Is Empathy and Mood Connected to the Awareness of Emotional Expression in Music

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ABSTRACT

The purpose of this study was to investigate how listener attributes such as empathy and mood will contribute to the perception of different emotions in music. A correlational design was utilised to carry out this study. A total of 110 participants took part, the sample was made up of a convenience sample of psychology students attending Dublin Business School. After completing a set of questionnaires including the researcher devised questionnaire, the Positive and Negative Affect Schedule (PANAS), and The Cambridge Behavioural Scale participants listened to ten excerpts of classical music. The task required identifying the intensity for the emotional responses on a scale 1 to 5. Analyses showed that there was a positive significant relationship between empathy and highly correct emotion scores. Females were significantly more empathic than males. Positive Affect negative affect scores showed a correlation with the correction perception of emotions in music.
INTRODUCTION

Music and its emotional effects play a significant role in our daily lives as iPods’, mp3 players, and other music listening devices have become an essential part of our lives. Why do people listen to music? People tend to value and listen to music to change emotions and mood, to let go of emotions, to correspond with their current emotions, to get pleasure from and to relieve stress, and for self-awareness. Results from an exploratory questionnaire that included 141 music listeners between of 17 and 74 of age, found that emotion was the main reason for individual’s to listen to music (Juslin & Laukka, 2004). Juslin et al (2004) stated that the features of music that are suggestive of discrete emotions are rhythm, timing, accents on specific notes, tempo, contour, sound level, vibrato, mode, tone attacks and decays, timbre, articulation, harmony, micro-intonation, tonality, interval and pitch. Music can express a range of emotions from delight to misery. It can also evoke many different affective states including preferences and moods. Meyer’s (1994, p.153) states that music conveys a process which is experienced with emotion and its importance is determined by its capability to evoke emotion in the listener. Music can be recognised as a social behaviour, it is a course of action that requires us to be aware of the inner state of those around us, as an environment that may possibly allow us to encounter feelings that are similar to the feelings of others. (McPherson & Welch, 2012). Music can express emotions that can be understood by the person listening to the music. In addition, music has the capability to induce emotional
responses in listeners or in some way change or alter their emotional states (Juslin & Sloboda, 2010).

It is significant to take note of the type of emotion that is being analysed in the study of music and emotions; perceived or felt emotions. In terms of music, perceived emotion suggests that emotion is in some way represented, communicated or expressed by music and therefore perceived and understood by the listener. In contrast, the term felt emotion refers to emotional responses that music evokes in the listener. It is generally assumed that music is able to express emotions, though there has been controversy over whether music is capable of stimulating emotions in listeners (Konecni, 2008). Kivy (1990) states that a musical piece can be portrayed as ‘sad’ for the reason that the musical features of the piece conveys sadness. Whereas musical emotivists assert that while listeners describe a piece of music as ‘sad’, it is because the piece makes them sad. The relationship between perceived and felt emotions may be somewhat difficult; a musical piece communicating happiness may not cause happiness in the listener, in fact it may not induce any emotional reaction at all, it can produce mixed emotions (Hunter, 2007) or a number of other types of emotions (Gabrielsson, 2002). The majority of music can at least move the listener emotionally, yet there is dispute over what emotions music really induce in the listener and whether the emotions stimulated by the music are similar to emotions experienced in real life (Juslin & Vastfjall, 2008).

Different people favour different kinds of music genres and respond differently to a different pieces of music. It has been proposed that listener attributes, for example musical expertise, personality, an individual’s memories, mood, and learned associations may contribute considerably to music induced emotions (Scherer & Zentner, 2001). Liking or disliking a piece of music is possibly the most common emotional response to music. Blood & Zatorre (2001) assert that listening to an enjoyed piece of music can have similar enjoyable effects as food and sex. Chills and shivers down the spine are sometimes felt by the listener.
Gabrielsson (2001) implies that chills and tears are present with a powerful experience with music, simultaneously with intense and mainly positive emotion.

**Empathy**

Laird’s self-perception theory proposes that music influences behaviour, action tendencies, and motor response and the feelings of these responses are understood as feelings of some specific emotion or mood (Cochrane et al, 2013). Some studies have focused on the role of empathy in emotional responses and the results indicate that positive and negative emotional responses may perhaps be differently linked with cognitive and emotional empathy. Cognitive empathy is the ability to knowledgeably take the viewpoint of another person and includes the decoding and labelling of emotions and their situational cues whereas emotional empathy concerns the sharing of another’s emotional state (Langdon & MacKenzie, 2012). Davis and colleagues learned in their study that emotional empathy was connected with experiencing negative emotions in response to negative film excerpts whereas cognitive empathy was linked with positive emotional responses (Davis, Hull, Young, & Warren, 1987). According to Scherer and Zentner (2001) empathy and emotional contagion may be a factor of music induced emotions. Emotional contagion is the involuntary nature by which the affective expressions of others may induce a corresponding feeling state in ourselves, for example smiling at somebody automatically.

Previous research showed that women are more empathic than men (Rueckert & Naybar, 2008). Recent studies have also established that individuals who have a certain state of emotion cause biases in emotion perception in music. Wollner (2008) found that individual’s differentiation in understanding music can relate to empathy and also genre preferences, styles of music and by habits.
Individuals may perceive an emotion in music or actually feel an emotion in response to music. Listener’s musical expression of a piece is determined by the individuals perspective and emotional meaning that the music stimulates, as well as metacognitive elaboration, emotional intelligence, life, experiences and; personal characteristics (Mladjenovic, Bogunovic, Masikosa, Radak, 2009). In a recent study, Vieillard, Roy, & Peretz (2012) tested how emotion category, categorised by distant musical structures (sadness, happiness, threat) and expressiveness (mechanical, expressive) might induce overt and covert behavioural judgements and physiological reactions in listeners, some were musically trained while others were not. Fifteen undergraduate participants took part. A variety of happy, sad and scary excerpts were presented while physiological measures were documented. Participants rated the intensity of the emotion they experienced. Brief breaths were also monitored. The results showed that the mechanical version was rated lower than the emotion categories with the musicians and expressive excerpts increased skin conductance level more than the mechanical ones. The researchers believed that musical structure and musical expressiveness exhibit different results on physiological activity, target detection response times and ratings of emotional intensity felt. One criticism of Vieillard et al was that the participant’s ability to induce emotions was questioned because of the short duration of the music stimuli used. This may have resulted in the participants to recognise emotions instead of experiencing them.

Ladinig and Schellenbery (2012) conducted a study on the liking of excerpts of unfamiliar music extracted from a diverse range of music genres. The excerpts differed in mode (major or minor) and tempo (fast or slow). A sample of 61 undergraduates provided liking ratings for each excerpt in addition to ratings of their emotional reactions (happiness, intensity, and sadness) on a five point response scale. Excerpts were taken from commercial
audio recordings. Personality and history of music lessons was also measured. The results revealed that listeners are inclined to like music linked with happy feelings and to dislike music that evokes sad emotions. Combinations of happy and sad emotions were evoked with inconsistent cues to sadness and happiness. Big Five Inventory (BFI) was used as a measure of the Big Five Personality traits. Participants who scored high on Openness-to-Experience or low on Extraversion tended to like music that made them feel sad while liking music that evoked mixed emotions was connected with music training. Participants with high emotional responses to the music in general scored highly on Agreeableness whereas those scored high on Agreeableness or Neuroticism induced sad emotions. The results revealed that different personalities respond differently to music.

Music and Empathy

Wollener (2012) investigated the performance and perception of a string quartet using time-series analyses. Four female quartet musicians of a major conservatoire between the ages of 20-21 years old were video recorded during a performance. Twenty two observers took part, 22 females with the mean age of 22.32 years old. It was found that the observers correctly perceived the string quartets expressive intentions when they watched the multimodal presentations. Interestingly, observers with a higher affective and overall empathy were more precise at guessing the musician’s intentions. They found that emotional contagion participates in acting in response to music performances and in evaluating musician’s emotional expression.

Miu & Baltes (2012) study looks into the effects of voluntarily empathising with a musical performer (i.e., cognitive empathy) on music induced emotions and their underlying physiological activity. 56 participants (47 female) with a mean age of 22.4 years were included in the study, none of which had any significant musical education. Two musical
stimuli were used: Gelido Il Farnace by Antonio Vivaldi and Rataplan, an operatic song by Maria Malibran. The participants looked at video clips of the two operatic pieces performed in concerts, with either high empathy or low empathy. Measures used for this study during music listening included heart rate and heart rate variability, respiration rate (RR) and skin conductance level (SCL). Music induced emotions were measured using the Geneva Emotional Music Scale straight after the participants listened to the music. The results showed that when the participants listened to music with sad content in a high empathy condition it facilitated the emotion of nostalgia and reduced SCL. In contrast, results showed that the participants listening to song with happy content in a high empathy condition also facilitated the emotion of power and increased RR. Overall this study illustrated that cognitive empathy affects emotion psychophysiology throughout listening to music. However, it is important to note that this study is the first experimental study that supports the view that empathy is a central mechanism of music induced emotions.

*Music & Mood*

Music has been found to have an effect on an individual’s mood state. Hunter, Schellenberg and Griffith (2011) investigated emotional responding to music after mood induction. Forty eight undergraduates participated in this study. Overall, mood induction was highly successful. The pictures used in the mood inductions portrayed happy, neutral, or sad content. Forty eight pieces of music were used from commercial recordings. The perception of sadness expressed by the emotionally ambiguous music was high among the participants who were feeling sad. The results of the study showed that happy music was favoured to sad music following the happy or neutral mood induction. However, this preference declined following a sad mood induction. Sad moods also increased the perception of sadness in music when the music was not evidently happy or sad sounding.
Wollner (2008) discovered after conducting his research that responses to the sound file were associated with the changes in the music’s acoustical intensity. Research literature has discovered that particular moods determine the ratings of the perception of music, such as positive moods gave high happiness ratings and low sadness ratings while negative moods exhibited a reverse pattern. According to Juslin and Vasfjall (2008) unfamiliar sad music can induce sadness through visual imagery. However Vuoskioski and Eerola (2012) found that participants listening to unfamiliar sad music found it to be more pleasant rather than self-selected sad music.

Vuoskioski et al conducted a study that involved investigating whether listening to sad music can evoke a sadness related effect on memory and judgement among one hundred and twenty Finnish university students between the ages of 19-56. The participants were randomly assigned into four conditions with different tasks. The first group listened to unusual sad music, the second group listened to neutral music, and the third group listened to self-selected sad music while the fourth group recalled a sad autobiographical event and wrote about it. The induced states were measured with a judgment task and a work recall task. Participants were asked to rate emotions expressed by pictures illustrating facial expressions. The findings of the discussed study showed that listening to sad music can produce changes in emotion linked with memory and judgment. Though, to some extent the effect could depend on the personality attributes of the listener, and the music’s relevance to the listener. Trait empathy also contributed to the responsiveness to sadness evoked by unfamiliar music, whereas autobiographical memories contributed to sadness brought on by self-selected music.

*Music and Emotion*
One explanation for the universal appeal of music is the emotional rewards that music presents to its listeners. Zentner and Scherer (2008) conducted four interrelated studies to understand music’s universal appeal by identifying emotions that are most and least induced by music. Their first two studies was carried out to make a list of music relevant emotion terms and to the frequency of both felt and perceived emotions amongst five groups of listeners with distinct music preferences. Emotional responses differed according to the type of response (felt vs. perceived) and musical genre. Study three was carried out during a musical festival, here they investigated the structure of music induced emotions through confirmatory factor analysis of emotion ratings, and a 9 factorial model of music induced emotions was established. Geneva Emotional Music Scale (Gems) was introduced from rigorous analytic techniques, which addressed the perceived issue of emotions specifically invoked by music, as opposed to the basic emotion categories. Study four repeated this model and discovered that it interpreted music elicited emotions clearer than the basic emotion and dimensional emotion models. When listening to music, individuals are inclined to become self-forgetful and to some extent detached from everyday concerns. Zentner et al exhibited a clear expression of this detachment as ‘dreamy’ was among the most frequent responses to the music. The discussed study was mostly based on instrumental music, results of felt sadness in response to the music pointed out to be somewhat rare. Instead the term, melancholic was used by listener’s to convey the distinctive character of the sadness feeling, once the pain that accompanies its appearance in real life is detached.

Jaimovich, Coghlan, and Knapp (2013) conducted an experiment to comprehend individual’s emotional reactions towards a mixture of musical excerpts through self-report questionnaires and the recording of electrodermal activity (EDA) and heart rate (HR) signals. The experiment was conducted over three months as part of a public exhibition having nearly 4,000 participants and over 12,000 listening samples. The results of the study showed a
negative correlation between physiological features and age and a relationship between physiological features and self-reports such as song likeness, and posivity. People value music mainly for the aesthetic reason for the emotions it creates, for activating memories and for its beauty (Juslin & Laukka, 2004).

**Gender Responses to Music**

Gender difference in music perception remains largely unexplored. Musical sounds may be recognised more intensely by females, therefore females may be more sensitive to music in general and mainly to the effects stemming from sound intensity (Kellaris & Rice, 1992). Kellaris et al affirmed that studies have shown gender sensitivity to the loudness of music which can have an effect on behavioural intention. Previous research has also stated that women experience emotions more powerfully then men and are also more expressive of their emotions (Kring & Gordon, 1998). North, Hargreaves, and O’Neill (2000) asserted that female listener’s use music more often to fulfil emotional needs. Lacher (1994) conducted a study to investigate the influence of gender on the creation of hedonic responses to new, first time heard music. Music evokes emotional responses when heard for the first time and these responses may fluctuate in strength between males and females. The study involved the participants listening to two songs and filling out a questionnaire. Results showed that gender does influence the strength of the different responses. However results showed that the music evoked stronger responses in males then in females. Gender showed to have an overall effect on music ability to evoke the response. The findings from the study suggest males and females respond differently to music. Limitations of this study include that the researchers should have used a bigger scope of participants and demographic variables such as occupation, income, and age.
Kring and Gordon (1998) investigated the sex differences in emotion. Expression, experience, and physiology were assessed from the responses of males and females in two studies. The first study comprised of undergraduates watching emotional films. Women were shown to be more expressive than males. The second study involved the undergrad males and females viewing an emotional film and afterwards self-report scales of gender role characteristics, expressivity, and family expressiveness were completed. Results from study two imitated those from study one and family expressiveness and gender role characteristics regulated the relationship between gender and expressivity. One of the limitations of Kring et al paper was that most of the participants that took part in the study were mostly Caucasian, causing it difficult to examine whether they were ethnic and racial differences in emotion and how ethnicity might interrelate with sex in moderating emotional response. The study also consisted of a small sample size.

Kellaris et al (1993) explored the influence of gender and to psychophysical stimulus properties of instrumental music, containing behavioural intentions towards the music and judgements of music’s affect characteristics. The researchers study involved 52 volunteers from introductory classes at a large urban university in the Midwest. The findings indicated that gender moderates the influences of loudness, for instance that females respond more positivity to music at lower volumes. Digital recording technology was employed to establish multiple versions of a musical score that varied in tempo but held pitch constant. Overall, they concluded that gender controls the influence of loudness on affective judgements to music played at a lower volumes. A Limitation of the former study, however is that the experiment did not stimulate a longer exposure to the music stimuli as they only used fifteen seconds, therefore future research could address the generality of the gender moderation effect by using different exposure durations. This limitation was taken into consideration for the current study in the choosing of the music duration.
How does music induce emotions?

Research argues that individuals value music mainly because of the emotions it evokes. However, the concept of musical emotions is highly debated and researchers have been unable to put forward a satisfactory account of such emotions. Juslin and Västfjäll (2008) article outlines a new theoretical framework containing six mechanisms which music listening may induce emotions in everyday life: brain stem reflexes, evaluative conditions, emotional contagion, visual imagery, episodic memory, and musical expectancy. They suggest that these mechanisms vary depending on such characteristics as their key brain regions, induction speed, information focus, degree of volitional influence, ontogenetic development, cultural impact, dependence on musical structure, and modularity. Brain stem reflexes is a procedure where an emotion is stimulated by the music since one or more essential acoustical characteristics of the music are chosen by the brain stem to signal a possible important event. Juslin at al asserts that brain stem reflexes to music may possibly function before birth, since findings have indicated that playing loud music to the foetus causes an increase in motor responses, and an increase in heart rates, while soft music creates moderate heart rate deceleration and a decrease in movement. Research indicates that brain stem responses occurs in close connection with the intraluminal nuclei of the thalamus, and the reticular formation of the brain stem; which obtains input from the auditory system. The brain stem is connected to the spinal cord and produces more complex movements than the spinal cord. Brainstem structures perform both sensory and motor functions (Kolb & Whishaw, 2009). As soon as an auditory signal reaches the primary auditory cortex, the signal undergoes analyses by the brain structures such as the inferior colliculus, the thalamus, and the superior olivary complex (Koelsch & Siebel, 2005). Brain stem reflexes can clarify the relaxing effects of music and how simple sounds can induce pleasantness and
unpleasantness. Evaluative condition, is a process where an emotion is stimulated by a piece of music purely because the stimulus has corresponds to a positive or negative stimuli. For instance a particular piece of music may have occurred repeatedly together in time in a specific event that always made you happy (e.g., meeting with your best friend) therefore over time even with the absence of the friendly contact these repeated pairings will evoke happiness.

Additionally, a study carried out by McNamara and Balllard (1999) to investigate the associations of music preference, resting arousal, and sensation seeking behaviour. Resting heart rate and blood pressure were observed and a questionnaire on music preferences was completed. They concluded that whatever is considered as ‘optimal’ by a listener varies depending on the situation and on the listener’s personality characteristics.

**Rationale**

The main aim of this study is to investigate how listener attributes such as empathy and mood will contribute to the perception of different emotions in music. The primary aim of this study was to investigate emotional reactions to music with a focus on their mood and empathy. To investigate these issues 110 college students will be required. To explore the role of individual differences in emotion recognition, this study will examine the relationship between individual’s empathy and emotional responses to classical music and how mood states are involved in the perception of emotions represented by music. The study will also explore if the participants mood before the research is conducted will reflect their perception of the music. The results from this study should add to previous studies on music, empathy and mood and demonstrate if there is a correlation between them.
Hypotheses

Three hypotheses have been adapted from the results of previous research:

Hypothesis 1- Individuals with higher empathy scores should be more accurate at estimating expressiveness in classical music.

Hypothesis 2- Women will show a significantly higher score on empathy than men.

Hypothesis 3- Participants mood before the experiment will reflect their perception of the music stimuli.

The mood of the participants may bias their judgement of emotions represented by the music. Negative mood states may possible give higher sadness ratings, therefore lower happiness ratings.

METHODOLOGY

Participants

A convenience sample of psychology students attending Dublin Business School, located in Dublin, Ireland was used. A total number of 110 students (N =110) completed the experiment. There were 75 females and 35 males, aged between 18 and 25 years (M = 23.29, SD = 5.64). 75% of the participants had played a musical instrument, 35% had previously had signing lessons and 29 % played a musical instrument in their free time. A request was made to lectures for the involvement of psychology students attending a psychology class in Dublin Business School. Participation was involuntary with no monetary or other rewards on offer.

Design
The design used to conduct this research was a correlational research design. A correlational design was used to assess if there was a significant relationship between the variables. The Independent variables involved were music stimuli used (Classical music), positive and negative affect scores, gender (male/female), age, and empathy. The dependent variable was the recognition of emotion in music. A correlational design was used to test whether empathy and mood was connected to the recognition of emotion expressed in music in the music and the listener’s feeling response.

Materials

All the participants taking part in the listening experiment also completed a variety of questionnaire measures. Background information about age, gender, musical expertise and frequency of music listening was collected, as well as current mood state, and empathy was collected. The different measures that were used in the present work are described in the sections below. The following instruments were brought together and compiled into a questionnaire booklet which was administered to each respondent. Responses were made by writing in the response in the spaces provided with a pen. The materials used in the current study were three self-administered paper and pencil questionnaires including, positive and negative affect schedule (PANAS; Watson & Pennebaker, 1989), The Cambridge Behavioural Scale (Baron-Cohen. S & Wheelwright. S, 2003), and the Geneva Emotional Scale (GEMS-9; Zentner & Scherer, 2008). A demographic questionnaire devised by the researcher was also attained (see appendix C).

Researcher-Devised Questionnaire

The questionnaire devised by the researcher recorded demographic data (age, gender), frequency of music listening and musical expertise. At the beginning of the questionnaire
participants were asked to state whether they were male or female, this information was gathered in order to ensure that there was a relatively equal amount in the percentage of males and females. Participant’s age was also asked in order to establish the mean age of the sample population. Frequency of music listening was recorded using a 5-point Likert scale (ranging from extremely often, to not at all often).

Positive and Negative Affect Schedule (PANAS)

PANAS (Watson & Pennebaker, 1989) is a 20 item questionnaire that measures mood (see appendix D). It comprises of two mood scales; it has 10 adjectives measuring positive affect and 10 adjectives measuring negative affect. Each item is rated on a 5-point scale ranging from 1 = very slightly or not at all to 5 = extremely to indicate the extent to which the respondent has felt this way in the indicated time frame specified by the experimenter. Participants are required to provide a rating for each item. Participants in this experiment were instructed to consider their responses in terms of how they felt over the past week.

The scores are obtained by adding item scores (1 to 5) for the ten Positive Affect (PA) adjectives to obtain the PA score and the other ten adjectives for the Negative Affect (NA) score. Total NA and PA scores can range from 10 to 50. PA scores are calculated by summing the scores for items 1, 3, 5, 9, 10, 12, 14, 16, 17, and 19. NA scores are calculated by totalling the scores for items 2, 4, 6, 7, 8, 11, 13, 15, 18, and 20. Watson, Clark, and, Tellegen (1988) reported Cronbach’s Alpha Coefficient, the PA ranged from .86 to .90 and .84 to .87 for the NA. The test retest correlations ranged from .47 to .68 for the PA while NA scores ranged from .39 to .71. They also reported that measures of general distress and dysfunction, state anxiety and depression are highly correlated with the NA scale (positive correlations) than the PA scale (negative correlations).
**The Cambridge Behavioural Scale**

Empathy was measured using the Cambridge Behavioural Scale (Baron-Cohen. S & Wheelwright. S, 2003) (see appendix E). This 40-item questionnaire which includes a series of questions that highlight various forms of empathic understanding. For this research it was intended to measure how a person can pick up on other people’s feelings and how strongly they are affected by other people’s feelings. Each of the items listed score one point if the respondent records the behaviour mildly or two points if the respondent records the behaviour strongly. Approximately half the items were worded to produce a ‘disagree’ response and half to produce an ‘agree’ response for the empathic response, this is to avoid a bias response. Participants were asked to rate how strongly they agreed or disagreed to each of the statements.

*Geneva Emotional Music Scale (GEMS-9)*

The Geneva Emotional Music Scale (GEMS-9, Zentner, Grandjean, & Scherer, 2008) is a 9-item scale questionnaire which contains domain specific music emotion factors. Participants were asked to rate any instance of experiencing the following emotions: wonder, transcendence, power, tenderness, nostalgia, peacefulness, joyful activation, sadness, and tension (see appendix F). They were asked to describe how the music excerpts made them feel not to describe what the music may be expressive of. Beneath each factor there is a feeling term outlined, for instance power is described as strong, triumphant, and energetic. Responses are scored using a 5 point Likert scale (ranging from 1 - *not at all* to 5 - *very much*). These emotional states can be condensed into 9 categories which group into 3 superfactors; vitality, sublimity, and unease.
The GEMS-9 was selected for use in this study as it is anticipated to investigate combined group of emotions rather than just basic emotions. Zentner et al reported validity in support of the GEMS domain-specific model than basic and dimensional models regarding higher inter-participant agreement with intra-class correlation coefficient ($ICC = .89$), the choice of emotion terms ($r = .90$) and greater perception of the musical pieces. This study established the Cronbach’s alpha; .68 for vitality, .62 for sublimity and .50 for unease.

**Apparatus**

The listening experiment was conducted using a windows 7 Intel Duo Core computer in a classroom in Dublin Business School. The music excerpts were loaded onto a computer from a USB stick and were presented to each class. All songs were downloaded of ITunes and the website used by the researcher to edit the music was mp3cut.net. All music excerpts were transferred onto a memory stick. The participants listened to the excerpts through the speakers in a classroom in Dublin Business School. The music excerpts were presented in the same order. Other materials used were the A4 paper questionnaire response sheets and pens.

**Stimuli**

The stimulus material chosen for this study consisted of ten excerpts of nonvocal, classical music (see appendix A). The duration of each musical excerpt was 30 seconds in length, the total music length was 5 minutes long. The music stimuli were presented via USB memory stick from a desktop computer through speakers. The loudness level of the music was consistent across participants. Classical music was used in this study as researchers found that listening to classical music heightens emotions (Jensen, 2001).

**Procedure**
A pilot study was conducted prior to the experiment to calculate the time needed, and to ensure that there were no problems with the procedure. After permission had been granted from a lecturer in Dublin Business School, the researcher entered the classroom and informed the students present of the aims of the study and informed them that participation was strictly voluntary and that they were not obliged to take part, and that they may refuse to participate at any time. They were also informed that participation was anonymous and confidential, therefore responses could not be recognised to any one participant. The participants had just finished their class and were already seated as the experiment begun. Potential participants were briefed about the experiment and told that the experiment would explore mood and empathy. They were verbally given a description of the procedures that they would be expected to participate in, that there was no major risks to their participation in the research study but some of the questions may cause mild emotional discomfort. It was requested that the participants would answer all items honestly.

A set of questionnaires was then distributed to the participants, with the first page clarifying the general purpose of the present research (see appendix B). Ten minutes was allocated for completion of the first three questionnaires, which included the researcher devised questionnaire (age, gender, frequency of music listening, and musical expertise), the PANAS which rated their current affective state using the 20 adjectives (1 adjective at a time), and the Cambridge Behavioural Scale. The participants completed the questionnaires with a pen taking between 10-15 minutes to complete. When all of the participants had fully completed the first three sets of questionnaires the researcher informed them of the next part of the experiment. They were informed that after listening to each music excerpt they would need to rate the intensity on the emotion scale; to describe how the music made them feel not what they thought the music was expressive of, they were also informed that beneath each factor there was a term outlined. At the end of each music excerpt participants then
completed the second half of the questionnaire booklet which required them to fill in the GEMS-9. The duration of the music listening was 5 minutes. The music excerpts were played in the same order for each of the different psychology classes. When the questionnaires were completed the researcher collected their response sheets. Participants were thanked for their participation and were offered the opportunity to follow up if they had any questions or were interested in receiving the general findings of the experiment. Participants who completed and returned the surveys consented to participate in this study.

**Data Analysis**

Data analyses included descriptive statistics (Mean, Standard Deviations) and a Spearman’s rho correlation. Items from the empathy measure were reverse coded to that high scores indicate high empathy. PANAS scores were grouped into PA and NA. Independent samples t-test was used to hypothesis 2. Spearman’s rho (which is $N - 2$) was used for hypothesis 1 and 3.

**Ethics**

The current study was given approval by DBS School of Psychology Research Ethics Committee and the researcher adhered to all ethical principles in the code of professional ethics (2010). Participants had the right to withdraw at any stage. The study was completely anonymous in order to protect the participants and all questionnaires were stored securely in a locked cabinet. Data collected from the questionnaires were transferred from the paper record to an electronic format and stored on a password protected computer. A detachable page was included at the end of the questionnaire booklet which contained the phone number of DBS counselling service and Samaritans helpline, in the unlikely event that the questions answered in the survey should evoke any memories or negative feelings.
RESULTS

A total of 110 participants took part in this study (30 males and 72 females). Data was analysed using SPSS (Statistical Package for Social Sciences) version 21 according to APA Publication Manual 6th edition (American Psychological Association, 2010). Data analyses included descriptive statistics (Mean, Standard Deviations) and a Spearman’s rho correlation. Items from the empathy measure were reverse coded to that high scores indicate high empathy. PANAS scores were grouped into PA and NA. Independent samples t-test was used to examine total empathy and gender. Spearman’s rho was used to check if there was a significant relationship between empathy and recognition of emotion in music. Spearman’s rho was also used to check whether positive and negative mood was related to the recognition in music.
Descriptive Statistics

Means and standard deviations of some of the variables dealt with in this study, these include; Positive affect, negative affect, total empathy, age, and gender (see Table 1).

Table 1: Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mood:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive Affect (PA)</td>
<td>33.47</td>
<td>7.79</td>
</tr>
<tr>
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<td>.47</td>
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<tr>
<td>Age</td>
<td>23.29</td>
<td>5.64</td>
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The participants were 31.8% male \(N=35\) and 68.2% \(N=75\) and were all between the ages of 18 and 45 \(M=23.29, SD=5.64\). Participants were asked how often they listened to music, analysis of frequency of music listening revealed that 60% of the participants listen to music extremely often \(N=66\), 22.7% very often \(N=25\), 16.4% moderately often \(N=18\) and .9% slightly often \(N=1\) (See Figure 1).

Figure 1: Frequency of music listening
Inferential statistics

To determine how empathy was related to the emotional responses to music, correlations were calculated between participants Cambridge Behavioural scores and the responses to the GEMS. In order to identify the relationship between mood states (Positive Affect and Negative Affect) correlations were also calculated between the respondent’s scores from the PANAS questionnaire and the responses to the GEMS. For the first and third hypothesis Spearman’s rank order correlation coefficient was used, while for the second hypothesis an independent samples t-test was calculated.

Hypothesis 1

The hypothesis that individuals with higher empathy scores should be more accurate at estimating expressiveness in classical music and correlations between total empathy scores and the listener’s reported emotions were calculated by a spearman rank order correlation
coefficient. Comparisons of reported emotions for each piece of music (see Table 2). In six out of ten music pieces, participants gave significantly higher ratings for the intended emotion.

Empathic individuals showed to have moderate positive significant relationship to ‘power’ in sample 1, \( r_s(108) = .293, \ p \ .003 \). ‘power’ was the correct emotion that was being portrayed and was correlated for that particular sample. As empathy increases, power increases. Sample music 3 revealed a statistically significant relationship for ‘joyful activation’ \( r_s(108) = .248, \ p \ .012 \), which was the correct emotion being portrayed. Empathic individuals have a weak significant relationship to the emotion in sample 3. A spearman’s rho correlation found that there was a moderate significant association between ‘tenderness’ and empathy \( r_s(108) = .453, \ p \ .001 \) for sample 7. The reported emotion ‘tenderness’ was the correct emotion being portrayed in this sample. Sample 8 revealed a strong significant relationship between ‘wonder’ and empathy \( r_s(108) = .632, \ p \ .001 \). When empathy tends to increase then the emotion ‘wonder’ increases. The correct emotion was portrayed and correlated with this sample piece of music. In sample 9 a Spearman’s rho correlation found that there was a weak significant association between empathy and ‘tension’ \( r_s(108) = .198, \ p \ .046 \). The correct emotion ‘tension’ that was being portrayed in this piece of music demonstrated that higher empathy correlated with the emotion score. For music sample 10; ‘power’ was the emotion reported. Spearman’s rank order correlation shown a moderate significant relationship with empathy and ‘Power’ \( r_s(108) = .256, \ p \ .009 \). The correct portrayed emotion for sample 10 was ‘power’.

Furthermore, a spearman’s rank order correlation for samples 2, 4, 5, and 6 (see Table 2) revealed positive significant relationships but participants reported the wrong emotion being portrayed in the music samples. Overall, Spearman rank order correlation coefficient
Hypothesis 2

postulated a positive significant correlation between empathy and highly correct emotion scores, therefore the null hypothesis is accepted.

Table 2: Correlations (r) between total empathy and reported emotions for each music excerpt

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<th>Sample 1</th>
<th>Correlation coefficient Sig. (2-tailed)</th>
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<th>PW</th>
<th>TD</th>
<th>NT</th>
<th>PC</th>
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<td>.803</td>
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<td>.046</td>
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<td>Correlation coefficient Sig. (2-tailed)</td>
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<td>.333**</td>
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</table>

* P < .05  
** P < .01  
(WD = Wonder, TS = Transcendence, PW = Power, TD = Tenderness, NT = Nostalgia, PC = Peacefulness, JA = Joyful Activation, SD = Sadness, TN = Tension)
The hypothesis that women will show a significantly higher score on empathy was supported by their answers on the Cambridge behavioural scale. Using an alpha level of .05 an independent samples t-test was conducted to evaluate whether males and females differed significantly on total empathy scores. The levene’s test for equal variances yields a p-value of .292. This means that the difference between the variances is statistically significant ($t(100) = -3.68$, $p < .001$). The p-value .001 less than 0.05 indicates that there is a significant difference between empathy scores for males and females. The 95% confidence interval for the difference between two means is -14.04 and -4.21. T-value (-3.68) which indicates that females were higher than males which resulted in a significant p-value less than alpha of .05 ($p < .05$). Therefore the null hypothesis is rejected in support of the alternative hypothesis, males and females differed significantly on empathy scores. As predicted, results from the independent samples t-test indicated that females ($M = 126.53$, $SD = 10.12$, $N = 75$,) were significantly more empathic than males ($M = 117.40$, $SD = 14.05$, $N = 35$). Two participants failed to complete the empathy measure.

**Hypothesis 3**

For the third hypothesis it was expected that participants mood before the experiment would reflect their perception of the music stimuli. Positive and negative affective states was assessed to see whether participant’s mood state in the past week influenced emotion ratings. A series of spearman rank order correlations were conducted in order to determine if there were any relationships between PA and the reported emotions for each music excerpt (see Table 3).

A 2 – tailed test of significance indicated that there was a weak significant relationship between PA and the reported emotion ‘power’ $rs(108) = .205$, $p .033$ in sample 1. Therefore as individual’s positive mood increases so does the emotion. Analysis revealed
that for the 110 participants there was a weak significant relationship between PA and the reported emotion ‘wonder’ \( rs(108) = .287, \ p .003 \) in sample 3. ‘Power’ and ‘joyful activation’ was also reported to have a weak positive relationship with PA in sample (refer to Table 3). Hence, when individuals positive affect increases, so does the three reported emotions for sample 3. Spearman’s rank order correlation showed the association between PA and the reported emotion ‘wonder’ \( rs(108) = .201, \ p .037 \). This showed a significant correlation. For sample 9, the analysis revealed that there was a positive significant association between PA and the reported emotion ‘sadness’ \( rs(108) = .210, \ p .029 \). Sample 10 showed a positive significant relationship between ‘joyful activation’ and PA \( rs(108) = .245, \ p .010 \). Consequently, as the individuals PA increases, ‘joyful activation’ increases.

Overall, Spearman rank order correlation coefficient postulated a positive significant correlation between PA and the correct perception of emotions in the music pieces. Therefore the null hypothesis is accepted. Analysis of correlations for Samples 1, 3, and 8 reported the correct emotion being portrayed.

A series of spearman rank order correlations were conducted in order to determine if there were any relationships between NA and the reported emotions for each music excerpt (see Table 4). In Three out of ten music pieces, participants gave significantly NA scores for the intended emotion. For sample 4 of the music the spearman’s rank correlation revealed a statistically positive significant relationship between NA and the correct reported emotion ‘nostalgia’ \( rs(108) = .245, \ p .011 \). As NA increases, ‘nostalgia’ increases. Sample music 5, the analysis revealed a positive significant result between NA and ‘nostalgia’ \( rs(108) = .229, \ p .017 \). Participants reported the correct emotion for this music piece. Sample music 7 showed to have a positive significant association between NA and ‘joyful activation’ \( rs(108) = .192, \ p .046 \). As NA increases, ‘joyful activation’ increases for this particular sample.
Additionally, a spearman’s rank order correlation for sample music 1, 8, 9, and 10 (see Table 4) revealed positive significant relationships but participants reported the wrong emotion being portrayed in the music samples. Overall, spearman rank order correlation coefficient postulated a positive significant correlation between NA and correct reported emotion scores, there the null hypothesis is accepted.

Table 3: Correlations (r) between Positive Affect (PA) and reported emotions for each music excerpt

<table>
<thead>
<tr>
<th>Positive Affect</th>
<th>WD</th>
<th>TS</th>
<th>PW</th>
<th>TD</th>
<th>NT</th>
<th>PC</th>
<th>JA</th>
<th>SD</th>
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<td>.016</td>
<td>-.023</td>
<td>.020</td>
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<td>.075</td>
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<td>.033</td>
<td>.716</td>
<td>.868</td>
<td>.812</td>
<td>.837</td>
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<td>.005</td>
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* P < .05  
** P < .01

(WD = Wonder, TS = Transcendence, PW = Power, TD = Tenderness, NT = Nostalgia, PC = Peacefulness, JA = Joyful Activation, SD = Sadness, TN = Tension)
Table 4: Correlations (r) between Negative Positive Affect (NA) and reported emotions for each music excerpt

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<th>PW</th>
<th>TD</th>
<th>NT</th>
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* P < .05  
** P < .01  
(WD = Wonder, TS = Transcendence, PW = Power, TD = Tenderness, NT = Nostalgia, PC = Peacefulness, JA = Joyful Activation, SD = Sadness, TN = Tension)
DISCUSSION

The main aim of this study was to investigate how listener attributes such as empathy and mood would contribute to the perception of different emotions in music among a sample of undergraduate psychology students in Dublin Business School. It was hypothesised that women will show significantly higher scores on empathy therefore more accurate at estimating expressiveness in classical music. It was also hypothesised that the participant’s mood (before the experiment) would reflect their perception of the music stimuli. The mood of participants may be bias in their judgement of emotions represented by the music. Negative mood states may possibly give higher sadness ratings, therefore lower happiness ratings.

According to Davis (1994) empathy is the ability to understand another person’s thoughts and feelings. Music and emotional outcomes are an important aspect of our daily lives. Previous research has shown that particular moods determine the ratings of the perception of music, such as positive moods gave high happiness ratings and low sadness ratings while negative moods exhibited a reverse pattern. Wollner (2008) found that individual’s differentiation in understanding music can relate to empathy and also genre preferences, styles of music and by habits. Previous research showed that women are more empathic in men (Rueckert & Naybar, 2008). Studies have also established that individuals who have a certain state of emotion cause biases in emotion perception in music. For these purposes the participants completed the PANAS questionnaire, empathy questionnaire and listened to ten pieces of music. The current study has demonstrated that musical stimuli provides a realistic way of discovering the interactions of mood and empathy in emotional processes. It also shows that the judgement of emotions expressed by music is biased by mood states.
Findings/Interpretation of Results

This research presents interesting findings. The findings of this research suggests that factors such as empathy and mood contribute to individual’s perception of emotions in music. It was firstly hypothesised was that in this study, individuals with higher empathy scores should be more accurate at estimating expressiveness. Spearman’s rank order correlation conducted to investigate if higher empathy was correlated highly with scores on the correct emotion for the samples indicated positive significant correlation between empathy and highly correct emotion scores. Higher the individuals empathy the stronger the relationship between the emotions. If empathy was low there would be a negative relationship. Therefore the null hypothesis was accepted.

Results from the independent samples t-test indicated that females were significantly more empathic than males. This finding supports Kellaris et al (1992) in saying that musical sounds are recognised more intensely by females. Finally mood (PA and NA) was investigated to the intensity of emotional responses evoked by the different types of excerpts (e.g., tenderness, nostalgia, and power). In the spearman rank order correlation analyses, intensity ratings of all 110 participants for emotions evoked by the ten different excerpts was analysed. Both PA and NA correlated positively with the correct emotion responses evoked by the ten different aspects. This suggests that music expressing positive emotions evokes moderate emotional responses when the emotions are different to the listener’s current mood state. Correlation analysis revealed that participants in positive moods gave higher happiness ratings and lower sadness ratings to the music excerpts. The opposite pattern was shown for negative moods. This supports previous research by Vuoskiok (2012) that particular moods
determine the ratings of the perception of music, such as positive moods gave high happiness ratings and low sadness ratings while negative moods exhibited a reverse pattern.

Limitations

The duration of exposure to the music stimuli was moderately short (5 minutes; 30 seconds each). This may have been a weakness in the experiment and it is possible that longer exposure to the music may yield different results in collaboration with previous research (Field, Martinez, Nawrocki, Pickens, Fox, & Schanberg, 1998). The short duration of musical stimuli, may question the participants ability to induce emotions, causing participants to recognise them rather than experience them. Musical stimuli used in this study also has to be taken into consideration as the results obtained in this research partly reflects the musical material used. From all possible music excerpts and listening contexts only one genre of music was selected, which was ‘classical music’, used in this research, which also affects the generalisability of the findings. The current study used a musical excerpts which was chosen by the researcher, though careful consideration was taken to select the excerpts used in terms of the type of emotion conveyed. This arguable limits the generalizability of the results, as different musical material would probably have provided different results. Zentner (2008) claims that musically evoked emotions are uncommon in contrast to basic day to day emotions and that a random variety of musical excerpts is unlikely to cause many experiences of strong musically evoked emotions.

Additionally, it may have been beneficial to discover not only what people listen to and the different ways in which they listen to music, but finding out the reason why people enjoy listening to different types of music. The researcher also didn’t include a question on types of genres the participants liked which could have had an influence on results if they strongly liked classical music. Furthermore, another issue that limits the findings of this
research involves the measurement of emotional responses to the music stimuli, as the participants were provided with rating scales that they had to use to describe their perceived and felt emotions, therefore this limited the responses the participants could give. This limitation could have been prevented by collecting free responses from the participants. Familiarity with the music excerpts used in this research may have increased the emotional reactions to an excerpt. Additionally, there are many responses to music other than emotional responses and not all individuals respond emotionally to music.

**Strengths of current study**

However, this research had many strong points. One of the main strengths of this study was that it had a large sample size (N = 110), there was also a good variation in age (m = 23.29). Another strength of the current study was that it expands previous research by using an Irish population for the first time which can enhance the validity of previous research. Given the fact that the respondent’s anonymity was protected and that they were aware that the questionnaires were completely anonymous would have helped them to provide honest answers. The instruments used in this research were suitable which could also be seen as a strength. Majority of respondents showed an interest in the subject being examined which would highlight its importance for being studied. A pilot study was carried out to ensure that the experiment did not have any obvious problems and could be conducted as smoothly as possible. Another strong point of this study would be that the participant’s mood states were assessed prior to the experiment to see whether mood states affected emotional responses to the musical excerpts.

**Implications for Future Research**
The results of the current study has implications for the field of music and emotions, and also for emotion research in general. This work has established that musical stimuli provides an efficient way of exploring the interaction of mood and empathy in emotional responses. A suggestion for future research could be to use a completely non-college sample as most of the previous research was done purely on college students. This may help to confirm the generalisability of the results across samples, as there may well be different results found in non-college samples as college students tend to be quite up to date with music. Future studies could also induce different music genres. Participants could also be asked to state whether they liked the musical excerpts, this would be useful for the understanding of music emotions and how individual differences influence them. For example liking the music excerpts may have resulted in a positive correlation between mood and emotional responses.

Conclusion

Regardless of the limitations of this current study, a few significant findings were found. This study provides preliminary support for the associations between empathy, mood and emotional responses to music using the GEMS. To summarise the conclusions drawn from this experiment, the prediction that women would score higher on empathy then men was supported by the outcome of this study. A significant correlation was found between empathy and individuals correct emotion to the music. This supports the hypothesis that individuals with higher empathy scores should be more accurate at estimating expressiveness. Higher empathic individuals have positive significant relationship to the emotions. A significant correlation was found between mood and individuals correct emotion to the music. In light of the results obtained in this study, individual differences (e.g., musical expertise, and personality) on the processing of music induced emotions should be
investigated in future studies. Overall the results from this study should add to previous literature involving empathy, mood and music and may provide useful information.

REFERENCES


**APPENDIX A**

*List of classical music utilised in the experiment*

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<th>Mood</th>
<th>Musical Excerpts</th>
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<td>Tension, Power</td>
<td>Allan Petterson – Symphony no.6</td>
</tr>
<tr>
<td>Sample 2</td>
<td>Sadness</td>
<td>Johann Sebastian Bach - Air on the G string (air on a G string, string orchestra)</td>
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<tr>
<td>Sample 3</td>
<td>Joyful Activation, Tenderness</td>
<td>Ludwig Van Beethoven - Symphony 9, 2nd movement (Molto vivace, Philharmonia Baroque)</td>
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<td>Sample 4</td>
<td>Tender, Nostalgia</td>
<td>Debussy – Clair De Lune (piano music)</td>
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<tr>
<td>Sample 5</td>
<td>Wonder</td>
<td>Richard Wagner - Lohengrin – Prelude to act 1</td>
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<tr>
<td>Sample 6</td>
<td>Sadness</td>
<td>Ludwig Van Beethoven – Moonlight Sonata</td>
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<td>Sample 7</td>
<td>Transcendence, Joyful Activation, Tenderness</td>
<td>Debussy – Reverie Sonata</td>
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<tr>
<td>Sample 8</td>
<td>Peacefulness</td>
<td>Franz Schubert – Standchen D957</td>
</tr>
<tr>
<td>Sample 9</td>
<td>Tension</td>
<td>Dmitri Shostakovitch – String quartet no. 8 in C minor</td>
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APPENDIX B

Experiment Cover Sheet

Anonymous Survey

Is Empathy and Mood Connected to the Awareness of Emotional Expression in Music

My name is Keeva Tallon and I am a full time undergraduate student at Dublin Business School carrying out research in the Department of Psychology. The objective of this study is to investigate whether empathy and mood states are involved in the perception of emotions represented in music. This research is being conducted as part of my final year project and will be submitted for examination.

I am inviting you to participate in this research study by completing the attached questionnaires and listen to samples of classical music. Participation involves answering all of the questions as honestly as possible and returning the completed questionnaire. This will take approximately 15-20 minutes. There are no major risks to your participation in this research study. Some of the questions may cause mild emotional discomfort. You will be
required to listen to music samples which will be played through the speakers and rate them on an emotion scale afterwards.

Participation is strictly voluntary and you are not obliged to take part. You may refuse to participate at any time. Participation is anonymous and confidential. Therefore responses cannot be recognised to any one participant. Consequently, it will not be possible to withdraw from participation after the questionnaire has been collected.

The questionnaire will be stored securely and data collected from the questionnaires will be transferred from the paper record to an electronic format and stored on a password protected computer.

**IT IS IMPORTANT THAT YOU UNDERSTAND THAT BY COMPLETING AND RETURNING THE QUESTIONNAIRE THAT YOU ARE CONSENTING TO PARTICIPATE IN THE STUDY.**

In the unlikely event that the questions you answered in this survey should evoke any memories or negative feelings and you are feeling vulnerable, please consider contacting a support helpline.

**Samaritans Helpline:** Call 1850 60 90 90 (open 24 hours a day) or email jo@samaritans.org

**DBS student counselling service:** Call 01-4178748

Should you require any further information about the research, please contact

My supervisor (Dr. Rosie Reid) who can be contacted at
Thank you for taking the time to complete this survey.

APPENDIX C
Experiment Demographic Questionnaire

1. How old are you? ____________________________

2. What is your gender? Male [ ] Female [ ]

3. Have you ever learned to play a musical instrument? Yes [ ] No [ ]

4. Have you ever had singing lessons? Yes [ ] No [ ]

5. Do you play any musical instruments in your Free time? Yes [ ] No [ ]

6. How often do you listen to music? Extremely Often Very Often Moderately Often Slightly Often Not at all Often
APPENDIX D
PANAS Questionnaire

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate answer next to that word. Indicate to what extent you have felt this way during the past week.

Use the following scale to record your answers.

(1) = Very slightly or not at all
(2) = A little
(3) = Moderately
(4) = Quite a bit
(5) = Extremely

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<th>Very slightly or not at all</th>
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<th>Moderately</th>
<th>Quite a bit</th>
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<td>3</td>
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<td>3. Excited</td>
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<td>3</td>
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<td>4. Upset</td>
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<td>2</td>
<td>3</td>
<td>4</td>
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<td>5. Strong</td>
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<td>2</td>
<td>3</td>
<td>4</td>
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<td>6. Guilty</td>
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<td>2</td>
<td>3</td>
<td>4</td>
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<td>7. Scared</td>
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<td>3</td>
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<td>8. Hostile</td>
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<td>9. Enthusiastic</td>
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<td>10. Proud</td>
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<td>3</td>
<td>4</td>
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<td>14. Inspired</td>
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APPENDIX E
Cambridge Behaviour Scale

Below is a list of statements. Please read each statement very carefully and rate how strongly you agree or disagree with it by circling your answer. There are no right or wrong answers, or trick questions.

IN ORDER FOR THE SCALE TO BE VALID, YOU MUST ANSWER EVERY QUESTION.

1. I can easily tell if someone else wants to enter a conversation. strongly agree slightly agree slightly disagree strongly disagree

2. I find it difficult to explain to others things that I understand easily, when they don't understand it first time. strongly agree slightly agree slightly disagree strongly disagree

3. I really enjoy caring for other people. strongly agree slightly agree slightly disagree strongly disagree

4. I find it hard to know what to do in a social situation. strongly agree slightly agree slightly disagree strongly disagree

5. People often tell me that I went too far in driving my point home in a discussion. strongly agree slightly agree slightly disagree strongly disagree

6. It doesn't bother me too much if I am late meeting a friend. strongly agree slightly agree slightly disagree strongly disagree

7. Friendships and relationships are just too difficult, so I tend not to bother with them. strongly agree slightly agree slightly disagree strongly disagree

8. I often find it difficult to judge if something is rude or polite. strongly agree slightly agree slightly disagree strongly disagree
9. In a conversation, I tend to focus on my own thoughts strongly agree slightly agree slightly disagree strongly disagree
rather than on what my listener might be thinking.

10. When I was a child, I enjoyed cutting up worms to see slightly agree slightly disagree strongly disagree
what would happen.

11. I can pick up quickly if someone says one thing but strongly agree slightly disagree slightly disagree
means another.

12. It is hard for me to see why some things upset people strongly agree slightly disagree slightly disagree
so much.

13. I find it easy to put myself in somebody else's shoes. strongly agree slightly disagree slightly disagree

14. I am good at predicting how someone will feel. strongly agree slightly disagree slightly disagree

15. I am quick to spot when someone in a group is feeling strongly agree slightly disagree slightly disagree
awkward or uncomfortable.

16. If I say something that someone else is offended by, I strongly agree slightly disagree slightly disagree
think that that's their problem, not mine.

17. If anyone asked me if I liked their haircut, I would strongly agree slightly disagree slightly disagree
reply truthfully, even if I didn't like it.

18. I can't always see why someone should have felt strongly agree slightly disagree slightly disagree
offended by a remark.

19. Seeing people cry doesn't really upset me. strongly agree slightly disagree slightly disagree

20. I am very blunt, which some people take to strongly agree slightly disagree slightly disagree
be rudeness, even though this is unintentional.

21. I don’t tend to find social situations confusing. strongly agree slightly disagree slightly disagree

22. Other people tell me I am good at understanding how strongly agree slightly disagree slightly disagree
they are feeling and what they are thinking.

23. When I talk to people, I tend to talk about their experiences rather than my own. strongly agree slightly disagree slightly disagree
24. It upsets me to see an animal in pain.

25. I am able to make decisions without being influenced by people's feelings.

26. I can easily tell if someone else is interested or bored with what I am saying.

27. I get upset if I see people suffering on news programmes.

28. Friends usually talk to me about their problems as they say that I am very understanding.

29. I can sense if I am intruding, even if the other person doesn't tell me.

30. People sometimes tell me that I have gone too far with teasing.

31. Other people often say that I am insensitive, though I don't always see why.

32. If I see a stranger in a group, I think that it is up to them to make an effort to join in.

33. I usually stay emotionally detached when watching a film.

34. I can tune into how someone else feels rapidly and intuitively.

35. I can easily work out what another person might want to talk about.

36. I can tell if someone is masking their true emotion.

37. I don't consciously work out the rules of social situations.

38. I am good at predicting what someone will do.
39. I tend to get emotionally involved with a friend's strongly agree | slightly agree | slightly disagree | strongly disagree
                  problems.

40. I can usually appreciate the other person's viewpoint, strongly agree | slightly agree | slightly disagree | strongly disagree
                  even if I don't agree with it.

APPENDIX F
Geneva Emotional Music Scale (GEMS-9)

Please describe how the music you listen to makes you feel (e.g. this music makes me feel sad). Do not describe the music (e.g., this music is sad) or what the music may be expressive of (e.g. this music expresses sadness). Keep in mind that a piece of music can be sad or can sound sad without making you feel sad. Please rate the intensity with which you felt each of the following feelings on a scale ranging from 1 (not at all) to 5 (very much).

(1) = not at all     (2) = Somewhat     (3) = Moderately     (4) = Quite a lot     (5) = Very Much

Sample Music 1

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<td>1. Wonder</td>
<td>Filled with wonder, Dazzled, Moved</td>
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<td>3</td>
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<td>2. Transcendence</td>
<td>Fascinated, Overwhelmed, Feelings of transcendence and spirituality</td>
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<td>3. Power</td>
<td>Strong, Triumphant, Energetic</td>
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<td>2</td>
<td>3</td>
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<td>4. Tenderness</td>
<td>Tender, Affectionate, In love</td>
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<td>3</td>
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<td>5. Nostalgia</td>
<td>Nostalgic, Dreamy, Melancholic</td>
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<td>6. Peacefulness</td>
<td>Serene, Calm, Soothed</td>
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<td>3</td>
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<td>8. Sadness</td>
<td>Sad, Sorrowful</td>
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<td>3</td>
</tr>
<tr>
<td>9. Tension</td>
<td>Tense, Agitated, Nervous</td>
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