

Emotional Responses of Musicians and Non-Musicians: Repeated Listening, Preferred Styles of Music, and Childhood Experience as Factors in Forming Responses

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Introduction¹

The focus of this study is how musicians and non-musicians between the ages of eighteen and twenty-five respond emotionally after listening to the same extracts of music. The participants were asked to listen to six different short extracts of music (two classical, two jazz, and two pop pieces) and then rate the following emotions on a scale of one to seven: a sad to happy scale; a boring to exciting scale; a relaxing to tense scale; and a calm to angry scale. They were also asked to rate how much they liked the piece, whether or not they would listen to the music out of choice, and then to explain why. Finally, they were asked what style(s) of music they listened to while growing up, and what style(s) of music they listen to as adults. The results of the study were found to be quite similar for the rating of emotions between the musicians and the non-musicians; however, the music they listened to while growing up and that they now listen to was found to have an impact on their responses, in terms of how much they liked the piece, and whether or not they would listen to the music out of choice.

The relationship between music and emotion is a complex topic that has been studied and considered in a number of different ways over time. The main focus of music and emotion studies is how the music makes a person feel when they listen to it; that is, does it make them feel sad, happy and so on. This then raises the question of why people feel these emotions, and why different people experience different emotional responses to the same piece of music. This study addresses this question by

¹ Mélisande Bonicel graduated with a Bachelor of Music (with Honours) from Bath Spa University in 2018. This article is based on her final research essay, which received a First Class result.

examining two possible factors that may have an influence on the way people respond: what music the participants listened to while growing up, and what music they prefer to listen to now.

Music and Emotion in a Scholarly Context

Interest in the subject of music and emotion can be traced back to the beginning of the twentieth century; one of the first experiments done on the topic was in 1912 by the American scholar H. P. Weld.² However, Leonard B. Meyer's *Emotion and Meaning in Music* (1956) was the first book by a music theorist that integrated elements of psychology to explore and explain the emotional impact of music on listeners.³ His approach was ground-breaking at the time, but in the twenty-first century the field has moved on, and a common criticism of Meyer is that "his writings focused on undifferentiated core affect, as expressed by the tension and resolution of melodic processes, rather than on plural, discrete emotional categories."⁴ The work of Michael Spitzer and Eduardo Coutinho demonstrates how the subject of emotion and music is now studied: in 2014 they published the results of an experiment on emotional perception in which they compared how a group of first year undergraduate students from the University of Liverpool, and a group of professional musicologists, the majority specialising in eighteenth century music, responded emotionally after listening to all four movements of Bach's Sonata for Unaccompanied Violin in G minor. The undergraduate music students (37 participants) were referred to as low-level experts (most of them being more interested in popular music, and not having heard the Bach sonata before), while the professional musicologists (31 participants) were referred to as high-level experts (the majority of them had heard the sonata before and had a very good knowledge of Bach's music). Before participating in the study, all subjects did a questionnaire (Likert scale 1-5) that revealed most intended to work as professional musicians, "more than half sing or play an instrument at a (semi) professional level... and that all play at least one

² H.P. Weld, 'An Experimental Study of Musical Enjoyment', *American Journal of Psychology*, vol. 12 (1912), pp. 245-308.

³ Leonard B. Meyer, *Emotion and Meaning in Music* (Chicago, IL: University of Chicago Press, 1956).

⁴ Michael Spitzer and Eduardo Coutinho, 'The Effects of Expert Musical Training on the Perception of Emotions in Bach's Sonata for Unaccompanied Violin No. 1 in G Minor (BMV1001)', *Psychomusicology: Music, Mind and Brain*, vol. 24, no. 1 (2014), pp. 35-57.

instrument (or sing) as a hobby.”⁵ The level of expertise of the subject group makes a considerable difference to the results.

To measure the level of emotions experienced by the participants, two methods were used. In the first, the participants were given an emoticons table, and they had to circle the emoticon (tenderness/love, anger, fear and sadness) they most associated with the movement they were currently listening to. In the second, the participants were given a list of words for different emotions, and they had to write down which emotions they most associated with each different piece of music. There were several conclusions drawn from this study, and perhaps the most interesting one was that the perception of emotions in music is linked to the listener’s level of musical training and experience. For example, the high-level expert participants were able to identify a greater number of different emotional categories than the low-level expert participants, and there were qualitative differences in the emotions the two groups identified in the music.⁶

While my study had some similarities to that of Spitzer and Coutinho, there are also a number of differences. Firstly, Spitzer and Coutinho’s study used an entire piece of music, while I employed a number of short extracts of music, all between thirty seconds and one minute, from several different genres: classical, jazz, and popular music. Furthermore, Spitzer and Coutinho studied two different categories of musicians, and did not consider non-musicians, while my study compared musicians and non-musicians. In addition, my study focused on young people between the ages of eighteen and twenty-five, and I hypothesised that young musicians and young non-musicians would have varying emotional responses to the different extracts of music. In a sense, my experiment was quite broad, and admittedly did not focus on a number of variables. For example, I did not measure the participants’ physical emotional responses while engaged in the experiment, something that is often done by clinical psychologists and other scientists researching music and emotion.⁷

⁵ Spitzer and Coutinho, ‘The Effects of Expert Musical Training on the Perception of Emotions’, p. 45.

⁶ Spitzer and Coutinho, ‘The Effects of Expert Musical Training on the Perception of Emotions’, p. 52.

⁷ Elliott Dainow, ‘Physical Effects and Motor Responses to Music’, *Journal of Research in Music Education*, vol. 25, no. 3 (1977), pp. 211-221.

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For example, a 1997 study entitled ‘Emotional Response to Music’ by Clifford Madsen investigated physiological responses to music. He conducted several experiments, all of which used the Continuous Response Digital Interface (CRDI) technology, which was developed in 1988.⁸ The CRDI allows “both discreet and/or continuous non-verbal measurements of subjects’ responses to whatever variable or variables the investigation chooses to study.”⁹ One of Madsen’s conclusions was that CRDI was especially useful when studying how people emotionally respond to longer pieces of music; but where shorter pieces of music are used, the CRDI results are very close to those of experiments conducted with paper and pen.¹⁰ This means that the inability to use technology to measure physical emotional responses, such as heart rate, temperature and so on, in my study does not compromise the results to any great extent.

What is more interesting, however, is to distinguish between emotions and moods. While definitions of these two words may often seem quite blurred, it is actually very important to distinguish between the two, and a study conducted in 2014 by Sandra Garrido investigates precisely this issue. In Garrido’s study “emotions were regarded as being of relatively short duration in comparison to moods, which are more long term.”¹¹ She is also noted “that on average participants needed about eight seconds to report an emotional response to music”, and that studies that investigated felt emotions generally used pieces of music of approximately thirty to sixty seconds in length.¹² When it comes to mood, however, “even a whole piece of music might not be long enough to induce any particular mood in a listener.”¹³ As this study will be looking at how participants react to short extracts of music immediately after listening to them, this study will be focusing on emotions and not moods.¹⁴

⁸ Clifford Madsen, ‘Emotional Response to Music’, *Psychomusicology: Music, Mind and Brain*, vol. 16, nos 1-2 (1997), pp. 59-67.

⁹ Madsen, ‘Emotional Response to Music’, p. 59.

¹⁰ Madsen, ‘Emotional Response to Music’, p. 64.

¹¹ Sandra Garrido, ‘A Systematic Review of the Studies Measuring Mood and Emotion in Response to Music’, *Psychomusicology: Music, Mind and Brain*, vol. 24, no. 4 (2014), p. 317.

¹² Garrido, ‘A Systematic Review of the Studies Measuring Mood and Emotion’, p. 317.

¹³ Garrido, ‘A Systematic Review of the Studies Measuring Mood and Emotion’, p. 317.

¹⁴ A possible criticism of my study is that the choice of music clips is diverse and could appear random. To what extent can two short extracts be representative of the genres of

Another aspect that is important to consider is what *precisely* makes music so emotionally rewarding to listen to, for which a study by Marcel Zentner, Didier Grandjean, and Klaus R. Scherer is relevant. In this study, four experiments took place. Experiments one and two were conducted so as to come up with a list of music-related emotional terms, to study the frequency of felt and perceived emotions across five groups of listeners with different musical preferences. These two experiments found that emotional responses varied widely depending on the musical genre, as well as whether it was a felt or perceived response. Experiment three was conducted during a music festival and looked at the structure of music-induced emotions via a confirmatory factor analysis of emotional ratings. Lastly, experiment four attempted to replicate the finding from experiment three with a different group of listeners, “and found that it accounted for music elicited emotions better than the basic emotion and dimensional emotional models.”¹⁵ From this result, Zentner, Grandjean, and Scherer introduce a device to specifically measure emotions that are musically induced is introduced: The Geneva Emotional Music Scale.

Zentner, Grandjean, and Scherer also talk about some of the limitations of previous studies that have been conducted on music and emotions; these are broken down into four main points. Firstly, previous studies on dimensions of musical affect only focused on emotional characteristics of music that were perceived by the listener. For example, in a study conducted by Lage Wedin in 1972, the participants were only asked to describe the music in emotional terms, and not what feelings the music made them experience.¹⁶ This current study will attempt to navigate between these two poles. First, while the participants will be asked how the music makes them feel, they will be limited in their responses by only being able to rate certain emotions. Second, ideally an investigation of musically evoked emotions ought to begin with a list of terms that represent

classical, jazz, and popular music, given that these three genres are very broad and listeners who disliked my selections might well have enjoyed other musical extracts. Further studies might focus on a narrower range of music (for example, six clips of romantic classical music) and analyse more nuanced responses.

¹⁵ Marcel Zentner, Didier Grandjean and Klaus R. Scherer, ‘Emotions Evoked by the Sound of Music: Characterization, Classification, and Measurement’, *Emotion*, vol. 8, no. 4 (2008), p. 494.

¹⁶ Lage Wedin, ‘A Multidimensional Study of Perceptual-Emotion Qualities in Music’, *Scandinavian Journal of Psychology*, vol. 13, no. 1 (1972), pp. 241-257.

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the entire spectrum of emotional responses that can be experienced while listening to music. Third, a major limitation is the methods used for data and validation processing for most studies that were conducted before advanced methods of scale and model building became a requirement for psychology research. The last and perhaps most important limitation is the lack of interest in situating the findings on emotions that are music-related in the wider context of general emotional theory and research. Unfortunately, these last three were limitations in my study to some extent as it was conducted in the context of an undergraduate degree.

It is also worth touching upon whether familiarity with the music being listened to has an impact on emotional responses that listeners have to a piece of music. A study conducted in 2012 by Olivia Ladinig and E. Glenn Schellenberg investigated this issue. This study considered whether liking a variety of different styles of unfamiliar music varied the participants' emotional responses; it also took into account differences in personality and musical training. Generally, increased familiarity with the music can cause more positive responses; over-listening to music, however, can cause the reverse, with people often liking the music less. The extracts of music used by Ladinig and Schellenberg were of music that sounded either happy or sad, as well as some extracts that sounded both happy and sad. For each extract, the participants rated how much they liked the music, the intensity of their emotional response, as well as whether the music made them feel happy or sad.¹⁷ One of the overall conclusions drawn from this study was that participants tended to enjoy music that made them feel happy, and to dislike music that made them feel sad. The most intense emotional musical responses, however, happened when the music was unmistakably happy or sad, and not a mixture of both emotions.

The Method: Electronic Questionnaire

The aim of this study was to investigate how different groups of participants, musicians, and non-musicians, emotionally responded after listening to shorts extracts of music from different genres. The participants were asked questions about how the music made them feel, and what genres of music they normally listen to, to see if that impacted on their

¹⁷ Olivia Ladinig and E. Glenn Schellenberg, 'Liking Unfamiliar Music: Effects of Felt Emotion and Individual Differences', *Psychology of Aesthetics, Creativity and the Arts*, vol. 6, no. 2 (2012), pp. 146-154.

response. The hypothesis is: that musicians will have stronger emotional responses than non-musicians to the different extracts of music, and that they will have a greater emotional response to their nominated favourite genre of music. The study also considered if the style of music they grew up listening to impacted on their responses. The responses between musicians and non-musicians were expected to be quite varied. The study was conducted in the form of an electronic questionnaire that was sent to participants to complete via Facebook Messenger. The questionnaire had seven sections to it. The first section was to get information about the participants: gender, age, what music they preferred listening to, what music they grew up listening to, and whether or not they considered themselves to be a musician. The next six sections were each focused on one of six short extracts of music (a maximum of one minute in length), which the participants had to listen to, and then answer questions on how the music made them feel. This was achieved by asking them to rate certain emotions on a scale of one to seven. There were four emotions scales: sad/happy, boring/exciting, relaxing/tense, and calm/angry. They were then asked to rate how much they liked the music on a scale of 1 to 5 (where 1 is strongly dislike and 5 is strongly like, with dislike, neutral and like as the states associated with 2, 3 and 4), and finally whether or not they would listen to the piece of music out of choice, and to elaborate on their answers using their own words.

The six extracts of music were from three different styles: two classical pieces, two jazz pieces, and two popular music pieces. The first clip was an extract from Edvard Grieg's *Peer Gynt* called 'Morning Mood Suite' (composed in 1875).¹⁸ The second was also a classical piece; an extract from the last movement of Haydn's string quartet Opus 33 known as 'The Joke' (composed in 1781).¹⁹ The third was a jazz clip, taken from Glenn Miller's 'Moonlight Serenade', which he composed in 1939.²⁰ The fourth was an extract from Paul Desmond's 'Take Five', which was first

¹⁸ Edvard Grieg (1843-1907), *Peer Gynt Suite*, 'Morning Mood', at: <https://www.youtube.com/watch?v=jkPKwwGe5KA>. Accessed 30 April 2018.

¹⁹ Joseph Haydn (1732-1809), *String Quartet in E Flat, Opus 33*, Movement 4, 'The Joke', at: <https://www.youtube.com/watch?v=gwZhCJN88ko>. Accessed 30 April 2018.

²⁰ Glenn Miller (1904-1944), *Moonlight Serenade* (2008), at: <https://www.youtube.com/watch?v=rjq1aTLjrOE>. Accessed 30 April 2018.

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recorded by the Dave Brubeck Quartet in 1959.²¹ The fifth, a pop song, was an extract from ‘Price Tag’, which was released in 2011 by the English singer and songwriter Jessie J.²² The final clip of music was taken from ‘Uptown Funk’, a 2014 Mark Ronson pop song featuring Bruno Mars.²³

The questionnaire could be completed by anyone as long as they were between the ages of eighteen and twenty-five (this was the only requirement). Twenty-eight completed questionnaires were returned, eighteen of which were from musicians and ten from non-musicians. Of the eighteen musicians, fourteen were female and four were male, with an average age of 21.2. Of the ten non-musicians, nine were female and one was male, with an average age of 20.9.

Survey Results

The results of the survey are here presented in a table (Table 1), and a series of charts that are designed for simplicity and clarity, with minimal comments attached.

	Musicians	Non-Musicians
Female	14	9
Male	4	1
Total	18	10
Average age	21.2 years old	20.9 years old

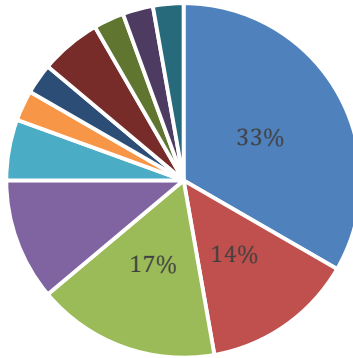
Table 1 – Participants by age and gender.

²¹ Dave Brubeck (1920-2012), *Take Five* (2008), at: <https://www.youtube.com/watch?v=vmDDOFXSgAs>. Accessed 30 April 2018.

²² Jessie J (b. 1988), *Price Tag* (2012), at: <https://www.youtube.com/watch?v=2qqWcjBXHS8>. Accessed 30 April 2018.

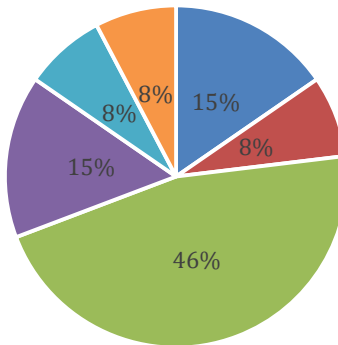
²³ Mark Ronson (b. 1975), *Uptown Funk* (2014), at: <https://www.youtube.com/watch?v=ziN7Y1M1v8s>. Accessed 30 April 2018.

Preferred style of music for musicians



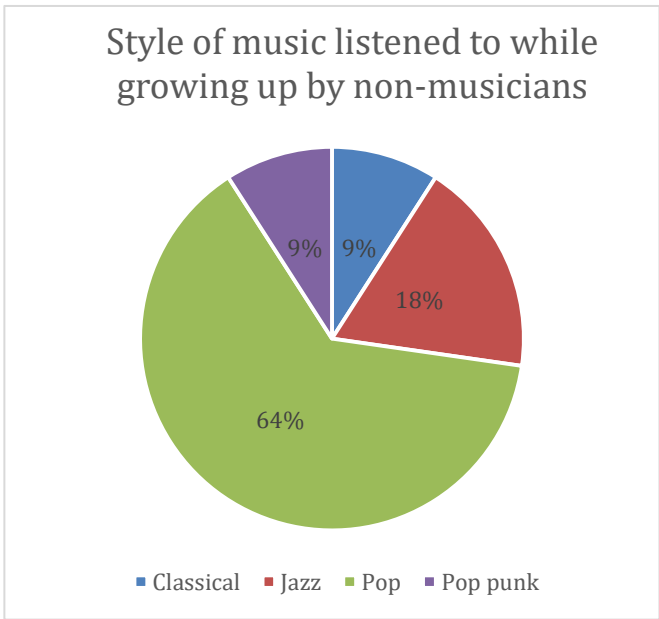
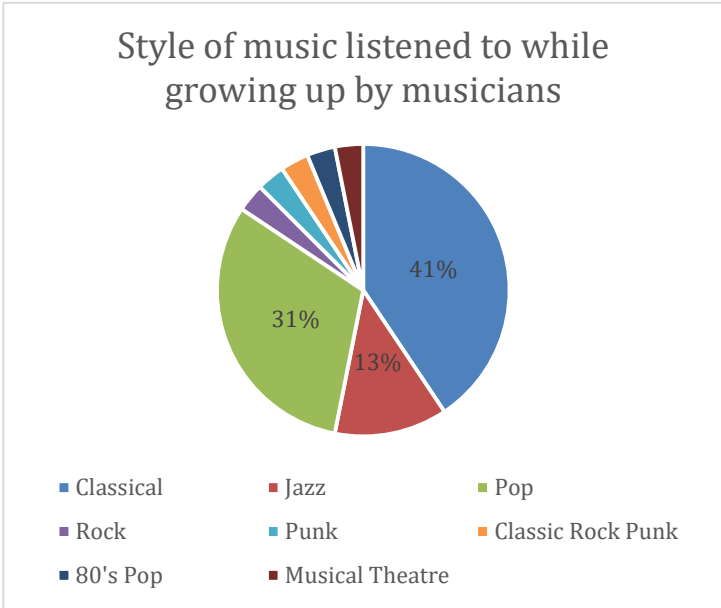
- Classical
- Jazz
- Pop
- Rock
- Metal
- Worship Music
- Indie
- Musical Theatre
- World Music
- Opera
- Gospel

Preferred style of music for non-musicians

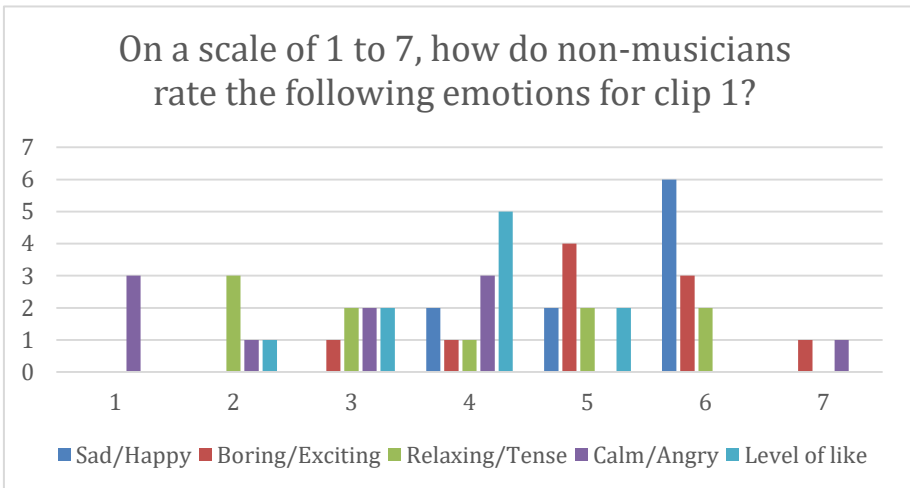
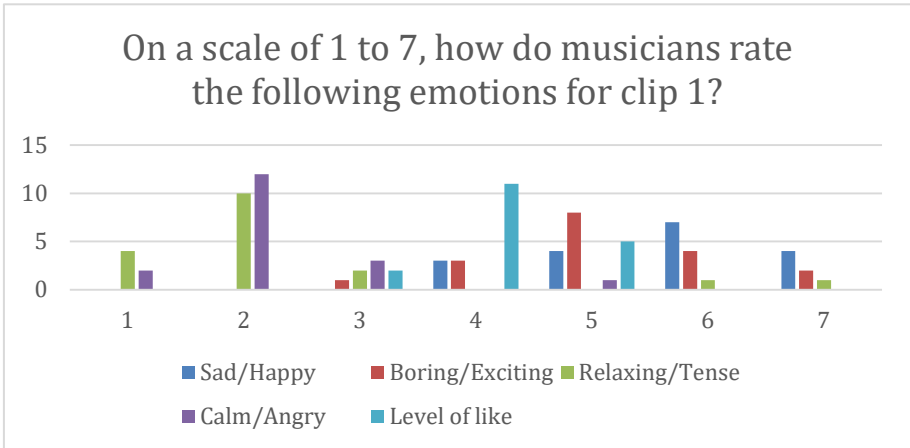


- Classical
- Jazz
- Pop
- Rock
- Pop Punk
- Musical Theatre

Musicians and Non-Musicians

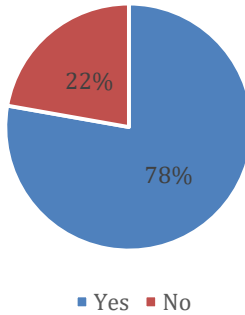


Clip 1: Edvard Grieg

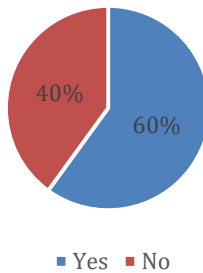


Musicians and Non-Musicians

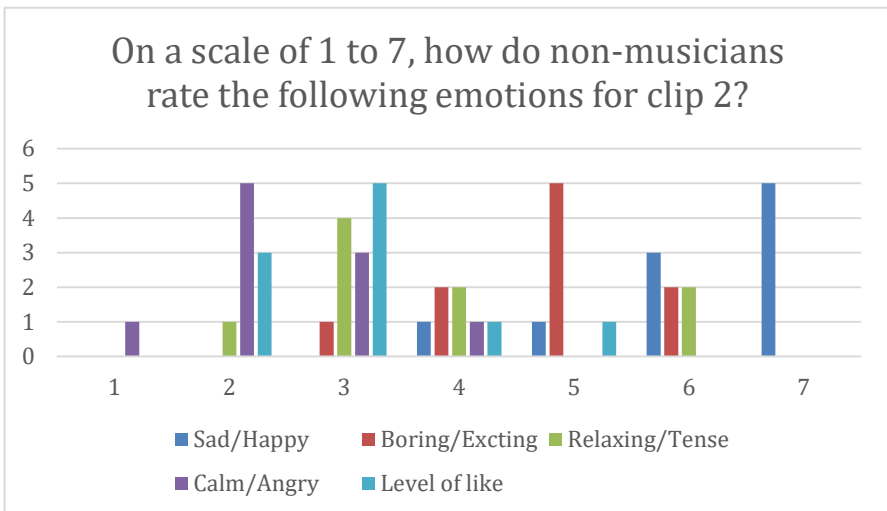
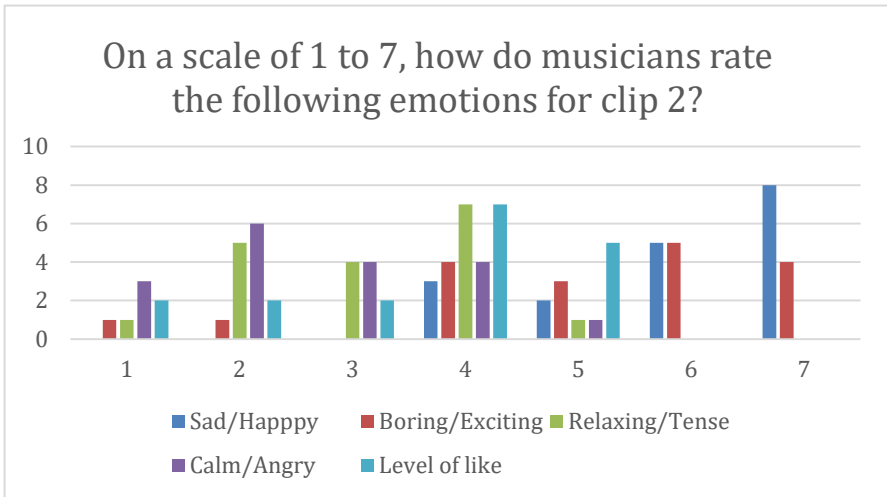
Would musicians listen to clip 1 if they had the choice?



Would non-musicians listen to clip 1 if they had the choice?

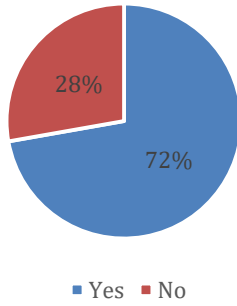


Clip 2: Joseph Haydn

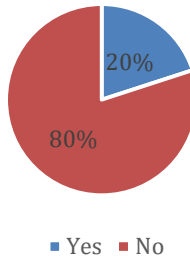


Musicians and Non-Musicians

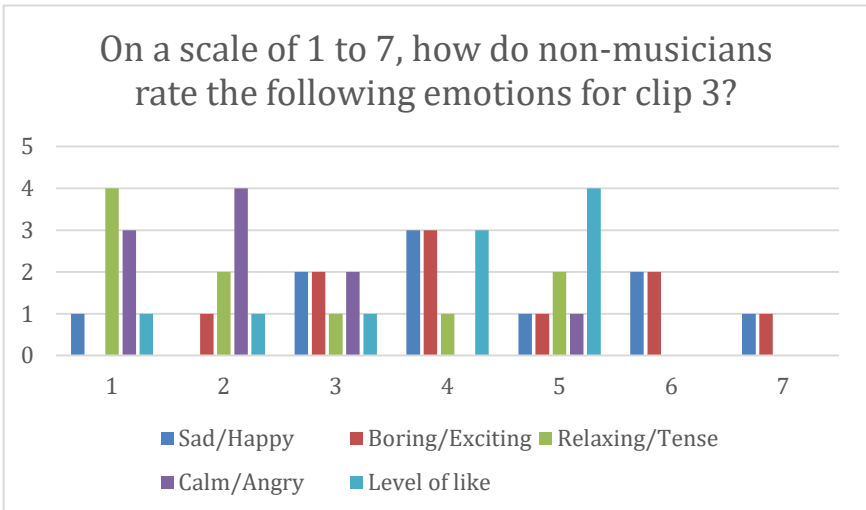
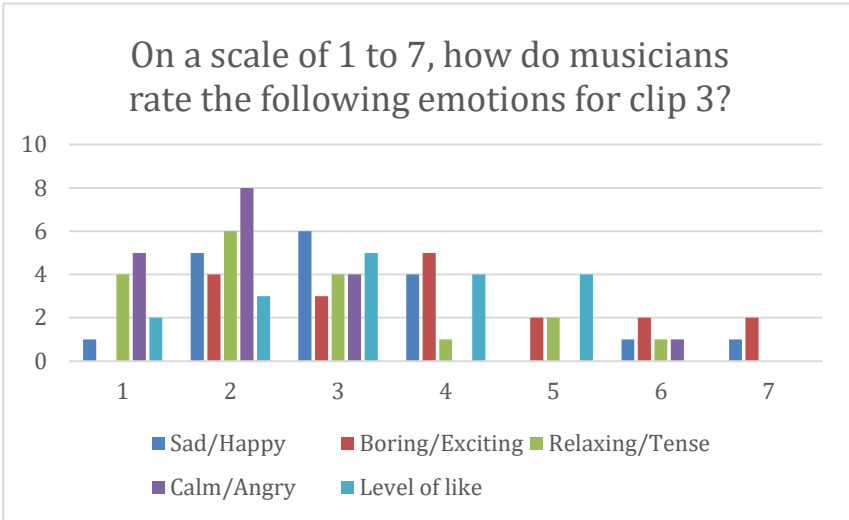
Would musicians listen to clip 2 if they had the choice?



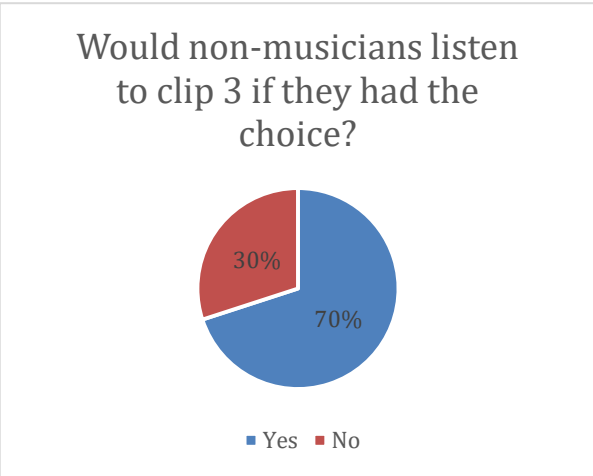
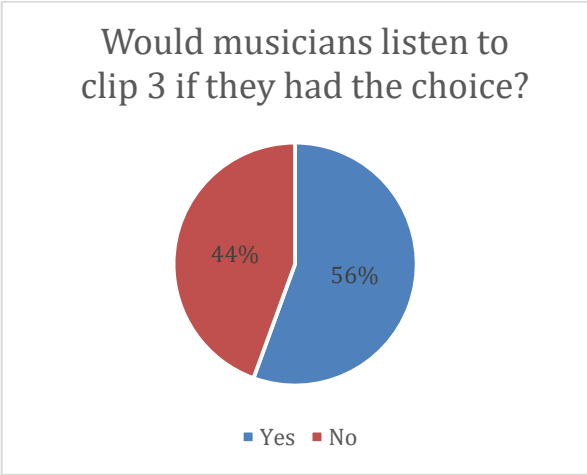
Would non-musicians listen to clip 2 if they had the choice?



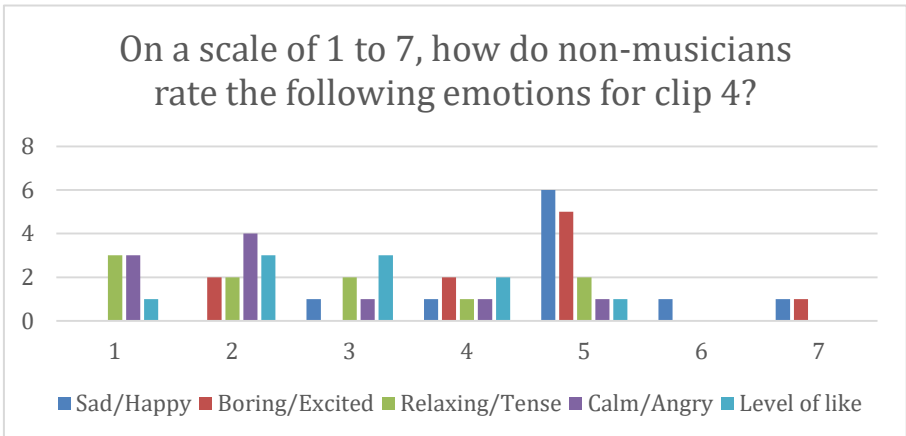
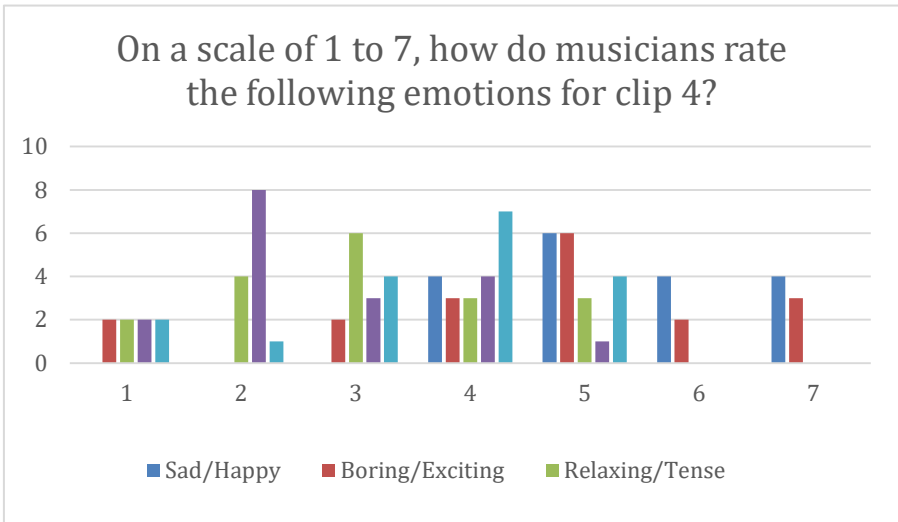
Clip 3: Glenn Miller



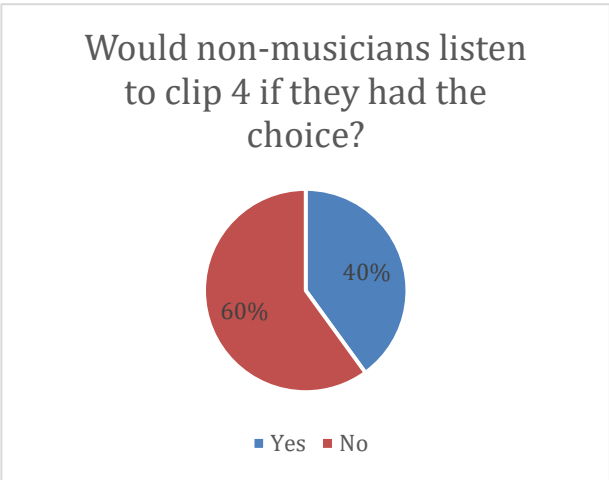
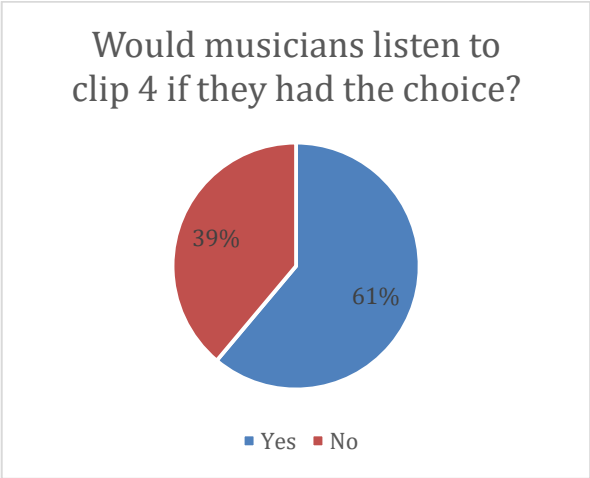
Musicians and Non-Musicians



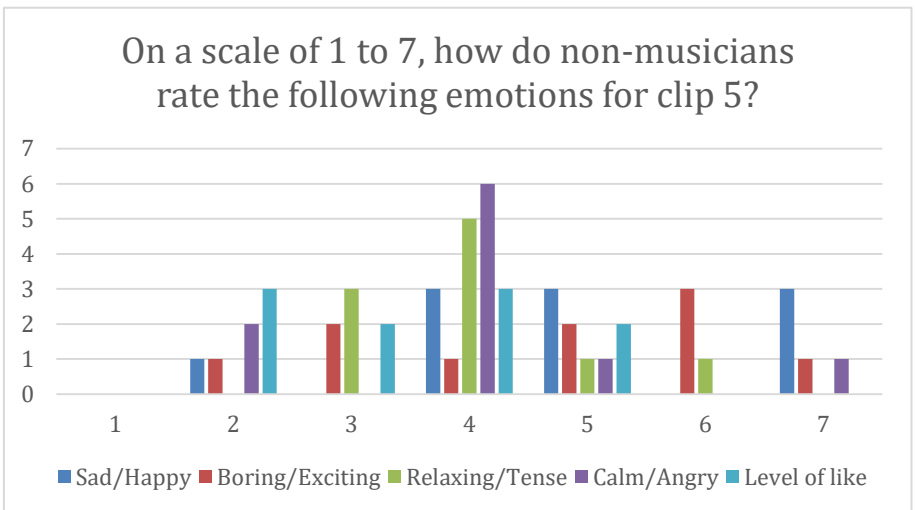
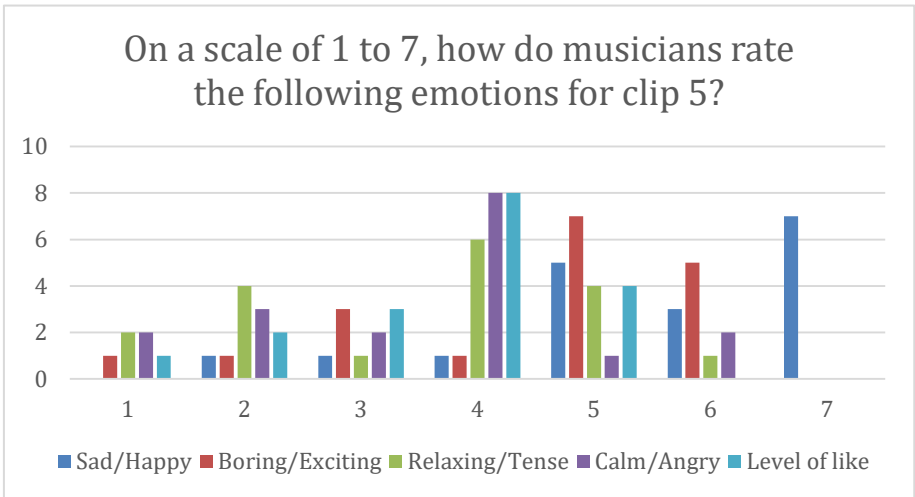
Clip 4: Paul Desmond



Musicians and Non-Musicians

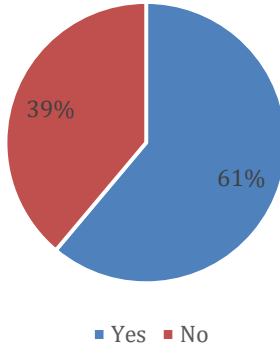


Clip 5: Jessie J

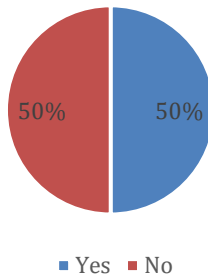


Musicians and Non-Musicians

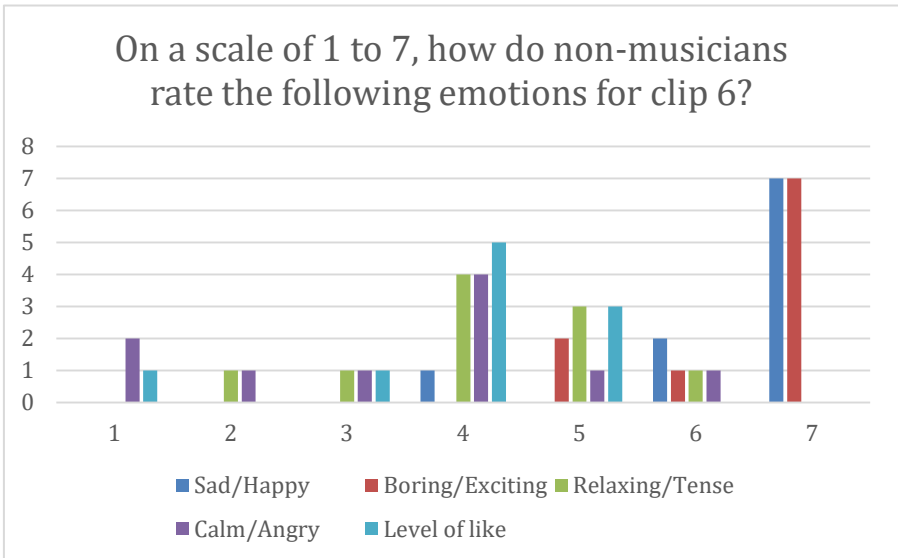
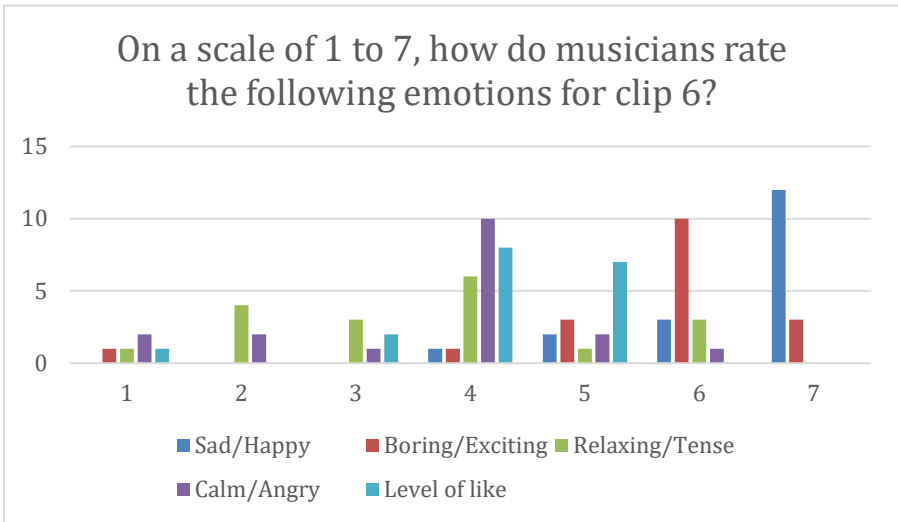
Would musicians listen to clip 5 if they had the choice?



Would non-musicians listen to clip 5 if they had the choice?

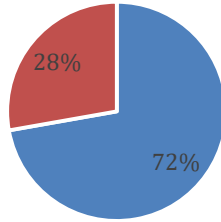


Clip 6: Mark Ronson



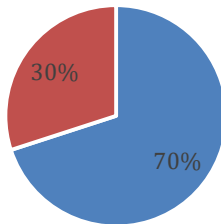
Musicians and Non-Musicians

Would musicians listen to clip 6 if they had the choice?



■ Yes ■ No

Would non-musicians listen to clip 6 if they had the choice?



■ Yes ■ No

Discussion of Results

The aim of this study was to investigate how two different groups of participants, musicians, and non-musicians, emotionally responded after listening to short extracts of music from different genres. The participants were asked questions on how the music made them feel, and what genres of music they normally listened to, as well as what music they listened to while growing up. The hypothesis was that: musicians would have stronger emotional responses than non-musicians to the different extracts of music, and that they would have a greater emotional response to their favourite genre of music. The study also looked at whether the style of music participants grew up listening to had impacted their responses. The responses between musicians and non-musicians were expected to be vary.

At the outset a limitation was the method of recruiting survey respondents, which was through Facebook Messenger. This was perhaps not the best way to find participants, as it meant that the number who filled out the questionnaire was quite limited (as it largely depended on who I knew, and who actually answered their messages). This was the main reason why more musicians than non-musicians completed the questionnaire, and as well as why there were more females than males; I was a female musician enrolled in a music degree and my peers were the keenest respondents. As the assessment was conducted in a limited time-frame, this method was the quickest and easiest way to secure respondents.

The results showed a difference between what musicians and non-musicians preferred listening to. The preferred style of music to listen to for musicians was classical music, which accounted for 33% of the results. Non-musicians, on the other hand, favoured popular music, which accounted for 46% of the result. The results show a difference between what the participants listened to while growing up, compared to what they listen to now. The amount of classical music listened to by musicians has dropped by 8%, with 41% saying they listened to classical music while growing up, compared to 33% now. Equally the amount of popular music listened to by musicians has also dropped, with 31% saying they listened to popular music while growing up, as opposed to only 17% now. The amount of jazz listened to, however, has not changed much, only moving from 13% to 14%. On the whole, the styles of music listened to by musicians have branched out over time, with many musicians listening to a wide range of genres, such as rock (11%), musical theatre (5%), metal (5%), world music (3%), and so on.

Musicians and Non-Musicians

The styles of music listened to while growing up for non-musicians, however, was much less varied. 64% of non-musicians said that they listened to popular music growing up (over double the amount than for musicians), while 18% said they listened to jazz, 9% to classical music, and 9% to pop punk music. It is worth noting that these preferences are not absolute; a strong preference for popular music does not preclude occasional forays into classical music or even metal. The results show that there is a decrease in the amount of popular music listened to by non-musicians however, with only 46% saying that they would listen to popular music now. It is also interesting to note that the amount of classical music listened to has increased from 9% to 15%, while the amount of jazz has dropped to 8% from 18%. Even though 15% say they enjoy listening to rock music and 8% to musical theatre, non-musicians do not seem to have branched out into listening to as many different styles to the extent that the musicians have. Overall however, the results do demonstrate that what respondents listened to growing up had some influence on what they listen to in adulthood: musicians still tend to listen to more classical music, while non-musicians still tend to listen to more popular music.

The first clip of music that the participants listened to was an extract from Edvard Grieg's *Peer Gynt* called 'Morning Mood Suite'. On the whole, this piece evoked quite similar results between the musicians and non-musicians. The most interesting contrast in responses to this clip is the difference between how the musicians and the non-musicians rated the calm to angry scale. A majority of musicians rated it as quite calm (67% rating it as a 2), while the non-musicians were more disparate in their ratings, with only 40% placing it at the end of the scale (1 and 2), while 50% placed it more toward the middle of the rating scale (3 and 4). One possible reason for this could be that musicians have a better understanding of the probable structures of music than non-musicians, based on the fact that musicians have studied and played music. Equally, the fact that non-musicians did not listen to much classical music may have played a role in the results here, given that the genre conventions would be unfamiliar to these listeners.

The second music clip that participants listened to was an extract from the last movement of Haydn's String Quartet Opus 33, known as 'The Joke'. On the whole, this clip was also quite similar in the results between the musicians and the non-musicians, though on three of the scales (the boring to exciting scale, the relaxing to tense scale, and the enjoyment of

the piece scale) on average the non-musicians rated the music slightly less highly than the musicians. The main difference, however, was whether the participants would listen to the music out of choice. 80% of non-musicians said they would not listen to the piece again, while only 28% of musicians said they would not. This is most likely where what the participants' preferred listening to comes into play. This extract is much more like what a non-musician might think that classical music sounds like than the Grieg piece. Equally, it is repetitive, and if one had not studied music, one would be less likely to understand how the piece is written, which would probably lessen the enjoyment of it.

The third musical extract that the participants had to listen to was an extract from Glenn Miller's 'Moonlight Serenade'. On the whole, this clip again generated quite similar results from both the musicians and the non-musicians. The biggest contrast was the rating of the enjoyment of the piece; the non-musicians on the whole clearly enjoyed the piece more than the musicians. 70% of the non-musicians said they would listen to it again, as opposed to only 56% of the musicians. Despite the small sample size, these are interesting results, given that neither group of participants said that they listened to a lot of jazz (14% of musicians said that they listened to jazz, while only 8% of non-musicians said that they did). Again, having studied music may have put some of the musicians off the piece, as some of the responses as to why they would not listen to it out of choice had to do with having heard the piece too many times and having been put off the music as a result.

The fourth music clip participants listened to was the extract from Dave Brubeck's 'Take Five'. The results for this clip were again reasonably similar between the musicians and the non-musicians. On average the non-musicians rated the sad to happy and the boring to exciting scale slightly lower than the musicians. However, the principal difference showed up on the relaxing to tense scale, and the enjoyment of the piece scale. While 33% of the musicians rated the music as a 3 on the boring to exciting scale, the non-musicians tended to rate it lower, with 30% rating it as a 1. The reason for this is once again probably linked to a limited knowledge and/or understanding of the piece on the part of the non-musicians. The enjoyment of the piece was also varied. On the whole, the musicians preferred it, with 39% giving the music a 4 out of 5, while the non-musicians rated it further down the scale, with 30% rating the music 2 out of 5, and another 30% giving it 3. While neither group of participants listen to a lot of jazz, the

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increase of enjoyment in the musicians is once again likely linked to the limited knowledge that non-musicians would have of the piece.

The fifth clip that participants listened to was an extract from ‘Price Tag’ by Jessie J. The emotions connected to this music did not differ greatly between the two groups of participants. The greatest differences were on the sad and happy scale. While 39% of the musicians rated the clip as a 7, the non-musicians were more varied in their responses, with 30% rating the music a 4, 30% as a 5 and another 30% as a 7. What was more interesting, however, was the variation on the enjoyment of the piece. While 44% of the musicians gave the song 4 out of 5, 30% of non-musicians gave it 2 out of 5, and another 30% gave it 4 out of 5, and only 50% of them said that they would listen to the song out of choice. This is a curious result, given that non-musicians generally preferred listening to popular music. One of the possible reasons for this is that the song has been overplayed, meaning people do not like it that much anymore (a number of participants stated this as the reason for not wanting to listen to Jessie J’s hit).²⁴ It is also possible that ‘Price Tag’, with its anti-consumerist message, is less pleasing than songs about love and romance.

The sixth and final clip of music that the participants listened to was an extract from ‘Uptown Funk’ (first recorded by Bruno Mars, who was featured on the better-known Mark Ronson version, which was used in this study). The results for this clip had the greatest similarity of all the clips. The only thing that differed slightly was the results on the boring to exciting scale, with the musicians rating it slightly lower (56% rated it a 6), than the non-musicians (70% of which rated it a 7).

Conclusion

To conclude, the results of the study do not show a strong correlation between the emotional responses experienced by musicians and the emotional responses experienced by non-musicians. While what the participants preferred listening to did impact on the results to a certain extent, mainly on how much they liked the piece, and whether or not they would listen to it out of choice, the rating of different emotions on the 1 to

²⁴ Kashmira Gander, ‘The Science Behind “Killing” a Song when You Listen to it Too Much’, *The Independent* (10 May 2017), at: <https://www.independent.co.uk/life-style/killing-song-science-magic-lost-listen-too-much-sound-good-michael-bonshor-a7728156.html>. Accessed 30 April 2018.

7 scale did not vary significantly. Often the average of the musicians and non-musicians would either provide the same answers or very similar answers (often higher or lower by only one number). The few main differences between the results are discussed above.

One of the limitations of this study was that since it was done in the participants' own time, so it was impossible to know in what conditions or how focussed they were while doing the experiment. Conducting the experiment again in set conditions, with all the participants in the same room and having them all doing the survey at the same time, would be one way of testing the validity of these findings. A further, less easily remedied limitation, is that it is impossible to know what sort of physical and emotional mood the participants were in at the time of doing the experiment; this is something that might have impacted on the results of the survey to a considerable extent. Future studies might seek to reduce the impact of this change by setting conditions about what the participants can consume (both food and drink) up to twelve hours before participating in the experiment. These types of conditions have indeed been set by other professional researchers in the field.

A final consideration regarding strengthening the validity of the findings for repeating this study in the future would be to make the same participants do the experiment twice within one week. One iteration could be carried out in set conditions, and the other could be in their own time (the way this study was done). This would be an interesting way to see if factors such as concentration, mood, and the amount of caffeine or alcohol consumed, impacted on the results (the question about consumption would need to be added to the questionnaire). The use of technology, such as the CRDI method discussed above, to measure the physical responses (such as heart rate, blood pressure, temperature and so on) that the participants might experience while listening to the music could also be integrated into a more thorough and sophisticated version of the survey discussed in this article.

Appendix – Questionnaire

Section 1

1. Which sex are you? Female, Male or Other
2. How old are you? 18, 19, 20, 21, 22, 23, 24 or 25
3. What genre of music do you prefer listening to? Classical, jazz, pop or other (please specify)
4. What genre of music did you listen to while growing up? Classical, jazz, pop or other (please specify)
5. Do you consider yourself a musician? Yes or no?

Section 2 [repeated for all music clips]

1. Extract from Grieg's *Peer Gynt Suite*.
2. On a scale to 1 to 7, how happy or sad does the music make you feel? (1 being not a lot, and 7 being a lot)
3. On a scale of 1 to 7, how boring or exciting does the music make you feel? (1 being not a lot, and 7 being a lot)
4. On a scale of 1 to 7, how relaxed or tense does the music make you feel? (1 being not a lot, and 7 being a lot)
5. On a scale of 1 to 7, how calm or angry does the music make you feel? (1 being not a lot, and 7 being a lot)
6. Overall, how much do you like this piece of music on a scale of 1 to 5? (1 being not a lot, and 5 being a lot)
7. Would you listen to this piece of music if you had the choice? Yes or no?
8. Please elaborate on why?