists' influence rather than the song itself was the main success factor.

Group 2 contained hits from Scandinavian and British artists. These hits were selected when they were high positioned in their countries' charts but were not introduced in the Dutch charts or well known in the Netherlands. Because these songs were unknown, influences from familiarity-, conditioning effects and episodic memory were excluded. This also reduced the chance of prejudices towards the artist and background knowledge. Moreover, all songs were in the English language. The use of Scandinavian and British songs was based on the idea that the charts from these countries are more or less similar to the charts in the Netherlands. Problems with foreign tonal systems, as explained earlier, were not an issue with this choice. Besides this, Scandinavian countries have more native artists singing in English language than, for example, France and Spain (Les charts, 2010; Spanish charts, 2010).

Group 3 contained songs which were unsuccessful in the Dutch charts. Differences with group 1 would support the expectation that hits have a special emotion profile. The songs from group 3 were chosen from the Dutch charts because flops from other countries sometimes turned out to have a higher ranking in the Dutch music charts (Dutch charts, 2010; Swedish charts, 2010; Finish charts, 2010; Danish charts, 2010). Variety of success of the same song in different countries can also be caused by marketing strategies (Lee, Boatwright & Kamakura, 2003) and does not have to be caused by the song quality.

Participants and Design

Three groups of songs were chosen with ten or five songs each; hits (1), unknown hits (2) and flops (3). All songs were divided into the five genres: pop, rock, hip-hop, dance and singer-songwriter. Respondents were randomly divided into two conditions, which only differed in the song selection of the hit group. Each respondent had to rate his or her emotions immediately after listening to each of the fifteen songs, including five songs from each group. Table 6 gives a short summary of the design.

Table 6: Design

Song assortment	
Group 1:	hits from the Dutch charts: 10 songs, 2 of each genre
Group 2:	foreign, unknown hits: 5 songs, 1 of each genre
Group 3:	flops from the Dutch charts: 5 songs, 1 of each genre
Respondent groups	
Condition 1:	5 hits, 5 unknown hits, 5 flops
Condition 2:	5 hits, 5 unknown hits, 5 flops

A number of 72 respondents (Dutch: *n* = 41; German: *n* = 17) participated which resulted in 922 song ratings. The mean age of the participants was 25.36 years (*SD* = 5.42). The genders were almost evenly distributed (male: *n* = 33; female: n = 38) and the conditions were nearly the same size (condition 1: *n* = 36, condition 2: *n* = 35). Within the two conditions, the gender distribution was in balance.

Procedure

The non-verbal questionnaire can be found in Appendix E. The experiment took place online. At first, respondents were introduced to the subject and the importance to report the emotions which they really felt instead of what they thought the music tried to communicate was stressed. Then the respondents got introduced to the non-verbal emotion character in a short demo to become familiar with the scale. Furthermore, they had to rate their mood previous to starting the survey. This was necessary in order to check whether people in extremely negative or positive moods, would rate the emotions differently from other respondents (Tompkins & Flowers, 1987). As the earlier mood state of the respondents did not have any effect on appreciation or hit potential, this will not be discussed any further. All songs were presented in random order. The strength of the emotions ‘calmness’, ‘joyful action’, ‘love’, ‘sadness’ and ‘tension’ had to be rated with the non-verbal characters on a 5-point Likert scale. After that,

several additional questions were asked to determine whether respondents knew the songs or artists. This was important to be able to explore familiarity effects. Respondents could answer with the options *yes, no, not sure*. To get to know the appreciation of the songs and opinion about the hit potential, respondents could rate them on a 5-point Likert Scale. Every respondent had to listen to one-minute sequences of fifteen different songs and, thus, had to rate his or her emotions fifteen times. The duration of the experiment was around 23 minutes.

Results

Manipulation checks

The selection of known and unknown hits and flops was successful. The respondents were familiar with the Dutch hits (93.3%, *n* = 291). The artists were known slightly less (64.6%, *n* = 201). Foreign hits and their artists were, as expected, mostly unknown (Song unknown: 90.4%, *n* = 273; Artist unknown: 83.8%, *n* = 253). The Dutch flops were known by 23.9% (*n* = 74) of the respondents and unknown by 65.4% (*n* = 202). The familiarity with the artists was comparable. In sum, the unknown and known hit selection was successful.

In order to explore whether the songs represented the genres properly, a one-way ANOVA and Post-hoc tests were conducted. Only three songs showed differences in the emotions 'sadness', $F(14, 910) = 5.19$, $p = .00$, or 'joyful action', $F(14, 910) = 23.77$, $p = .00$. Altogether, it can be concluded that the songs fit in their genre.

As a one-way ANOVA with Post-hoc comparisons using Bonferroni tests revealed, hits scored higher in hit potential, $F(2, 919) = 135.26$, $p = .00$ and appreciation, $F(2, 919) = 37.75$, $p = .00$) than flops and unknown hits. The hit scores were positive on a five point scale in appreciation ($M = 3.43$, $SD = 1.2$) and very high in hit potential ($M = 4.18$, $SD = .86$). Flops ($M = 2.72$, $SD = 1.19$) and unknown hits ($M = 2.72$, $SD = 1.13$) scored slightly more negative on appreciation and hit potential scores did neither score extremely negative nor positive *(Flops:* $M = 3.17$, $SD = 1.01$; Unknown hits: $M = 3.0$, $SD = 1.02$). Results can be seen in Figure 1.

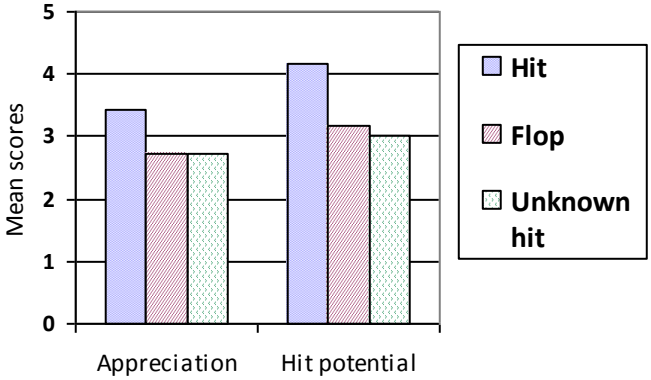

*Figure 1: M*ean differences appreciation and hit potential

Differences between the hit-profile, flops and unknown hits

The mean scores of all emotions were calculated for all three groups on a 5-point Likert scale, resulting in a hit profile, an overall flop profile and an unknown hit profile. The strongest emotions of the hit profile were 'calmness' and 'joyful action'. The profile scored rather low on 'tension' and 'sadness'. Moreover, scores on 'love' scores were marginal. All of the five emotions did not score extremely negative or positive as can be seen in Table 7.

To discover whether there were overall differences between hits, flops and unknown hits, a one-way ANOVA was conducted between the three groups. Two significant differences were found in the emotions 'joyful action', $F(2,922) = 23.59$, $p = .00$, and 'sadness', $F(2, 922) = 4.64$, $p = .01$. Hits scored higher on these two emotions. 'Love' showed a tendency to score higher as well, but the effect was not significant $F(2,922) = 2.02$, $p = 1.33$. 'Sadness' $F(2,922) = 1.18$, $p = .31$ and 'tension' $F(2,922) = 1.6$, $p = .20$ were not significantly different as well. Mean scores can be found in Table 7 and Figure 2. These results showed that hits were, as expected, experienced in other ways than flops and unknown hits, whereas group 2 and 3 did not show the expected results.

Table 7: Mean score Hit profile, Flop and Unknown hit

Group	Emotion	*N*	*M*	*SD*
Hit profile	love	312	2.35	1.27
	sadness	312	1.78	1.10
	tension	312	1.70	1.07
	calmness	312	2.84	1.23
	joy	312	3.20	1.35
Flop	love	309	2.18	1,20
	sadness	307	1.78	1,02
	tension	309	1.82	1,10
	calmness	309	2.56	1,23
	joy	309	2.49	1,35
Unkn. hit	love	304	2.19	1.14
	sadness	304	1.67	.97
	tension	304	1.85	1.08
	calmness	304	2.62	1.23
	joy	304	2.71	1.24

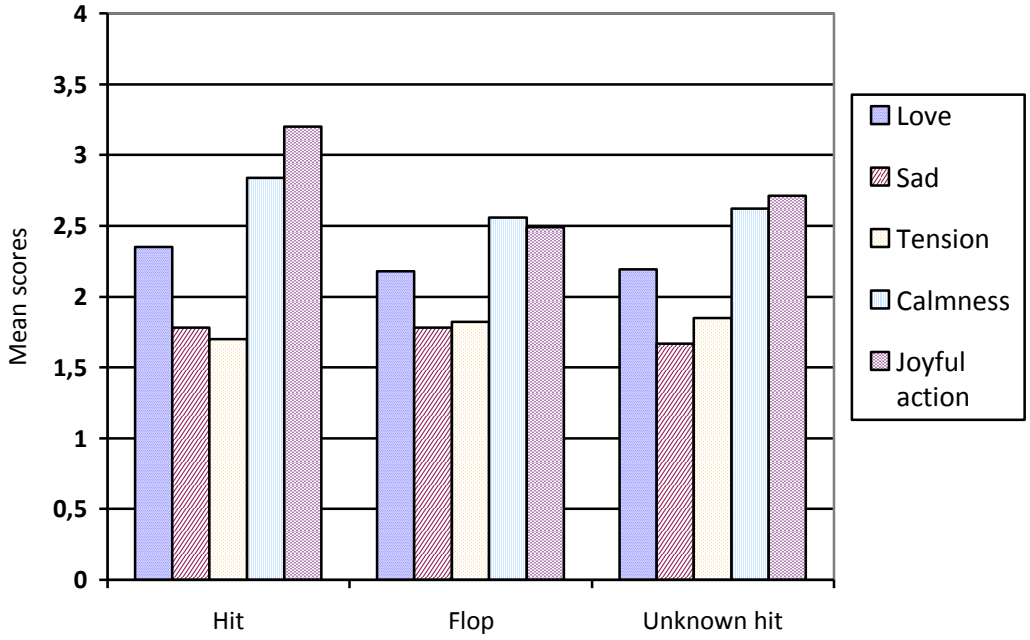

Figure 2: Mean of emotions in Hit group, Flop group and Unknown hit group

Interestingly, flops and unknown hits were scoring similar on emotions, appreciation and hit potential. With further investigations it was analyzed whether the reason therefore could lie in familiarity effects of the song. This effect was explored in the flop group, because this group contained three songs which were known by 29%, 34% and 44% and two songs which were mainly unknown by 89% and 84% of the respondents. ANOVA analysis and Post-hoc tests were conducted. As a result, known songs tended to score more positive on appreciation than unknown songs: $F(2, 306) = 19.65$, $p < .00$. This effect was also found in hit potential, $F(34.23, 278.33) = 18.82$, $p < .00$. Differences between known and unknown artists were smaller but still significant in 'appreciation', $F(2, 306) = 11.85$, $p < .00$ and hit potential, $F(2, 306) = 8.48$, $p < .00$. One additional effect could be found in the emotion 'joyful action', $F(2, 306) = 5.41$, $p = .01$. Known songs scored also higher on 'joyful action' ($M = 2.81$, $SD = 1.41$) than unknown songs ($M = 2.21$, $SD = 1.31$) did. Again, prior knowledge seemed to influence the scores positively.

Genre differences

In order to investigate the emotional experience of all genres and to compare them to identify which emotions have the most and the least similarities, genre profiles were created by using mean scores of the hit group. Illustrations and scores of the genre differences can be found in Figure 3, Table 8 and in Appendix F.

Conducting another one-way ANOVA with Post-hoc comparisons, genre differences were found to be significant in every emotion, $p < .05$. 'Calmness' was the emotion with the biggest difference ($F(4, 307) = 17.55$, $p < .00$), followed by the emotions 'love', $F(4, 307) = 13.17$, $p = .00$ and 'joyful action', $F(4, 307) = 11.51$, $p = .00$. 'Sadness' was also significant at the $p < .00$ level ($F(4,307) = 9.51$), as well as 'tension', $F(4, 307) = 3.04$, $p = .02$.

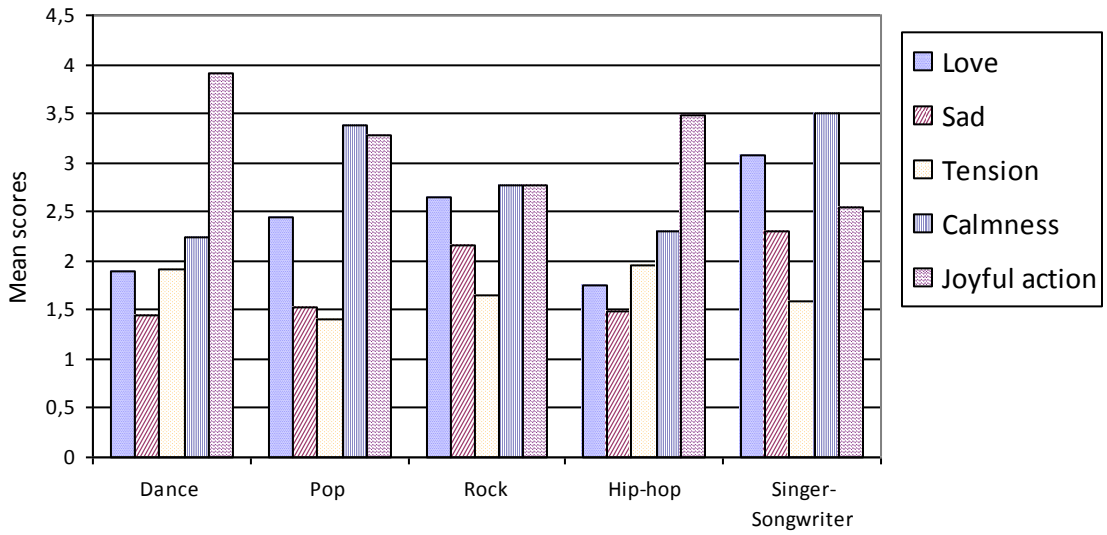

Figure 3. Mean emotions per genre of hit group

While listening to dance music, respondents felt the most 'joyful action' of all genres. Feelings of 'sadness' were not felt and 'love', 'tension' and 'calmness' were also experienced only very rarely. The perception of hip-hop could be described as feeling a bit of 'joyful action', a little 'tension' and 'calmness' and almost no 'sadness' and 'love'. Singer-Songwriter was the most emotional of all genres. It had the most extreme scores on three emotions. This genre induced a calm and relaxed feeling as well as a little 'love' and a little 'sadness'. Furthermore, tension was felt very rarely and 'joyful action' was experienced marginally. Opposed to what one might expect, listening to rock music had very little to do with experiencing tension. 'Sadness' and 'love' were also not felt very strongly. Marginal 'joyful action' and 'calmness' were the strongest emotions perceived. Pop music had the lowest tension scores, which suggests that this genre made people feel the least angry. Instead, it made respondents feel calm and serene combined with some 'joyful action' and 'love' and without any 'sadness'.

In sum, it can be stated that all genres differ from one another in their emotional experience. Furthermore, these results indicate that the non-verbal scale is capable of differentiating between different songs from diverse styles.

Table 8: Emotion mean scores per genre from hit group

Emotion	Genre	*n*	*M*	*SD*
Love	Dance	62	1.89	1.16
	Pop	64	2.44	1.15
	Rock	62	2.65	1.32
	Hip-hop	63	1.75	1.02
	S.-S.	61	3.07	1.24
	Total	312	2.35	1.27
Sadness	Dance	62	1.45	.91
	Pop	64	1.53	.85
	Rock	62	2.16	1.24
	Hip-hop	63	1.48	.80
	S.-S.	61	2.30	1.32
	Total	312	1.78	1.10
Tension	Dance	62	1.92	1.15
	Pop	64	1.41	.85
	Rock	62	1.65	.99
	Hip-hop	63	1.95	1.18
	S.-S.	61	1.59	1.05
	Total	312	1.70	1.06
Calmness	Dance	62	2.24	1.25
	Pop	64	3.39	1.03
	Rock	62	2.77	1.08
	Hip-hop	63	2.30	1.12
	S.-S.	61	3.51	1.09
	Total	312	2.84	1.23
Joyful action	Dance	62	3.90	1.25
	Pop	64	3.27	1.19
	Rock	62	2.77	1.32
	Hip-hop	63	3.49	1.34
	S.-S.	61	2.54	1.23
	Total	312	3.20	1.35

Emotions and hit potential

In order to explore the relationship between the five emotions and the hit potential and appreciation of a song, regression analysis was conducted. Results can be found in Table 9. The model, including all five emotions as independent variables and hit potential as independent variable, explained 18.2% of the variance of hit potential, $F(5, 913) = 40.53$, $p = .00$. 'Joyful action' was the strongest predictor (ß =.43, $p = .01$), and uniquely explained hit potential with 15%. The second strongest variable was 'sadness' (ß =.09, $p = .01$). But the effect was only small. The other three emotions were not statistically significant ($p > .05$).

The regression model with the five emotions as independent variables and appreciation as the independent variable showed stronger results. The emotions explained appreciation with 49.7% ($F(5, 913) = 180.39$, $p < .00$). Compared with the hit potential model, the emotion 'sadness' was the only one which was not statistically significant ($p = .07$). 'Joyful action' had the highest score, followed by 'calmness', tension and 'love'.

A regression analysis with appreciation as the independent variable predicting the hit potential was executed in order to gain a better understanding of the relationships between the two variables. Regression analysis showed that appreciation explained 16.3% (ß =.40) of the hit potential scores, $F(1, 919) = 178.32$, $p = .00$. The emotions, appreciation and hit potential did not show a mediation relationship as could be expected when exploring the results.

Table 9: Regression analysis for emotions predicting hit potential (N = 923)

Dependent variable	Independent variables	*B*	*SE B*	ß
Hit potential	Joyful action	.35	.03	.43*
	Sadness	.10	.04	.09*
	Calmness	.04	.04	.04
	Tension	.04	.04	.04
	Love	.05	.04	.05
Appreciation	Joyful action	.35	.02	.38*
	Sadness	.06	.03	.05
	Calmness	.30	.03	.31*
	Tension	-.23	.03	-.20*
	Love	.15	.03	.15*

* $p < .05$.

GENERAL DISCUSSION

The three studies were conducted for several reasons. The first one was to develop a new non-verbal scale for measuring musical emotions. A second aim was to find out whether different song categories, like the five genres and the three groups (e.g. hits, flops, unknown hits), would induce different emotional experiences, which also concerned mood regulation. In addition, the possibility of predicting hit potential with the emotions was explored.

As an important result, it can be concluded that the new scale is capable of measuring musical emotions and differentiating between diverse songs. A comparison showed numerous differences in the emotion scores between the genres. Furthermore, hits turned out to be experienced more intense in positivity, activity and serenity than flops or unknown hits. Unknown hits and flops scored lower on hit potential and appreciation than the hits did. Despite the success of unknown hits in other countries, ratings of this group did not differ significantly from the flops. Besides showing that hits were differently experienced than other songs, the prediction of hit potential turned out to be weak. A reason for this might be that hit potential is a very complex concept. However, appreciation of songs could be explained to a large extent by their emotion scores. Still, the important roles of 'joyful action' and 'calmness' were again confirmed by the regression results in this study.

The fact that the two most important emotions turned out to represent happiness, activity and serenity fits to previous studies about music and mood regulation (Laukka, 2007; Greenwood & Long, 2009; Thayer, Newman, & McClain, 1994). These findings are in line with research showing that the most common emotions felt while listening to music, were 'happiness' and 'joy', followed by 'calmness' on position four, 'love' on five, 'sadness' on position 23 and 'angriness' on 34 (Laukka, 2007). 'Love' turned out to be very strong as well in the hit group and was almost significantly different from unknown hits and flops, which would be in line with the findings of Laukka (2007). Tension did not show important effects in the current study, which also corresponds with the fact that angriness was on a lower position on that list. As suggested by results of the regression analysis, tension was negatively related to appreciation and thus seems not to be an emotion people like to experience. Listening to music was also related to well-being in earlier studies (Laukka, 2007). The most important listening strategies were mood regulation, pleasure and relaxation (Laukka, 2007). Again, all five emotions of the scale fit precisely to these strategies. Further research explored that main functions of music are the regulation of positive and negative moods (Greenwood & Long, 2009). This result is again in line with the fact that 'joyful action' and 'calmness' are highly responsible for the liking of songs, as confirmed by the regression analysis. Previous studies show that listening to music was a successful strategy in raising energy and reducing tension

(Thayer, Newman, & McClain, 1994), which supports the importance of the mixed emotion 'joyful action'. Besides this, the mood management model assumes that people would first seek for mood congruent stimuli and when a threshold level is reached, they would automatically switch to incongruent ones to control their mood (Forgas, 2000). This small time delay before mood repair takes place implicates that sad people would probably first listen to sad music before switching to happier songs (Chen, Zhou & Bryant, 2007). It further explains why people in a bad mood are more selective in their music choice (Chen, Zhou & Bryant, 2007; Knobloch & Zillmann, 2002). The current results show that not only 'joyful action' is an important emotion in music, but 'calmness' and 'sadness' are as well crucial musical emotions people seek for. Besides this, mood regulation strategies also depend on social situations (Erber & Erber, 2000). People seem to reflect whether their mood is appropriate or not and then can inhibit their mood repair if necessary.

The genre analysis showed that the best music styles for calm emotions were singer-songwriter and pop music. Dance, pop and hip-hop are the most appropriate genres for emotions like 'joyful action'. This implies that different genres turn out to be most effective for the regulation of different moods. Bruner (1990) investigated former results from studies about musical structures and their effect on mood. His findings suggest which technical parts of a song can achieve happy, calm or sad emotions. 'Joyful action' could for instance most likely be perceived through music that has a major mode, fast tempo, high pitch, flowing rhythm, a consonant harmony and medium volume. However, these theories would possibly work better for new, unknown songs. It is important to keep in mind, that the influence of the personal mechanisms (Juslin & Västfjäll, 2008) and familiarity effects can turn the emotional experience into another direction. An old favourite song could probably work better for cheering up than an unknown dance song which scores high on 'joyful action'.

As expected, the comparison between hits, flops and unknown hits showed that hits were more appreciated and had higher hit potential scores. People already knew that these songs were actual hits, which made it more likely that the appreciation was high as well. Moreover, there could be effects of emotional contagion (Juslin & Västfjäll, 2008).

Furthermore, hits scored significantly higher on the two important emotions 'joyful action' and 'calmness' and almost scored significantly higher on 'love'. The emotions of the hit profile did not show extremely high scores on the 5-point Likert scale, ranged from M=1.70 (SD=1.07) of 'tension' to M=3.20 (SD=1.45) of 'joyful action'. This small range is not surprising regarding the fact that it was not the task to rate the emotions perceived in the song itself, but instead to rate only the own personal feelings. Extreme ratings would have meant that respondents showed extreme emotional reactions. For example, a 'sadness' score of 5 would mean that respondents almost had to cry. A 'joyful action' score of 3 could be explained as one

being happy. Thus, a hit makes people feel happy, active and can give them a calm feeling, but certainly does not make them feel angry or sad.

Only 18.2% of the variance of hit potential could be explained by the emotions. Besides the regression results, hit potential could also be related to more knowledge of the song and the artist, as demonstrated by the different results from the known and unknown flop songs. Another factor influencing the hit potential was the liking of the song. The appreciation predicted 16% of the hit potential. Almost 50% of appreciation could in turn be explained by four emotions. Again 'joyful action' was the most essential predictor, followed by 'calmness', 'tension' and 'love'.

A noteworthy result was that flops and unknown hits did not differ significantly. It was expected that flops would be strongly different from hits and instead unknown hits would be more similar to the hit profile. However, this is not supported by the data. Unknown hits and flops neither differed in their emotion scores, nor in their hit potential and appreciation. Thus, flops did score better on appreciation and hit potential, whereas unknown hits scored worse than expected. One possible reason for this finding could lie in the fact that three out of five flops were actually known by around 30% to 40% of the listeners. The knowledge itself influenced appreciation, hit potential and even 'joyful action' scores. This could be partly explained by effects like mere exposure (Zajonc, 1968). Songs that are simply more listened to are more appreciated because of the higher amount of exposure. Other simple heuristics could have enhanced this effect. It is more likely that a song has more hit potential when it had airplay, than a song that is totally unknown. This effect is also known as a side effect of TV advertising. People think that products which are very frequently shown in TV advertising are more popular, independently from their message (Sutherland & Sylvester, 2000). Referring to the mechanisms of musical emotion induction (Juslin & Västfjäll, 2008), it is likely that evaluative conditioning and episodic memory have affected the results of the known song appreciation scores. People could have had experiences in the past while feeling certain emotions.

Another explanation for the similar ratings between the two groups could lie in the music taste of Scandinavian and Dutch people. Flops from the Scandinavian charts sometimes turned out to be more successful in the Netherlands. The Scandinavian hits could also be unsuccessful in the Netherlands. It is difficult to transfer the success of a song from one country to another, because it is not only the musical content that makes a hit, but also a great deal of marketing strategy and earlier success of the artist (Lee, Boatwright & Kamakura, 2003).

The identification and appreciation of the character of the scale would possibly vary more between countries with bigger cultural differences. In the current study, no differences due to country or age were found. The two variables were not very high scoring, ending up in a

more neutral field, implying that the characters were not evaluated extremely positive or negative. In contrast to the findings of Perry and Bussey (1979), there was no difference in appreciation of the male and female character, which could be influenced by the fact that no cross-gender evaluation was done in this study. Nevertheless, the results were positive scores, which gives rise to the conclusion that the emotion rating process did not suffer from a lack of identification and appreciation. Furthermore, a number of respondents did mention that the participation in the study was very pleasurable and enjoyable.

Limitations, follow-up studies and practical implications

When discussing the results, the limitations of the research should also be taken into account. The new developed measurement tool turned out to be valid, implying that Dutch and German respondents interpreted the characters as intended. Differences between respondents from different countries could be explained by language and not by different interpretations of the character. An example could be given when looking at the case of the character expressing sadness. Even though German scores in sentiment and melancholy were much higher than the Dutch ones, both groups had very high scores on the most important item sadness (96.6% and 94.6%). Thus, the overall interpretation of the character can be called 'sadness'. The difference shows that the detailed interpretation of items can differ between individuals or language groups. Still, this does not introduce a problem as long as the overall interpretation of the character stays the same. In fact, the flexibility is an important advantage for non-verbal scales in comparison to verbal ones. Especially when studying cross-cultural differences, this tool prevents validation problems due to languages. Nevertheless, validation in different cultures would be needed to ensure the understanding and the necessary level of identification of the characters.

Another topic to be discussed is the development process of the non-verbal scale. A verbal scale which was statistically tested on musical emotions served as the basis for the new scale. The five final emotions were selected by an analysis based on the musical scale which was translated into the Dutch language. At first sight, it could seem illogical to use verbal scales in order to create a non-verbal measurement scale. A pure non-verbal way of development would have been far more complicated. When not being able to base the scale on the GEMS, one instead had to use methods like facial or physical emotion measurements. Still, it would be challenging to label the emotions, make a selection of the most important factors and compare them to other emotion scales. Furthermore, the non-verbal development would be difficult when using music, since music has a diverse and dynamic content of emotions (Desmet, 2002). Measuring emotions induced by a single stimulus, would be easier.

The five factors resulting from the factor analysis of the pre-test were slightly different from those of the GEMS. The reason for this can be the genre selection. This shows how

important it is to match the emotion scale to the genres which are part of the study. Follow-up studies will have to take this into account.

A follow-up study with more songs in all three conditions would be required in order to replicate the current findings. A hit profile based on more hits would result in more reliable mean scores. More hits from every genre will create better genre hit profiles in order to be able to explore whether flops and hits differ between genres. Besides this, the integration of more known and unknown songs would be very valuable to further investigate the effects of prior knowledge of songs and artists. Moderating influence of familiarity to consumer responses has already been suggested by Bruner (1990). It would be valuable to analyse how much the pure knowledge of a song or the artist contributes to the hit potential. Another recommendation for future follow-up studies would be carrying out studies in different countries to explore cultural effects and differences in hit potential, appreciation and identification of the characters. Research has already shown that especially in the case of sad music, mood repair with emotional incongruent music is delayed after a short period of listening to emotional congruent music (Chen, Zhou & Bryant, 2007). Further investigations could examine the effectiveness of the mood repair process of diverse mood states by the use of different emotional song profiles. Moreover, future studies about mood regulation could be dealing with cross-cultural differences in regulation tactics and mood repair. For those cross-cultural studies the scale would be very suitable.

Such future studies can have numerous practical implications as well. Mood regulation results are very important for practical use as mood regulation is an essential process for people's everyday life and music has a great influence on it (Chamorro-Premuzic & Furnham, 2007). Music can be categorized in a new way, not only by genre but also by emotion. This development can be explained by the fact that people are increasingly selective in their music choice, listen less often to the radio but manage their own personal playlists (Knobloch & Zillmann, 2002). The measurement scale can be used for practical mood regulation tools.

Even when the hit potential prediction was not as strong as expected, the fact that musical emotions can be explored with the new non-verbal tool gives novel opportunities. Music could be tested on its emotional profile in order to match it with objects which have an emotional fit and create a strong emotional concept this way. In a marketing perspective this could be an important tool for managing brand personality or could help to create emotional experiences. Results proved that music has the power to influence our emotions. Positive effects of the moderating role of emotions on consumer respondents have already been shown for a long time (Holbrook & Batra, 1987). Therefore it can be a basis for further consumer psychology research. Achieving higher appreciation, attention, recall, remembering, buying intention and also mood regulation of consumers, are all possible topics of research. Being able to explain almost 50% of appreciation, is a valuable result for further studies as well. Moreover,

measuring the appreciation of songs makes it easier for music companies to choose the best track for the introduction in the music market. Other economic fields, like the movie and TV business could profit by selecting songs for projects based on the emotional profile. Interesting was also the explanation of appreciation effects based on the emotion scores.

Moreover, the new scale is visually attractive, easy to understand and quick to fill in, which makes it very suitable for further research. The cross-cultural understanding makes it even more accessible to a big and diverse group of respondents. People enjoy working with the characters, which can lead to a reduction of missing values due to drop out of the respondents.

In sum, music strongly influences our emotions. Music is important for us and our regulation of emotions. With this non-verbal scale it is possible to explore the emotional profile of songs and genres and to help choosing the right song to regulate our mood. As expected, the emotional experience of a hit song is different between unknown songs and flops. The key features of the dissimilarity are ‘joyful action’ and ‘calmness’, which also are the two most important emotions for the main listening strategies mood regulation and relaxation (Laukka, 2007). Even though it is hard to predict hit potential in a solid way, explanations of appreciations confirmed that respondents like music that makes them feel positive and energetic on the one hand, and gives them the opportunity to relax and get calm on the other hand. Regarding the fact that we are often forced to control our mood, all we need is music.

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APPENDIX

Appendix A: Song selection of pre-test

Table 1: songs & genre

Genre	Artist and song
Pop international	Lily Allen – Not fair Robbie Williams - Bodies
Hip-hop	Jay-Z ft. Alicia Keys – Empire State of mind Keri Hilson ft. Kanye West & N – Knock you down
Rock/Alternative	Green Day – 21st century breakdown Di-rect- Times are changing
Dance	David Guetta ft. Kelly Rowland – When loves takes over Cascada – Evacuate the dancefloor
Singer-songwriter	Miss Montreal – Just a flirt John Mayer – Who says

Appendix B: Character development

Table 2: Emotion development

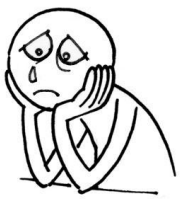
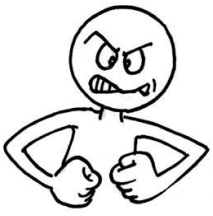
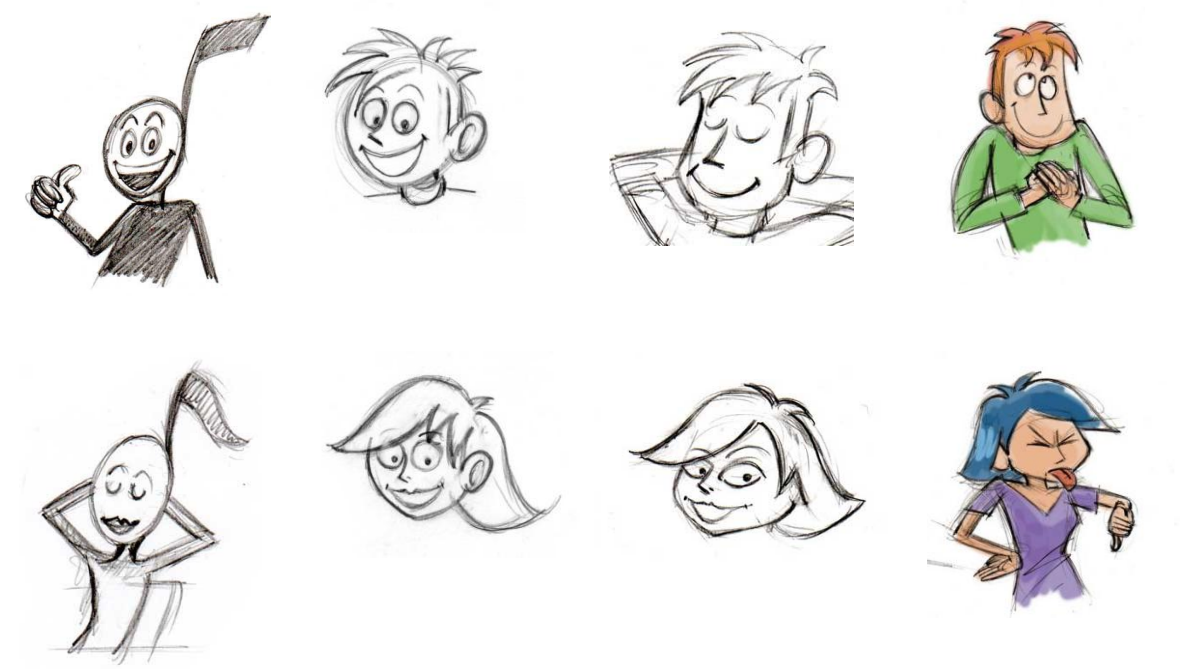
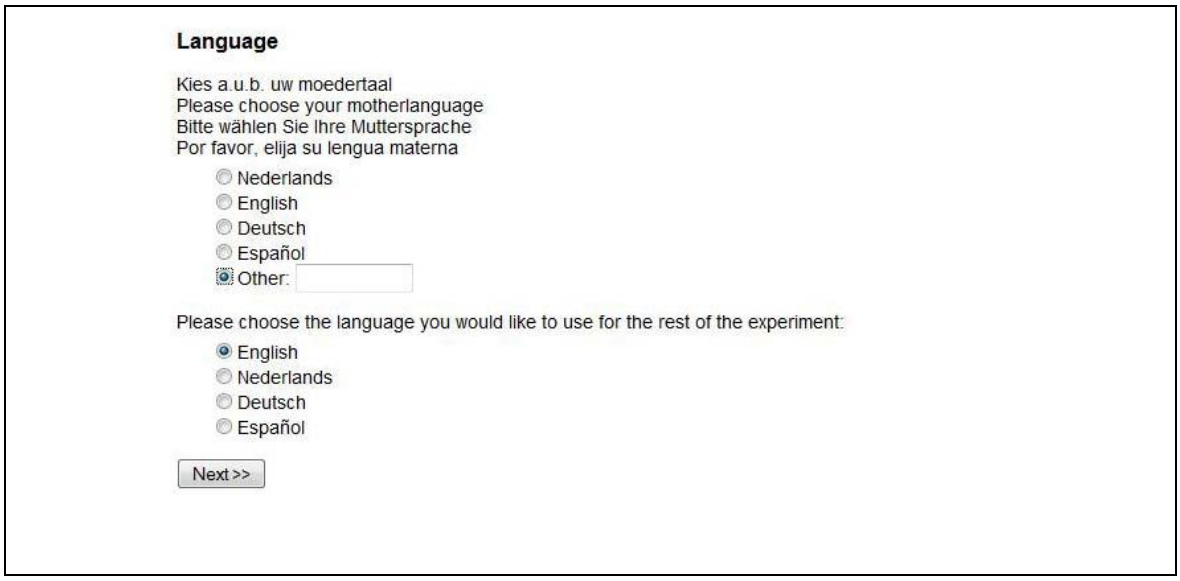
Joyful action	Tension	Love	Calmness	Sadness
				
				

Table 3: Character development



Appendix C: Validation



Validatie

Welkom bij dit onderzoek!

Dit is een kort onderzoek naar emoties. Uw antwoorden zullen helpen om een nieuwe onderzoeksschaal te ontwikkelen. Natuurlijk blijven alle antwoorden vertrouwelijk en worden ze anoniem verwerkt.

Ik wil u alvast bedanken voor het meewerken.

Volgende >>

Figure 4 of 5

Please mark the feeling on the list, which you think is expressed by the character. (more answers possible)

☐ fiery	☐ amused	☐ meditative
☐ triumphant	☐ calm	☐ affectionate
☐ irritated	☐ animated	☐ nostalgic
☐ dreamy	☐ thrills	☐ in love
☐ admiring	☐ sad	☐ agitated
☐ bouncy	☐ strong	☐ serene
☐ sentimental	☐ tender	☐ allured
☐ overwhelmed	☐ moved	☐ tearful
☐ tense	☐ filled with wonder	☐ joyful
☐ energetic	☐ soothed	☐ melancholic
☐ mellowed	☐ fascinated	☐ Other:

Next >>

Figuur 1 van 5

Geef aan welk gevoel door het figuur wordt uitgebeeld (meerdere antwoorden mogelijk):

☐ vurig	☐ geamuseerd	☐ meditatief
☐ triomfantelijk	☐ rustig	☐ dierbaar
☐ geïrriteerd	☐ geanimeerd	☐ nostalgisch
☐ dromerig	☐ rillingen	☐ verliefd
☐ aanbiddend	☐ verdrietig	☐ ongerust
☐ springerig	☐ sterk	☐ sereen
☐ sentimenteel	☐ teder	☐ verleidelijk
☐ overweldigd	☐ ontroerd	☐ treurig
☐ gespannen	☐ verwonderd	☐ vrolijk
☐ energiek	☐ gerust	☐ melancholisch
☐ verzacht	☐ gefascineerd	☐ Anders, namelijk:

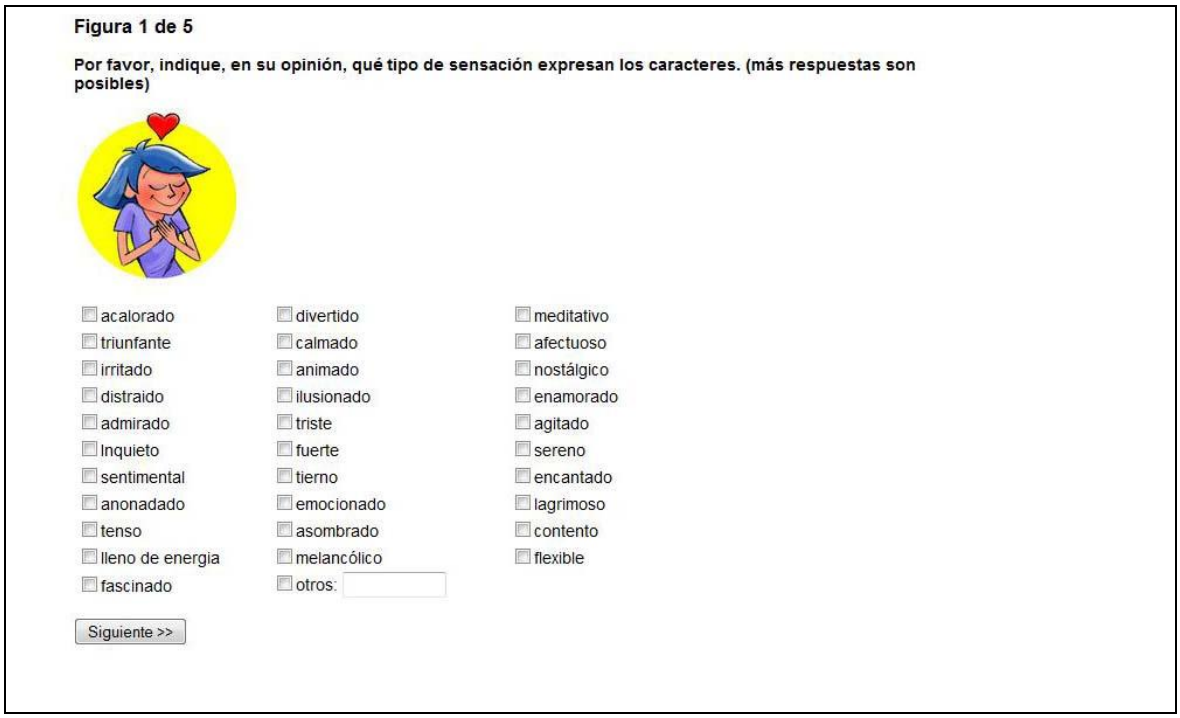
Verder >>

Abbildung 2 von 5

Markieren Sie das Gefühl, das Ihrer Meinung nach, durch die Figuren ausgedrückt wird. (mehrere Antworten möglich)

☐ feurig	☐ belustigt	☐ meditativ
☐ triumphierend	☐ ruhig	☐ voller Zuneigung
☐ irritiert	☐ animiert	☐ nostalgisch
☐ träumerisch	☐ erschauern	☐ verliebt
☐ bewundern	☐ traurig	☐ aufgeregt
☐ sprunghaft	☐ stark	☐ gelassen
☐ sentimental	☐ zärtlich	☐ angezogen
☐ überwältigt	☐ bewegt	☐ weinerlich
☐ angespannt	☐ verwundert	☐ freudig
☐ energiereich	☐ beruhigt	☐ melancholisch
☐ sacht	☐ fasziniert	☐ Andere, nämlich:

Weiter >>



Appendix D: Song selection of study 3

Table 4: Hit selection Group 1

Genre	**Artist and song**	**Hitpotential**
Pop international	Gabriella Cilmi - Sweet about me	Position 46 “succesvolste hits in NL top 40 aller tijden. Position 3 “top100 2008”
	Gnarls Barkley - Crazy	Position 35 “succesvolste hits in NL top 40 aller tijden. Position 4 “top100 2006”
Hip-hop	Rihanna feat Jay z - Umbrella	Position 8 “top100 2007”
	Usher & Lil john, Ludacris - Yeah	Position 10 “top100 2004”
Rock/Alternative	Anouk - Girl	Position 31 “succesvolste hits in NL top 40 aller tijden. Position 5 “top100 2005”
	3 doors down - Here without you	Position 14 “top100 2004”
Dance/House	Guru josh project	Position 50 “succesvolste

	- Infinitiy	hits in NL top 40 aller tijden.
	David Guetta & Kelly Rowland – When love takes over	Position 49 “succesvolste hits in NL top 40 aller tijden. Position 19 “top100 2009”
Singer,songwriter	James Blunt – You’re beautiful	Position 11 “succesvolste hits in NL top 40 aller tijden.
	Amy Macdonald – This is the life	Position 13 “succesvolste hits in NL top 40 aller tijden.

Choice based on the top 100 from 2004 to 2009, Dutch charts.

Table 5: Unknown Hits selection, Group 2

Genre	**Artist and song**	**Hit potential**
Pop international	Donkeyboy – Sometimes	Position 1 (8 weeks), Norway top100, 2009
Hip-hop	Chipmunk feat. Talay Riley – Look for me	Position 7, UK charts, 2010
Rock/Alternative	Amanda Jensson – Happyland	Position 4 , Swedish top100, 2008
Dance/House	Anna Abreu – Music everywhere	Position 2, Finnish top100, 2009
Singer,songwriter	Espen Lind – Scared of heights	Position 1, Norwegian charts, 2008

Table 6: Flop selection, Group 3

Genre	**Artist and song**	**Chart peak position**
Pop international	Girls Aloud – I’ll stand by you	Position 85, 5 weeks in Dutch charts, 2004
Hip-hop	Timoti feat. Snoop Dogg – Groove on	Position 88, 3 weeks in Dutch charts, 2009
Rock/Alternative	Nickelback - If everyone cared	Position 99, 1week in Dutch charts, 2005
Dance/House	Eddie Thoneick feat. Berget Lewis – Deeper love	Position 92, 2 weeks Dutch charts, 2006
Singer,songwriter	David Gray – The one I love	Position 93, 3 weeks in Dutch charts, 2005

Appendix E: Music study

Algemene Introductie

Welkom bij dit onderzoek!
Dit is een onderzoek naar emotionele muziekbeleving. Ik wil u alvast bedanken voor het meewerken. Natuurlijk blijven alle antwoorden vertrouwelijk en worden ze anoniem verwerkt.

Participanten die het onderzoek helemaal doorlopen, kunnen aan het eind van de vragenlijst deel nemen aan een verloting van 3 keer 2 kaarten voor voorstellingen van het Nationaal Muziekkwartier in Enschede.

Straks krijgt u 15 korte muzieksequenties van 1 minuut te horen.
Na elk lied worden de emoties gemeten die u tijdens het luisteren voelt.
Uw emoties kunt u aangeven met behulp van vijf verschillende figuren. Elk figuur beeld een ander gevoel uit. Bekijk de figuur en ga na in hoeverre u uzelf zo voelt.
Geef met behulp van de lijst op de schaal van 1 t/m 5 de sterkte van u gevoel aan.
1 betekent "ik voel het helemaal niet",
5 betekent "ik voel het heel sterk"

LET OP:
Geef aan, wat u vindt welke emoties het lied in u oproept. Richt u niet zozeer erop wat u denkt wat het lied zou willen overbrengen. Het gaat juist om uw eigen beleving!

Allereerst volgt een kort voorbeeld, zodat u even kunt oefenen hoe u uw gevoelens met de figuren kunt aangeven. Als u in aansluiting daaraan op "Volgende" klikt, begint het echte onderzoek.

Zet nu a.u.b. uw geluidspeaker aan!

Volgende >>

Fragment 1 van 15

Klik hieronder op de button om het muziekfragment te luisteren.

Fragment 1 van 15 (0:54)

Klik na het luisteren op 'volgende' om verder te gaan.

Volgende >>

Geef nu aan wat u bij het nummer voelt.

ik voel het helemaal niet ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ik voel het heel sterk

ik voel het helemaal niet ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ik voel het heel sterk

ik voel het helemaal niet ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ik voel het heel sterk

ik voel het helemaal niet ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ik voel het heel sterk

ik voel het helemaal niet ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ik voel het heel sterk

Volgende >>

Fragment 1 van 15

Geef hier aan, hoe u het lied waardeert:

○ ○ ○ ○ ○

Heeft het nummer, onafhankelijk van uw persoonlijke waardering, hitpotentie?

Helemaal geen hitpotentie ○ ○ ○ ○ ○ Heel sterke hitpotentie

Kent u het lied?

○ Ja
○ Nee
○ Weet ik niet zeker

Kent u de artiest?

○ Ja
○ Nee
○ Weet ik niet zeker

Volgende >>

Appendix F: Genre differences in hit group

Table 7: Bonferroni test between genres in hit group

Emotion	Genre	Genre	Mean Difference	*SE*	*p*
Love	Dance	Pop	-.55	.21	.09
		Rock	-.76	.21	.00
		Hip-hop	.14	.21	1.00
		S.-S.	-1.18	.21	.00
	Pop	Dance	.55	.21	.09
		Rock	-.21	.21	1.00
		Hip-hop	.69	.21	.01
		S.-S.	-.63	.21	.03
	Rock	Dance	.76	.21	.00
		Pop	.21	.21	1.00
		Hip-hop	.89	.21	.00
		S.-S.	-.42	.21	.49
	Hip-hop	Dance	-.14	.21	1.00
		Pop	-.69	.21	.01

		Rock	-.89	.21	.00
		S.-S.	-1.32	.21	.00
	S.-S.	Dance	1.18	.21	.00
		Pop	.63	.21	.03
		Rock	.42	.21	.49
		Hip-hop	1.32	.21	.00
Sadness	Dance	Pop	-.07	,19	1.00
		Rock	-.71	.19	.00
		Hip-hop	-.02	.19	1.00
		S.-S.	-.84	.19	.00
	Pop	Dance	.08	.19	1.00
		Rock	-.63	.19	.01
		Hip-hop	.05	.19	1.00
		S.-S.	-.76	.19	.00
	Rock	Dance	.71	.19	.00
		Pop	.63	.19	.01
		Hip-hop	.69	.19	.00
		S.-S.	-.13	.19	1.00
	Hip-hop	Dance	.02	.19	1.00
		Pop	-.06	.19	1.00
		Rock	-.69	.19	.00
		S.-S.	-.82	.19	.00
	S.-S.	Dance	.84	.19	.00
		Pop	.76	.19	.00
		Rock	.13	.19	1.00
		Hip-hop	.82	.19	.00
Tension	Dance	Pop	.51	.19	.07
		Rock	.27	.19	1.00
		Hip-hop	-.03	.19	1.00
		S.-S.	.33	.19	.84
	Pop	Dance	-.51	.19	.07
		Rock	-.24	.19	1.00
		Hip-hop	-.55	.19	.04
		S.-S.	-.18	.19	1.00
	Rock	Dance	-.27	.19	1.00
		Pop	.24	.19	1.00
		Hip-hop	-.31	.19	1.00
		S.-S.	.06	.19	1.00
	Hip-hop	Dance	.03	.19	1.00
		Pop	.55	.19	.04
		Rock	.31	.19	1.00
		S.-S.	.36	.19	.56
	S.-S.	Dance	-.33	.19	.84
		Pop	.18	.19	1.00

		Rock	-.06	.19	1.00
		Hip-hop	-.36	.19	.56
Calmness	Dance	Pop	-1.15	.20	.00
		Rock	-.53	.20	.08
		Hip-hop	-.06	.20	1.00
		S.-S.	-1.27	.20	.00
	Pop	Dance	1.15	.20	.00
		Rock	.61	.20	.02
		Hip-hop	1.09	.20	.00
		S.-S.	-.12	.20	1.00
	Rock	Dance	.53	.20	.08
		Pop	-.61	.20	.02
		Hip-hop	.47	.20	.19
		S.-S.	-.73	.20	.00
	Hip-hop	Dance	.06	.20	1,00
		Pop	-1.09	.20	.00
		Rock	-.47	.20	.19
		S.-S.	-1.20	.20	.00
	S.-S.	Dance	1.26	.20	.00
		Pop	.12	.20	1.00
		Rock	.73	.20	.00
		Hip-hop	1.20	.20	.00
Joy	Dance	Pop	,64	.23	.05
		Rock	1.13	.23	,00
		Hip-hop	.41	.23	.71
		S.-S.	1.36	.23	.00
	Pop	Dance	-.64	.23	.05
		Rock	.49	.23	.30
		Hip-hop	-.23	.23	1.00
		S.-S.	.72	.23	.02
	Rock	Dance	-1.12	.23	.00
		Pop	-.49	.23	.30
		Hip-hop	-.71	.23	.02
		S.-S.	.23	.23	1.00
	Hip-hop	Dance	-.41	.23	.71
		Pop	.22	.23	100
		Rock	.71	.23	.02
		S.-S.	.95	.23	.00
	S.-S.	Dance	-.36	.23	.00
		Pop	-.72	.23	.02
		Rock	-.23	.23	1.00
		Hip-hop	-.95	.23	.00

* The mean difference is significant at the 0.05 level.