

**An investigation into the relationships between  
music, personality, mood and emotion.**

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## **ABSTRACT**

The aim of this study was to compare the effects of music and lyrics on personality, mood and emotion. This study also sought to investigate relationships between personality traits and preferences of music genres. Ninety six participants were assigned to three groups (music, lyrics, music & lyrics). After completing a set of questionnaires including the Big Five Inventory (BFI), and the Positive and Negative Affect Schedule (PANAS), the groups commenced a listening session. Participants were then readministered the BFI, the PANAS and completed the Geneva Emotional Music Scale. The results show that music produced significantly greater changes in the short-term self-reported experience of personality traits, and significant relationships were revealed between personality traits and preferences for music genres.

## INTRODUCTION

Language and music both convey meaning and evoke emotion. The brain has evolved systems that analyse sounds for meaning; speech in the left temporal lobe and music in the right (Kolb & Whishaw, 2011). In fact, when we listen to music, our brains are engaged in quite a complex computational task. In comparison to language, music activates a large number of systems including the cerebellum, which processes rhythm, the frontal lobes, a region which processes musical structure, and the mesolimbic system, which is involved in arousal and pleasure (Levitin, 2006). Language allows us to communicate, organise our thoughts and perceptions, and tell others what we think, know and imagine. All the benefits of language are seemingly obvious, but the benefits of music may seem less straightforward. Music helps us to regulate our emotions and also affect the emotions of others; from putting children to sleep, enhancing social interactions and romance, to bolstering group identification. However, just how much influence music has on our lives is a moot point. What effect does music have on our personality?

### *Personality*

Personality refers to psychological qualities that contribute to an individual's "enduring and distinctive patterns of feeling, thinking and behaving" (Pervin & Cervone, 2010, p. 8). There are different conceptions of personality structure, or units of analysis, provided by different personality theorists. A popular unit of analysis is that of a personality trait, which refers to a consistent style of emotion or behaviour that a person displays across a variety of situations. The multiplicity of personality traits have been usefully organised into five broad bipolar dimensions known as the Big Five. These are known as Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism – easily remembered as the first letters spell the word OCEAN. Openness to experience can be described with characteristics of curiosity, broad

interests, and creativity. Conscientiousness is related to organisation, self-discipline, and ambition. Extraversion describes sociability, optimism and talkativeness. Agreeableness is associated with trust, helpfulness, and being good-natured. And finally, Neuroticism is linked with a broad range of negative feelings including anxiety, irritability, and nervous tension. Other than understanding what individuals are like, personality theorists are also interested in individuals' personality development (Pervin & Cervone, 2010). Roberts, Walton, & Viechtbauer performed a meta-analysis of longitudinal studies on personality change. To test the effect of age on mean-level personality trait change, they created age categories across the life course. The age categories corresponded to adolescence (ages 10 to 17.9), the college years (ages 18 to 21.9), and the subsequent decades through age 101. Overall it would appear there is no specific age at which personality traits stop changing, and they can continue to change well into old age, particularly with regards to specific traits such as social vitality (Extraversion), Agreeableness, Conscientiousness, and Openness to experience. However, they found that the period of young adulthood (20-40), rather than adolescence, is the primary period of personality trait development. This was a somewhat surprising finding as personality development was thought to be a phenomenon of childhood and adolescence, and was also thought to stop developing at adulthood. However this could be explained by the fact that people in Western countries have extended their educational experiences and delayed their careers from their teens into their late 20's and even 30's, resulting in major life changes which effect personality trait changes (2006). People of all ages listen to music, however one would expect that music would have more influence on adolescents than young adults, particularly because the changes to traits in young adults are associated with major life changes – something music listening could not be categorised as.

### *Music and Lyrics*

Research in music is an area that has attracted a lot of interest. Famously, the “Mozart effect”, a term coined by the Los Angeles Times, referred to a study by Rauscher, Shaw, & Ky in 1993 in which students who listened to the first ten minutes of a Mozart sonata performed better on a spatial-temporal reasoning task immediately afterwards. However this effect lasted only 10 minutes. This particular piece of research though, received a disproportionate amount of attention from the popular press, which resulted in a vast range of CD's, websites, and articles being produced, with titles such as “Mozart Makes You Smarter” and “Mozart Makes the Brain Hum”. If anything this underlines the seductive power of the press (Rauscher, 2002). Schellenberg reviewed a number of studies in this area and did find that music listening and music lessons can lead to short-term and long-term cognitive benefits, respectively - with music lessons particularly beneficial in childhood (2005).

The influence of lyrics has been researched in a number of studies. Anderson and Carnagey (2003) conducted 5 experiments with 59 students, examining the effects of songs with violent lyrics. They found overall that songs with violent lyrics increased aggressive thoughts and hostile feelings. Peterson, Safer, and Jobes (2008) looked at individual differences with 126 participants in reactions to songs with lyrics about suicide. Openness was found to be negatively correlated, and Neuroticism positively correlated, with higher levels of suicide-related content in projective story-writing. On a more positive note, Greitemeyer (2009) revealed that listening to songs with prosocial lyrics appeared to increase prosocial thoughts, interpersonal empathy, and fostered helping behaviour in a study of 162 students over 3 experiments. Similarly, Jacob, Guéguen, and Boulbry, in an experiment containing 786 customers from a restaurant setting, showed that songs with prosocial lyrics were associated with a significant increase in tipping behaviour (2010).

*Emotional Responses to Music and Lyrics*

“Emotions are complex collections of organized chemical and neural responses to specific external or internal stimuli (real or imaginary), signalling events of potential relevance to the organism, and leading to the creation of circumstances advantageous to the organism” (Damasio, 2000, as cited in Coutinho and Cangelosi, 2011, p. 921). Coutinho and Cangelosi assert from findings of an experiment using 45 participants, that emotion (in relation to music) can be predicted from a set of six psychoacoustic features: loudness, pitch level, pitch contour, tempo, texture, and sharpness (2011). Furthermore, it would appear that timbre independently affects the perception of emotions in music, according to the results of 2 experiments with 23 participants conducted by Hailstone et al. (2009). Hunter, Schellenberg, and Griffith examined emotional responding to music after mood induction. 48 undergraduates in 2 experiments were used to rate how much they liked short music excerpts played to them. Those participants in a sad mood did not show preference to happy-sounding music, and they perceived more sadness in music that was ambiguous with respect to mood (2011). In comparing the emotional responses to music and lyrics, as part of research carried out by Huang (2007), 12 different music excerpts were played to 179 undergraduates. The pieces of music were classified as: classical & non-classical, instrumental & vocal, and stimulative & sedative. Although Huang did not report whether the participants found the categories more or less emotional (just different in terms of happy / sad, agitated / calm, humorous / serious, longing / depressed, and majestic / delicate), significant differences were reported in the emotional responses for instrumental and vocal music. However Ali and Peynircioglu, in a series of 4 experiments where participants rated the intensity of four types of emotions in instrumental music and music paired with lyrics, did find that when presented together, music appears to elicit more emotion than lyrics. They also reported that lyrics appeared to detract from the emotion in happy and calm music, but enhanced the emotion in sad and angry music (2006).



Looking specifically at associations between personality traits and emotional responses that occur as a consequence of music listening, Ladinig & Schellenberg (2011) played excerpts from commercially available audio recordings, to 61 undergraduates. The excerpts comprised a wide variety of genres (eg. Classical, pop, folk, electronic etc) in order to evoke a wide range of liking from the participants. Personality was measured using the Big Five Inventory and the participants labelled and rated their emotion to each excerpt. Ladinig and Schellenberg found that listeners who scored high on Agreeableness had more intense emotional responses to music in general. They also reported that listeners who liked music that made them feel sad scored high on Openness or low on Extraversion. This implies that liking particular music varies as a function of the emotions it evokes and individual differences in personality.

### *Music and Personality*

Most of the studies regarding personality and music have been using a top-down approach, in which “personality traits are often theorised to mobilise active mechanisms leading to different music listening preferences” (Miranda & Gaudreau, 2010, p. 247). For instance, Chamorro-Premuzic, Fagan and Furnham (2010) used a sample of 100 participants who were played 20 compositions which they rated, using a 5-point Likert scale, into categories of: happy, sad, complex, and social. They found that Openness predicted liking for complex music, and Extraversion predicted liking for happy music. Rentfrow and Gosling (2003) examined individual differences in music preferences in a series of 6 studies with over 3,500 participants. Developing the Short Test Of Music Preferences (STOMP), analyses of the music preferences revealed 4 music-preference dimensions: Reflective / Complex (blues, jazz, classical, and folk music), Intense / Rebellious (rock, alternative, and heavy metal music), Upbeat / Conventional (country, sound track, religious, and pop music),

and Energetic / Rhythmic (rap / hip-hop, soul / funk, and electronic / dance music). The Intense / Rebellious dimension was positively correlated with Openness, the Upbeat / Conventional dimension was positively correlated with Extraversion, Agreeableness, and Conscientiousness and had negative correlations with Openness, and the Energetic / Rhythmic dimension was positively related to Extraversion and Agreeableness. Using the same measures, Langmeyer, Guglhör-Rudan, and Tarnai (2012) found with a sample of 422 participants that Openness was positively correlated to the Reflective / Complex, and Intense / Rebellious dimensions. Openness was also reported to be negatively correlated to Upbeat / Conventional, while Extraversion was positively correlated to this dimension and the Energetic / Rhythmic dimension. Another study to use STOMP with 155 undergraduates and 32 children, reported that with students, Agreeableness was positively associated with the dimensions of Upbeat / Conventional and Energetic / Rhythmic and negatively associated with the Intense / Rebellious dimension. While with children, Conscientiousness was positively associated with the Reflective / Complex dimension, and Neuroticism was negatively associated with the Upbeat / Conventional and Intense / Rebellious dimensions (Livosky, Stevens, Hoff, and Surawski, 2012). A further 4 music-preference dimensions were revealed by Delsing, Ter Bogt, Engels and Meeus (2008) in a longitudinal study of 2,334 adolescents. They were: Rock (heavy metal / hard rock, punk / hardcore / grunge, gothic and rock), Elite (jazz, classical and gospel music), Urban (hip-hop / rap and soul / R&B) and Pop/Dance (trance / techno and top 40 / charts). Openness was positively correlated with Rock, which also had negative correlations with Conscientiousness. Elite was positively correlated with Agreeableness, Conscientiousness, and Openness. Finally, Urban and Pop / Dance were positively correlated with Extraversion and Agreeableness. Higdon & Stephens, in their survey of 166 students, recorded characteristics of the participants' preferred music as well as the music genres themselves. They reported that those who scored higher in Sensation Seeking and Openness preferred harder forms of

music such as: Hard Rock, Heavy Metal, Punk, Electronic / Dance, Rap, Alternative (2008). Overall, there does seem to be some agreement among the findings. They are mainly: 1) the Intense / Rebellious dimension (categorically similar to the dimension Rock (Delsing et al. 2008) and “harder forms of music” (Higdon & Stephens, 2008)) is positively associated with Openness. 2) The Upbeat / Conventional dimension is positively associated with Extraversion. 3) The Energetic / Rhythmic dimension is positively associated with Agreeableness. Having a clear picture as to which music genres certain personality types prefer would be beneficial in many potential applications. For example, by helping very high sensation seekers with dangerous and irresponsible behaviours by giving them a better outlet for their desires in more safe and prosocial ways.

While the previously mentioned studies' contribution cannot be understated, and the top-down approach for music and personality is not exhaustive, very few studies have addressed the question of bottom-up channelling between personality and music, or specifically looked at whether listening to music everyday could influence personality. Miranda & Gaudreau (2010) approached this by employing a longitudinal study that looked at whether coping by music listening predicted neuroticism in adolescents. They reasoned that music listening as a coping resource to maintain emotional stability is likely to influence personality development. Having examined three styles of coping by music listening (emotion oriented, problem oriented, and avoidance / disengagement oriented) in a sample of 336 adolescents over 6 months, Miranda & Gaudreau found that avoidant coping by music listening correlated with increased neuroticism. This implies that such behaviour could serve as a risk or precipitating factor for increasing neuroticism in adolescence. Neuroticism is related to a number of mental health problems (Lahey, 2009, as cited in Miranda & Gaudreau, 2010); this underlines the importance of the research given the ubiquity of music listening in adolescence. However, Miranda & Gaudreau insist coping by

music could also represent a potential short-term beneficial factor as well. For example, they suggest that problem-oriented coping by music listening may actually reduce neuroticism. Overall this study may illustrate some micro level influences of music on personality development, although one of the limitations of this study was that the correlational design did not allow the inferring of causality.

Another study to investigate the influence of music listening on personality, and which overcomes the limitation mentioned above by using an experimental design, was carried out by Djikic (2011), who compared the effects of both music and lyrics on participants' self reported personality traits under laboratory conditions. Previously, Djikic, Oatley, Zoeterman, and Peterson (2009) used an experiment to test whether literature, as an art form, could cause significant changes of the subjective experience of one's own personality traits. Using a sample of 166 undergraduates under laboratory conditions, participants were required to complete a set of questionnaires, including measures of personality, before and after they were assigned to either the experimental group who read a short story, or the control group who read a comparison text which had the same content as the short story but was in documentary form. It was found that the experimental group reported significantly greater change in self-reported experience of personality traits than the control group, with emotion change facilitating the effect of art on traits. Subsequently Djikic (2011) hypothesised that music, as a form of art, would have the same effect on the subjective experience of one's own personality traits. Additionally, Djikic wanted to compare the effects of music with the effects of lyrics on changes in personality, as modern music is often coupled with lyrics. It was hypothesised that music would have a unique additive effect on the short-term changes in personality over and above that of lyrics. This resulted in the construction of 3 groups: one including music, one including lyrics, and one including both music and lyrics. 87 undergraduates were assigned to one of the 3 groups. Participants

filled out a set of questionnaires before and after the listening sessions which measured personality using the Big Five Inventory as one of 13 questionnaires. It was hoped the sheer quantity of questionnaires would mask the purpose of the experiment and prevent demand characteristics. After gathering the data, a personality change index was created to test for differences on scores before and after the listening session. A manipulation check was also used to test which condition the participants found most artistic. Significant increases of variability in personality traits were found with music, while lyrics showed a decrease in variability of personality traits. The music condition was also rated more artistic than the lyrics conditions, concluding that music, as a form of art, had a short term effect on personality.

One of the limitations of Djikic's (2011) paper was that the sample consisted of undergraduates with a mean age of just over 18, an age where personality is still in flux. It was suggested that an older group should be looked at in future research. Another point raised by Djikic, was the possibility that the effect of music on personality traits was an artefact of mood induction. Music is often used to induce mood in psychology experiments (Kenealy, 1988 as cited in Djikic 2011). For example Vuoskoski and Eerola (2012) found that sad music could induce sadness-related effects on memory and judgment, and Krahe and Bieneck reported that more positive music-induced mood was related to less anger and aggressive behaviour following provocation (2012). In comparing the effect of music and lyrics on mood, Stratton & Zalanowski played music, lyrics, and music paired with lyrics to 42 participants and discovered that while the music alone increased positive affect, the lyrics plus music had the opposite effect. Overall, they concluded that lyrics appear to have greater influence on mood change than music alone (1994). However, Sousou (1997) tested the effects of music and lyrics on mood (as well as memory) with 137 participants, and their analysis suggests that music influences mood not lyrics.

Therefore the purpose of this study is to expand on the research of Djikic (2011) by comparing the effects of music and lyrics on personality overall, but also to investigate whether participants of older and varying ages show the same effects as Djikic had proposed. Another limitation to address from the study by Djikic (2011) is whether the effect of music on personality traits was an artefact of mood induction, and also to investigate whether music or lyrics significantly influence either positive or negative affect. In order to do this, measures of mood will be included to test whether positive or negative mood are significantly different across conditions.

Emotion will be measured to test whether emotional intensity is indeed greater for music over lyrics, replicating the findings of Ali & Peynircioglu (2006). This will also allow to test whether personality traits, specifically Agreeableness, elicit more emotion, possibly extending the findings of Ladinig and Schellenberg (2011).

Finally, along with demographics, frequency of listening to music and preferred music genres will be recorded. The latter will show whether the findings of previously mentioned studies' can be replicated in terms of personality types preferring certain types of music. While Djikic had 13 questionnaires in order to prevent demand characteristics, most of the questionnaires were merely fillers. It is also another reason to include the measures of mood, emotion and music genres, so as to record some meaningful data instead of simply distracting the participants. It is hoped this extra data will lead to some significant findings which will further contribute to the literature on the relationships among music, personality, mood and emotion.

Other than the limitations inherent in Djikic's (2011) study, the method, controls, and even the choice of music that was used are sufficiently appropriate for this experimental design, and therefore will be followed as closely as possible in this current study (with the addition of the extra measures mentioned above).

The main hypotheses of this study are:

1. Participants exposed to the music condition will show significantly more personality change compared to the lyrics conditions.
2.
  - (i) There will be significantly greater levels of perceived emotional intensity following exposure to the music condition compared to the lyrics conditions.
  - (ii) There will be significantly greater levels of perceived emotional intensity overall with those who score high on Agreeableness.
3.
  - (i) Openness will be significantly positively associated with preferences of music genres from the Intense / Rebellious category.
  - (ii) Extraversion will be significantly positively associated with preferences of music genres from the Upbeat / Conventional category.
  - (iii) Agreeableness will be significantly positively associated with preferences of music genres from the Energetic / Rhythmic category.

Additional variables will be looked at, such as: age, gender, frequency of music listening, positive and negative mood, how artistic the participants rated the conditions, and how much the participants enjoyed the conditions. Age will be recorded to explore whether the effect of music on personality, if any, is limited to younger cohorts. Mood will be recorded to test whether any effect from music on personality is an artefact of mood induction, and also to see whether music or lyrics significantly influence positive or negative affect. Given the contradictory findings from Stratton, & Zalanowski (1994) and Sousou (1997), there is no prediction about whether listening to music or lyrics will result in greater positive or negative affect. Finally, recording how artistic the participants rated the conditions and how much they enjoyed the conditions will show whether any effect of music on personality is related to enjoyment or the artistic merit of the music.

The main purpose of this current study is to investigate the effects of music on personality, mood and emotion. A convenience sample of approximately 30 participants per group (3 groups consisting of music-only, lyrics-only, and music-and-lyrics) will be administered questionnaires before and after a listening session.



## **METHODOLOGY:**

### *Materials*

#### *Conditions*

Participants were assigned to three groups (music, lyrics, music & lyrics). Each experimental condition included a video that had lyrics presented across the screen to follow the lyrics/spoken content. This was done so as to control for differences in sensory stimulation across conditions. The music used in this study was *Ständchen* by Franz Schubert (1779-1828). This is a classical song with German lyrics that were written by Franz Grillparzer (1791-1872). The particular rendition that was used was performed by Sarah Walker and Graham Johnson, which lasts 6 minutes and 2 seconds. The music-only condition had the German words presented on the video as the music played. The music and lyrics condition had the translated English words presented on the video as the music played. And finally the lyrics-only condition had the English words presented on the video as the English translation of the lyrics were recited / played instead of the classical piece itself. The videos were constructed by synchronising the audio with the relevant texts for each condition.

#### *Questionnaire Measures*

Paper-and-pencil questionnaires were used in this study, including the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991), the Positive & Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), the Geneva Emotional Music Scale (GEMS-9; Zentner, Grandjean, & Scherer, 2008), and a questionnaire devised by the researcher which recorded demographic data (age, gender), musical preferences, frequency of music listening and a

manipulation check on how “artistic” the participants found the conditions and how much they enjoyed the conditions.

*The Big Five Inventory (BFI).*

The Big Five Inventory (BFI; John et al. 1991) is a 44-item scale questionnaire measuring the Big Five personality dimensions – Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. It uses short descriptive phrases to measure these dimensions. Responses are scored using a 5-point Likert scale, (ranging from 1-Disagree Strongly, to 5-Agree Strongly). Research has shown it has moderate to high reliability, structural validity, self-peer agreement and strong convergence with longer Big Five measures (Benet-Martínez & John, 1998; John, Naumann, & Soto, 2008; Soto, John, Gosling, & Potter, 2008, Soto & John, 2009). For example, Benet-Martínez & John (1998) reported that the internal consistencies for the English-language scales were substantial (mean  $\alpha = .83$ ), and Soto & John, 2009 found correlations with the NEO PI-R facet scales correlations averaged .93 (range = .87–1.00).

*The Positive & Negative Affect Schedule (PANAS).*

The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) is a 20-item questionnaire comprising two mood scales, one measuring positive affect and the other measuring negative affect. It uses single word descriptions relating to mood. Responses are scored using a 5-point Likert scale, (ranging from 1-Very Slightly or not at all, to 5-Extremely) to measure the extent to which the respondent has felt at the indicated time. Research, including from the authors themselves, has reported PANAS to be a reliable, valid and efficient means for measuring the two dimensions of mood (Watson et al., 1988; Crawford & Henry, 2004; Ostir, Smith, Smith, & Ottenbacher, 2005). For example Crawford

& Henry (2004) found that the reliabilities of the PANAS scales, as measured by Cronbach's alpha, were .89 for positive affect and .85 for negative affect, while Ostir et al., (2005) reported the test retest intraclass correlation (ICC) values for the positive and negative affect scales were 0.79 and 0.93, respectively.

*The Geneva Emotional Music Scale (GEMS-9).*

The Geneva Emotional Music Scale (GEMS-9; Zentner et al., 2008) is a 9-item scale questionnaire which uses single word descriptions related to emotions. Responses are scored using a 5-point Likert scale, (ranging from 1-Not at all, to 5-Very much). The authors found support for its reliability and validity.

*Researcher-devised questionnaire.*

The questionnaire devised by the researcher, recorded demographic data (age, gender), musical preferences, frequency of music listening and a manipulation check on how "artistic" the participants found the conditions and how much they enjoyed the conditions. The musical preferences were loosely based on the Short Test Of Music Preferences (STOMP; Rentfrow & Gosling 2003). Genres such as "Bluegrass" and "Soundtracks" were removed, due to their obscurity and broadness, respectively, and Opera was included as a separate genre to Classical for its particular relevance to this study. The music genres and their categories were as follows: Reflective / Complex (Jazz, Classical, Opera), Intense / Rebellious (Hard-rock, Heavy-metal, Punk, Alternative), Upbeat / Conventional (Pop, Easy-listening, Oldies, Gospel, Country), and Energetic / Rhythmic (Electronic / dance, Rap). Participants rated how much they liked each genre on a 5-point Likert scale (ranging from 1-Strongly like, to 5-Strongly dislike). Frequency of music listening was also recorded using a 5-point Likert scale (ranging from 1-A few times a day, to 5-Rarely),

as where the manipulation checks (1-Very slightly or not at all, to 5-Extremely). The manipulation checks were carried out to test whether any differences in personality changes were due to music or lyrics being more artistic, and whether liking the conditions themselves had any influence on the results.

### *Apparatus*

The music/lyrics videos were loaded from a computer, with sound played from speakers and images displayed using an overhead projector in a classroom in Dublin Business School. The same classroom and volume settings were used to control for extraneous variables.

### *Participants*

A convenience sample of 96 Psychology undergraduates (42 male, and 52 female, with 2 participants not specifying gender) from Years 1, 2 and 3 in Dublin Business School were used. The participants were not randomly assigned to groups, rather the groups relating to the year of study were used. However, the groups were randomly assigned to conditions. Year 1 was assigned to the music-only condition (German speaking participants were excluded from this condition because the music contained German lyrics), Year 2 was assigned to the lyrics-only condition, and Year 3 to the music-and-lyrics condition. The music-only condition contained 33 participants, the lyrics-only condition contained 30 participants, and the music-and-lyrics condition contained 31 participants. Participation was voluntary, with no monetary or other rewards on offer.

### *Design*

This research used a quasi-experiment to test for a) the effects of music and lyrics on

personality, mood and emotion, and a correlational design to test for b) relationships between personality types and music preferences. The quasi-experiment used a between-participants design, of which the independent variable was music / lyrics and the dependent variables were personality change, positive affect change, negative affect change and emotional intensity. The control group was the music-and-lyrics condition. Participants were not randomly assigned to groups, however the groups were randomly assigned to conditions. In the correlational design, the predictor variable was the personality trait, and the criterion variable was music preferences.

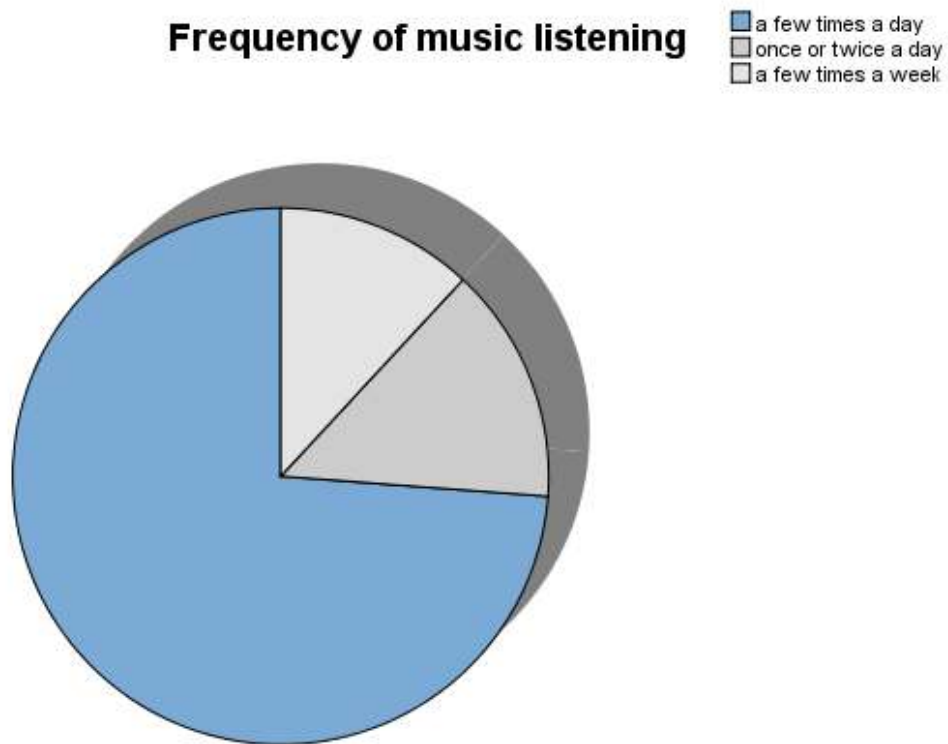
### *Procedure*

Informed consent was obtained verbally from the participants prior to taking part in this research. The participants in each group had just completed lectures from their respective courses and were already seated as the experiment began. A set of questionnaires was then handed out to the participants, with the first page explaining the general purpose of the research and giving assurances of anonymity. Initially, they filled out one half of the set, which recorded some of the researcher-devised questionnaire (age, gender, frequency of music listening, and preferred music genre), as well as mood, using The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988), and personality, using The Big Five Inventory (BFI; John et al. 1991). When all the participants were finished with part 1 of the set of questionnaires, one of the videos from the conditions (music-only, lyrics-only, music-and-lyrics) was played to them. At the end of the video, participants then completed the second half of the set of questionnaires. Part 2 contained the rest of the researcher-devised questionnaire (manipulation checks on how “artistic” the participants found the condition and how much they enjoyed the condition), as well as emotion, using the Geneva Emotional Music Scale (GEMS-9; Zentner et al., 2008), and mood, using the Positive and

Negative Affect Schedule (PANAS; Watson et al., 1988) again. Personality was also recorded again, using The Big Five Inventory (BFI; John et al. 1991). However, in order to prevent practice effects, the order of the items were altered. Taking into account primacy and recency effects, the items were shifted around so that the first and last few items were now centred around the middle of the questionnaire. Upon completion, the participants were thanked and debriefed.

## RESULTS

Analysis of frequency of music listening revealed that 64.6% of the participants listen to music a few times a day, 12.5% listen to music once or twice a day, 10.4% listen to music a few times a week, with none reporting that they listen to music a few times a month or rarely (See figure 1).



*Figure 1.* Frequency of music listening

### *Hypothesis 1*

It was predicted that participants exposed to the music condition would show significantly more personality change compared to the lyrics conditions.

Initially, a one way ANOVA was employed to test for differences in how the participants rated the conditions artistically and how much they enjoyed the conditions. This confirmed that differences existed,  $F(2, 78) = 8.07, p = 0.00$  and  $F(2, 79) = 7.01, p = 0.00$ , respectively. Fisher's LSD post hoc analysis revealed that participants found the music-only condition and music-and-lyrics condition more artistic than the lyrics-only condition ( $p = 0.00$ ) & ( $p = 0.00$ ), and that the music-and-lyrics condition was the most enjoyable ( $p = 0.00$ ) & ( $p = 0.00$ ).

A personality change index was created to measure the sum of changes in personality traits on an individual level in either an upward or downward direction. This was done because previous research (Djikic, 2011) suggests that the impact of music on personality is idiosyncratic, rather than directional, and that aggregating traits across individuals could drown out changes on an individual level. The index was calculated by regressing scores from the five traits at time 2 on scores for the five traits at time 1, followed by summing the absolute values of the standardised residuals. Absolute values were used because there was no prediction about which way the traits would change. The index represents an overall change in traits for each individual.

96 participants took part in this study, of which 2 failed to complete the Big Five Inventory.

The number of participants who took part in the 3 conditions is as follows: music-only condition ( $n=33$ ), lyrics-only condition ( $n=30$ ), music-and-lyrics condition ( $n=31$ ).

The mean age of all the participants was 23.34 ( $SD = 6.76$ ). For the music-only



condition the mean age was 21.61 (SD = 6.15). For the lyrics-only condition the mean age was 23.10 (SD = 6.38). And for the music-and-lyrics condition the mean age was 25.42 (SD = 7.38)

The overall mean and standard deviation for the personality change index were 3.58 and 1.65 respectively. To test the main hypothesis, that music would have a significant effect on personality change, a one-way ANOVA was completed, which confirmed that there was a significant difference between the conditions for personality change index,  $F(2, 91) = 4.12$ ,  $p = 0.02$ . The means and standard deviations for personality change index for the 3 conditions were:  $M = 4.22$  (SD = 2.16) for the music-only condition,  $M = 3.21$  (SD = 1.10) for the lyrics-only condition, and  $M = 3.26$  (SD = 1.25) for the music-and-lyrics condition. Fisher's LSD post hoc analysis revealed that the music-only condition had a significantly larger personality change index than the lyrics condition and music-and-lyrics condition, ( $p = 0.01$ ) and ( $p = 0.02$ ) respectively. See Figure 2.

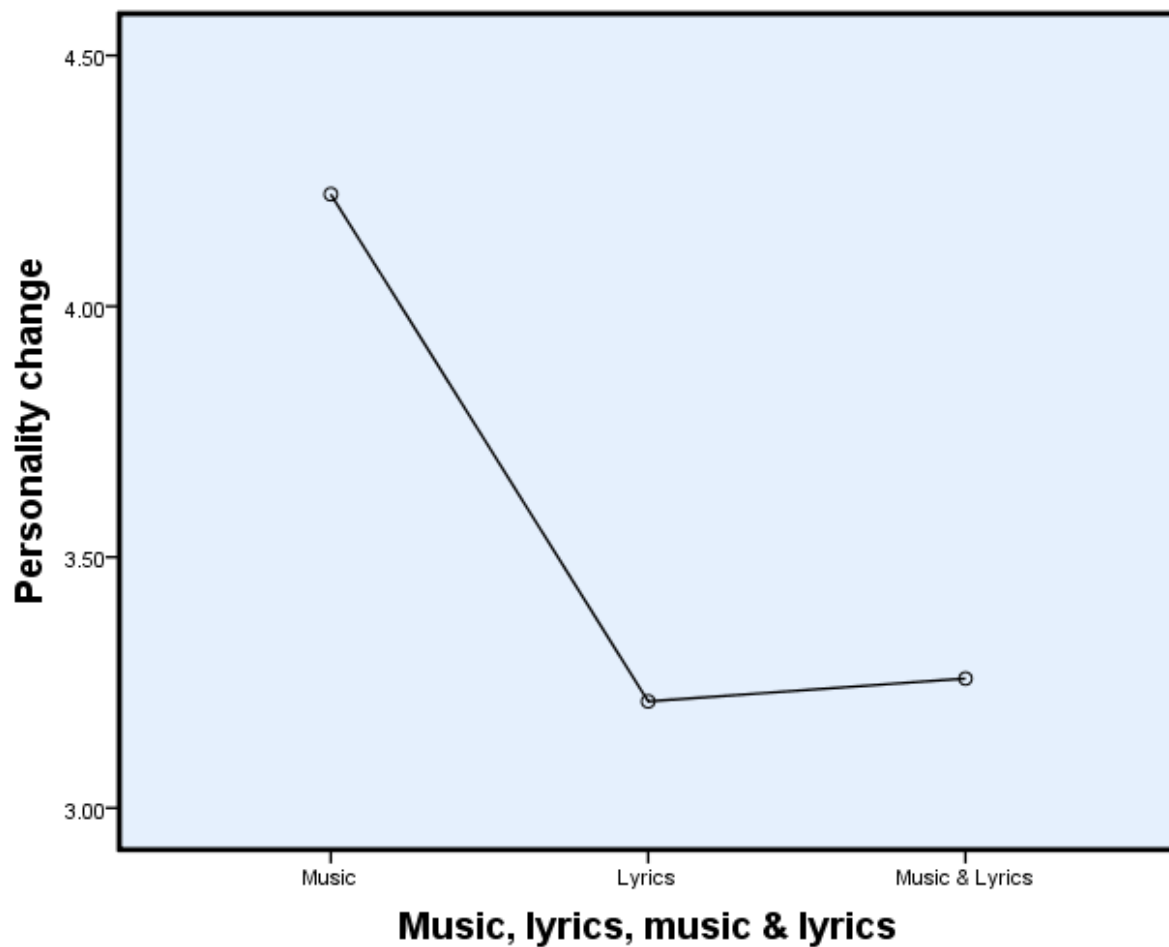


Figure 2. Means plot for personality change with music, lyrics, and music & lyrics conditions.

In order to further analyse whether music was having an increasing effect on personality change, a new variable was created: lyrics conditions. This was done by merging the sample of participants from the music-and-lyrics condition with the lyrics-only condition. An independent t-test was completed to compare the music-only condition with the lyrics conditions. The results (see table 1) reported that music and lyrics conditions significantly differed with regards to personality change.

Table 1: Overall personality change differences for Music-only and Lyrics conditions.

	Mean	Std. Deviation	t	p
Music	4.22	2.16		
Lyrics conditions	3.26	1.17	2.44	.02

Music ( $M = 4.22$ ,  $SD = 2.16$ ) produced significantly more personality change ( $t(42) = 2.44$ ,  $p = .02$ ) than the lyrics conditions ( $M = 3.24$ ,  $SD = 1.17$ ).

As predicted, participants exposed to the music condition showed significantly more personality change compared to the lyrics conditions.

#### *Additional analysis*

(i) Positive and negative mood were recorded before and after the listening session to address the possibility that the effect of music on personality was an artifact of mood induction, and also to explore whether music or lyrics significantly influenced positive or negative affect.

First of all, scores for positive affect and negative affect at time 1 were subtracted from scores for positive affect and negative affect at time 2, which resulted in new variables: positive affect change and negative affect change. The means and standard deviations for positive affect change and negative affect change were  $M = 4.88$  ( $SD = 8.61$ ), and  $M = 1.83$  ( $SD = 4.11$ ) respectively.

A one-way ANOVA was then completed, which found that there was no significant difference between the conditions for positive affect change,  $F(2, 92) = 2.36$ ,  $p = 0.10$ , and that there was no difference between the conditions for negative affect change,  $F(2, 92) = 1.20$ ,  $p =$

0.31).

In order to further analyse whether personality change was influenced by positive or negative affect, a pearsons correlation coefficient was employed to test for relationships among these variables. The results (see table 2) show that there were no significant associations between personality change and positive affect and between personality change and negative affect.

This confirmed that the effect of music on personality was not an artifact of mood induction, and that neither the music conditions nor the lyrics conditions significantly influenced either positive or negative affect.

*Table 2.* Correlations among positive affect change, negative affect change, and personality change.

		PAchange	NAchange	Personality change
PAchange	Pearson Correlation	1	0	-0.19
	Sig. (2-tailed)		0.99	0.07
NAchange	Pearson Correlation	0		0.14
	Sig. (2-tailed)	0.99		0.19
Personality change	Pearson Correlation	-0.19	0.14	1
	Sig. (2-tailed)	0.07	0.19	

(ii) In order to investigate whether the same effects of music on personality would be

evident with older participants, the sample was divided at the median age, which was 21.

43 participants older than 21 took part in this study. The number of participants from this age group who took part in the 3 conditions are as follows: music-only condition (n=10), lyrics-only condition (n=10), music-and-lyrics condition (n=23). The mean age of the participants was 27.72 (SD = 8.06). For the music-only condition the mean age was 27.40 (SD = 8.82). For the lyrics-only condition the mean age was 29.92 (SD = 8.56). And for the music-and-lyrics condition the mean age was 27.22 (SD = 7.80)

The mean and standard deviation for the personality change index in this age group were 3.46 and 1.38 respectively. The means and standard deviations for personality change index for the 3 conditions were: M = 3.76 (SD = 1.72) for the music-only condition, M = 3.22 (SD = 1.18) for the lyrics-only condition, and M = 3.42 (SD = 1.32) for the music-and-lyrics condition.

To test whether music would have a significant effect on personality change, a one-way ANOVA was completed, which confirmed that there were no significant differences between the conditions for personality change index with this age group,  $F(2, 39) = 0.37, p = 0.69$ .

### *Hypothesis 2*

(i) It was predicted that there would be significantly greater levels of perceived emotional intensity following exposure to the music condition compared to the lyrics conditions.

A new variable was created to measure emotional intensity. This was done by averaging the scores for the 9 emotions recorded (using the Geneva Emotional Music Scale).

The mean and standard deviation for emotional intensity were 2.21 and 0.74 respectively. The means and standard deviations for emotional intensity for the 3 conditions were: M = 2.08 (SD = 0.71) for the music-only condition, M = 2.14 (SD = 0.81) for the lyrics-

only condition, and  $M = 2.43$  ( $SD = 0.66$ ) for the music-and-lyrics condition.

To test whether emotional intensity would be significantly greater for the music condition, a one-way ANOVA was completed, which confirmed that there were no significant differences between the conditions for emotional intensity,  $F(2, 93) = 2.12$ ,  $p = 0.13$ .

In this case the null hypothesis was accepted as no significant difference was found. Emotional intensity was not significantly greater for music over lyrics.

(ii) It was predicted that there would be significantly greater levels of perceived emotional intensity overall with those who scored high on Agreeableness.

The means and standard deviations for personality traits recorded at baseline with the Big Five Inventory were:  $M = 3.30$  ( $SD = 0.74$ ) for Extraversion,  $M = 3.68$  ( $SD = 0.63$ ) for Agreeableness,  $M = 3.40$  ( $SD = 0.73$ ) for Conscientiousness,  $M = 2.98$  ( $SD = 0.90$ ) for Neuroticism, and  $M = 3.64$  ( $SD = 0.61$ ) for Openness.

A pearsons correlation coefficient was employed to test for relationships between personality traits recorded at baseline and emotional intensity. The results found no significant associations between personality traits and emotional intensity.

In this case, the null hypothesis was accepted as no significant relationships were found between Emotional intensity and Agreeableness.

### *Hypothesis 3*

(i) It was predicted that Openness would be significantly positively associated with preferences of music genres from the Intense / Rebellious category (Hard-rock, Heavy-metal, Punk, and Alternative).

(ii) It was predicted that Extraversion would be significantly positively associated with preferences of music genres from the Upbeat / Conventional category.

(iii) It was predicted that Agreeableness would be significantly positively associated with preferences of music genres from the Energetic / Rhythmic category.

Personality traits recorded at baseline with the Big Five Inventory were tested for relationships with preferred music genres using a Pearson's correlation coefficient.

The mean score for Agreeableness was 3.68 (SD = 0.63). A Pearson correlation coefficient found that there was a weak negative significant relationship between Agreeableness and Easy-listening ( $r = -0.23$ ,  $p = 0.02$ , 2-tailed), and a weak negative significant relationship between Agreeableness and Gospel ( $r = -0.27$ ,  $p = 0.00$ , 2-tailed).

The mean score for Conscientiousness was 3.40 (SD = 0.73). A Pearson correlation coefficient found that there was a weak positive significant relationship between Conscientiousness and Heavy-Metal ( $r = 0.26$ ,  $p = 0.01$ , 2-tailed), a weak negative significant relationship between Conscientiousness and Easy-listening ( $r = -0.24$ ,  $p = 0.02$ , 2-tailed), and a weak negative significant relationship between Conscientiousness and Country ( $r = -0.21$ ,  $p = 0.05$ , 2-tailed).

The mean score for Neuroticism was 2.98 (SD = 0.90). A Pearson correlation coefficient found that there was a moderate positive relationship between Neuroticism and Easy-listening ( $r = 0.32$ ,  $p = 0.00$ , 2-tailed), and a weak negative significant relationship between Neuroticism and Electronic / dance ( $r = -0.23$ ,  $p = 0.03$ , 2-tailed).

The mean score for Openness was 3.64 (SD = 0.61). A Pearson correlation coefficient found that there was a weak negative relationship between Openness and Hard-rock ( $r = -0.26$ ,  $p = 0.01$ , 2-tailed), a moderate negative relationship between Openness and Heavy-Metal ( $r = -0.39$ ,  $p = 0.00$ , 2-tailed), a weak negative significant relationship between Openness and Oldies ( $r = -0.21$ ,  $p = 0.05$ , 2-tailed), a moderate negative significant relationship between Openness and Jazz ( $r = -0.39$ ,  $p = 0.00$ , 2-tailed), a moderate negative significant relationship between Openness and Classical ( $r = -0.50$ ,  $p = 0.00$ , 2-tailed), a

moderate negative significant relationship between Openness and Opera ( $r = -0.45$ ,  $p = 0.00$ , 2-tailed).

In all three predictions, the null hypotheses is accepted because: no significant relationships were found to exist between Extraversion and preferences of any music genres, no significant relationships were found to exist between Agreeableness and preferences of music genres from the Energetic / Rhythmic category (Electronic / dance, Rap), and while significant relationships were found to exist between Openness and preferences of music genres from the Intense / Rebellious category (Hard-rock, Heavy-metal, Punk, Alternative), it was predicted that these relationships would be significantly positive, whereas Openness was found to be significantly negatively associated with Hard-rock and Heavy-metal.



## DISCUSSION

The aim of this study was to expand on the research of Djikic (2011) by comparing the effects of music and lyrics on personality overall, but also to investigate whether participants of older and varying ages showed the same effects, as Djikic had proposed. Another aim was to reveal whether the effect of music on personality traits was an artefact of mood induction, and to investigate whether music or lyrics significantly influenced either positive or negative affect.

Additionally, this study attempted to replicate the findings from previous research (Ali & Peynircioglu, 2006) by showing that music elicited significantly more intense emotional responses than lyrics. This would fit well with the finding that emotions mediate the effect of art forms on personality traits (Djikic et al., 2009).

Finally, this research sought to add to the literature on the relationships of personality traits and music genres (Rentfrow & Gosling, 2003; Delsing et al., 2008; Langmeyer et al., 2012, Livosky et al., 2012) by identifying associations between these variables.

In the case of hypothesis 1, that participants exposed to the music condition would show significantly more personality change compared to the lyrics conditions, it was revealed that the music-only condition had a significantly larger personality change index than the lyrics condition and music-and-lyrics condition. Overall, the results showed that the music condition produced significantly more personality change than the lyrics conditions (lyrics-only and music-and-lyrics conditions). Furthermore, analysis confirmed that the participants rated the music-only condition and music-and-lyrics condition more artistic than the lyrics condition. This is consistent with the findings of Djikic et al. (2009), and Djikic (2011) that music, as a form of art, can produce increased variability in the subjective experience of one's own personality. The significantly greater changes recorded in personality under the music-only

condition compared to the lyrics conditions, was despite the fact that the music-and-lyrics condition was found to be the most enjoyable out of the 3 conditions by the participants.

From a dynamical systems perspective, if music appears to be able to introduce variability into the personality system, then this can lead to the possibility of long-term developmental change. Dynamical systems theory involves patterns of change across systems as diverse as cells, neurons and even political systems (Thelen, 1995 as cited in Hayes, Laurenceau, Feldman, Strauss, & Cardaciotto, 2007). Dynamical systems are sets of elements that interact and evolve over time. This includes dynamical systems in personality (Vallacher, Read, & Nowak, 2002, as cited in Hayes et al., 2007). While motor development, for example, has been quite thoroughly examined from a dynamical systems perspective, papers on personality development are beginning to incorporate dynamical systems principles as well (Lewis, 2000). Change can not only occur in a gradual and linear way but also in discontinuous and nonlinear ways. This type of discontinuity in stable systems that precedes change is called 'critical fluctuations' (Bak & Chen 1991; Kelso 1997; Schiepek, Eckert & Weihrauch 1992; van der Maas & Molenaar 1992 as cited in Hayes et al., 2007), and is marked by an increase in variability and followed by system reorganisation.

The effect of music on personality was shown not to be an artefact of mood induction, as there were no differences found to exist among the conditions for positive affect change or negative affect change. Furthermore, no relationships were revealed between personality change and positive affect change or between personality change and negative affect change. Neither music nor lyrics appeared to influence mood one way or the other. Similarly, previous research looking into the influences of music and lyrics on mood show contradictory findings (Stratton, & Zalanowski, 1994; Sousou, 1997).

When the sample of participants was divided at the median age (21), and the older group was tested for the effects of music and lyrics on personality, no significant differences

were revealed. The cut-off age of 21 corresponds to the categories devised by Roberts et al. (2006) who tested the effect of age on mean-level personality trait change. Those categories were: adolescence (ages 10 to 17.9), the college years (ages 18 to 21.9), and the subsequent decades up to 101. They reported that young adulthood is the primary period of personality trait development, but suggested these changes were due to major life changes evident in Western society due to delayed education and career progression. Taking the findings of this current study into account, it would seem then that music listening, not being a life-changing event, is most influential on personality through adolescence and the early 20's.

Hypothesis 2 (i), predicted that there would be significantly greater levels of perceived emotional intensity following exposure to the music condition compared to the lyrics conditions. Analysis of the variables confirmed that there was not a significant difference among the conditions for emotional intensity. This is not consistent with the findings from Ali & Peynircioglu (2006), who reported that music elicited significantly more emotional intensity than lyrics. Also hypothesis 2 (ii) predicted that there would be significantly greater levels of perceived emotional intensity with those who score high on Agreeableness. No significant relationships were found between Emotional intensity and Agreeableness, in fact there were no significant associations between any of the personality traits and emotional intensity. Again, this is not consistent with the findings from Ladinig & Schellenberg (2011).

While these results may suggest that the lyrics and music used in this research elicited the same emotional intensity, it is more likely to be due to a problem of using self-report measures of emotion. Scherer & Zentner suggest that while self-report measures are the only method that allows access to the subjective emotional experience, they also point out that data collected this way is sensitive to biases. Demand characteristics is one problem, but listeners may also confuse the emotions expressed in the music with what they

actually feel unless they are specifically told to differentiate between the two emotion modalities (2001).

In the case of Hypothesis 3 (i) that Openness would be significantly positively associated with preferences of music genres from the Intense / Rebellious category (Hard-rock, Heavy-metal, Punk, Alternative), analysis revealed that Openness was significantly negatively associated with preferences of Hard-rock and Heavy-metal. This result is not consistent with the findings of previous research (Rentfrow and Gosling, 2003; Delsing et al., 2008; Higdon & Stephens, 2008; Langmeyer, et al., 2012). Hypothesis 3 (ii) predicted that Extraversion would be significantly positively associated with preferences of music genres from the Upbeat / Conventional category (Pop, Easy-listening, Oldies, Gospel, Country). Analysis revealed no correlations between Extraversion and preferred music genres. This is not consistent with previous research (Rentfrow and Gosling, 2003; Delsing et al., 2008; Langmeyer, et al., 2012). And finally, hypothesis (iii) predicted that Agreeableness would be significantly positively associated with preferences of music genres from the Energetic / Rhythmic category (Electronic / dance, Rap). No significant relationships were found to exist between Agreeableness and preferences of music genres from this category. Again, this is not consistent with previous research (Rentfrow and Gosling, 2003; Delsing et al., 2008; Livosky et al., 2012). The findings regarding personality types and preferred music genres from this current study can be summarised as the following: Agreeableness was found to be significantly negatively correlated with preferences for Easy-listening and Gospel music. Openness was found to be significantly negatively correlated with preferences for Hard-rock, Heavy-metal, Jazz, Classical, Opera, and Oldies. Conscientiousness was found to be significantly negatively correlated with preferences for Easy-listening and Country music and significantly positively correlated with preferences for Heavy-metal. And Neuroticism was found to be significantly negatively correlated with preferences for Electronic / dance

and significantly positively correlated with Easy-listening.

The predictions for the associations between personality types and preferred music genres were based on broad agreement among previous studies, but not all of the previous findings were universal. Perhaps this demonstrates that liking particular music is also culture specific, or even lifestyle specific. The findings reported in this current study should add to the literature about relationships between personality types and preferred music genres, at the very least, in the Irish context. North & Hargreaves suggest that musical preferences correlate with a variety of different lifestyle choices. In their study of 2,532 participants, they found numerous associations between musical preferences, and aspects of the participants' lifestyle, namely their leisure interests and music usage (2007). This rings true with the research of Livosky et al. (2012), who reported different associations between personality traits and preferred music genres with undergraduates and children. Similarly, Levitin suggests that children prefer music from their own culture but during adolescence, choices about music genres stay with people forever. Adolescence is an emotional time and people tend to remember things that have an emotional component because the amygdala and neurotransmitters tag those memories as something important. Also, the human brain undergoes massive changes up until adolescence, and afterwards becomes more stable and begins to prune rather than grow neural connections. Consequently, it is during this period that people are most receptive to new kinds of music, analogous to learning a new language (2006).

There were a number of limitations with this current study. For example, there was no random assignment of participants to groups. This becomes more critical when the results seem to suggest that age is a factor in whether music has an effect on personality change, as the group in the music-only condition were the youngest group overall. This group was taken from 1<sup>st</sup> year undergraduates and had a mean age of 21.61. The

participants in the lyrics-only condition were taken from 2<sup>nd</sup> year undergraduates with 23.10 as the mean age, while participants in the music-and-lyrics condition had a mean age of 25.42 (3<sup>rd</sup> year undergraduates). A true experiment with random assignment would be an improvement, and a consideration for future research.

While each condition was matched in terms of stimulus (audio and visual), the lyrics-only condition was a lot shorter in duration. This is because the lyrics for the piece of music chosen are often repeated and pause at the end of a phrase, while when spoken / recited there is no need for repetition or unnaturally long pausing. Perhaps the difference in duration was related to the difference in the participants' subjective experience of their own personality. This could be improved upon by choosing a different piece of music which would match the length in time for translated spoken words.

Another possible limitation is the sample size, especially when comparing for effects of music on personality with an older age group. In this study, when the sample was divided at age 21, participants who were older than 21 numbered only 10 in 2 of the conditions, and 23 in the other. A larger sample, particularly looking at older participants should be considered in future research.

In relation to mood, it should be noted that the participants from the music-only condition had just finished a lecture on bereavement. This is possibly an extraneous variable that influenced the results when testing for differences in positive and negative affect changes over the 3 conditions. Ideally, participants would be tested together, and not directly after class.

Other than the problems inherent with using self-report measures of subjective emotional experience, i.e. demand characteristics and confusion regarding the emotions expressed in the music with what was actually felt (Scherer & Zentner, 2001), there is probably a better way of recording emotional intensity than the method employed in this

research (averaging the scores for the 9-items of emotions from the Geneva Emotional Music Scale). This could be improved upon.

Lastly, the music genres used in this research were loosely based on the Short Test of Music Preferences. Perhaps STOMP should have been used in its entirety. Or perhaps for future research it would be better to develop and test which genres and subgenres to include in a measure of preferences for the specific cultural context, as the authors of STOMP had done when developing their questionnaire (Rentfrow and Gosling, 2003).

Overall the ubiquity of music underlines the importance of carrying out research in this area. The analysis of frequency of music listening shows this, with nearly 2 thirds of the participants reporting that they listen to music a few times a day. This is similar to findings from a survey carried out by Rolling Stone magazine which reported that 94.7% of respondents rated music as extremely or very important in their life. In answer to a question about the reasons for listening to music, one reader responded, "Asking me why I listen to music is like asking me why I breathe." (Because you really like music, 2010).

One of the potential applications of the findings of this research includes the field of music therapy, for example the knowledge that there is a correlation between some personality types and music preferences would only benefit the music therapist. Music therapy has been found to be a promising approach in improving engagement in substance abuse treatment groups (Dingle, Gleadhill & Baker, 2007), in reducing behavioural disorders of severely demented patients (Raglio et al., 2010), in reducing depression and improving mental health (Jinliang, Haizhen, & Dajun, 2011), and in enhancing physical, psychological, cognitive and emotional functioning within physical rehabilitation (Weller & Baker, 2011). Oliver Sacks underlines the benefits of music therapy in his book *Musicophilia: tales of music and the brain*. "Musical perception, musical sensibility, musical emotion, and musical memory can survive long after other forms of memory have disappeared. Music of the

right kind can serve to orient and anchor a patient when almost nothing else can” (Sacks, 2008, p. 373). Finally, because it has been demonstrated that music can introduce variability into the personality system, there could be many other benefits from this research. Increase in variability in dynamic systems is evident in life transformations through “crystallisation of discontent” (which is a period of distress that precedes life change (Baumeister as cited in Hayes et al., 2007)), in adversarial growth in psychotherapeutic situations, including treatment of anxiety disorders, depression, personality disorders, substance abuse (Hayes et al., 2007), and in the developmental process (Smith & Thelen, 2003).



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## APPENDIX

Dear Respondent,

I am a final year psychology student in DBS and am conducting my thesis on the effects of music and lyrics on various psychological phenomena such as mood and emotion.

Attached are a number of questionnaires that ask a variety of questions about your personality and music listening habits, as well as recording your mood and emotional responses to music. If you choose to participate, DO NOT write your name on the questionnaire. I do not need to know who you are and nobody will know whether you participate or not.

### **ALL INFORMATION REMAINS STRICTLY CONFIDENTIAL**

It should take between 10-15 minutes to complete the experiment. The questionnaires are split into 2 parts. A short video will be presented after completion of part 1 and before commencement of part 2. Participation in this study is voluntary. You can choose not to take part and you can also choose not to finish the questionnaire or omit any question you prefer not to answer without penalty or loss of benefits.

By returning this questionnaire, you are giving your consent to participate.

If you have any questions or concerns about participating in this study, you may contact me at [REDACTED]

Your participation is much appreciated.

Many thanks,  
Daniel Doherty.



### How I am in general

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who *likes to spend time with others*? Please write a number next to each statement to indicate the extent to which **you agree or disagree with that statement.**

1	2	3	4	5
Disagree Strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly

### I am someone who...

1. \_\_\_\_\_ Is talkative
2. \_\_\_\_\_ Tends to find fault with others
3. \_\_\_\_\_ Does a thorough job
4. \_\_\_\_\_ Is depressed, blue
5. \_\_\_\_\_ Is original, comes up with new ideas
6. \_\_\_\_\_ Is reserved
7. \_\_\_\_\_ Is helpful and unselfish with others
8. \_\_\_\_\_ Can be somewhat careless
9. \_\_\_\_\_ Is relaxed, handles stress well.
10. \_\_\_\_\_ Is curious about many different things
11. \_\_\_\_\_ Is full of energy
12. \_\_\_\_\_ Starts quarrels with others
13. \_\_\_\_\_ Is a reliable worker
14. \_\_\_\_\_ Can be tense
15. \_\_\_\_\_ Is ingenious, a deep thinker
16. \_\_\_\_\_ Generates a lot of enthusiasm
17. \_\_\_\_\_ Has a forgiving nature
18. \_\_\_\_\_ Tends to be disorganized
19. \_\_\_\_\_ Worries a lot
20. \_\_\_\_\_ Has an active imagination
21. \_\_\_\_\_ Tends to be quiet
22. \_\_\_\_\_ Is generally trusting
23. \_\_\_\_\_ Tends to be lazy
24. \_\_\_\_\_ Is emotionally stable, not easily upset
25. \_\_\_\_\_ Is inventive
26. \_\_\_\_\_ Has an assertive personality
27. \_\_\_\_\_ Can be cold and aloof
28. \_\_\_\_\_ Perseveres until the task is finished
29. \_\_\_\_\_ Can be moody
30. \_\_\_\_\_ Values artistic, aesthetic experiences
31. \_\_\_\_\_ Is sometimes shy, inhibited
32. \_\_\_\_\_ Is considerate and kind to almost everyone
33. \_\_\_\_\_ Does things efficiently
34. \_\_\_\_\_ Remains calm in tense situations
35. \_\_\_\_\_ Prefers work that is routine
36. \_\_\_\_\_ Is outgoing, sociable
37. \_\_\_\_\_ Is sometimes rude to others
38. \_\_\_\_\_ Makes plans and follows through with them
39. \_\_\_\_\_ Gets nervous easily
40. \_\_\_\_\_ Likes to reflect, play with ideas
41. \_\_\_\_\_ Has few artistic interests
42. \_\_\_\_\_ Likes to cooperate with others
43. \_\_\_\_\_ Is easily distracted
44. \_\_\_\_\_ Is sophisticated in art, music, or literature

**How often do you listen to music?**

Please indicate your answer by circling the relevant option.

a few times a day    once or twice a day    a few times a week    a few times a month    rarely

**Below is a list of different music genres. Please indicate the extent to which you like listening to each of them using the following scale to record your answers.**

(1) = Strongly like

(2) = Like

(3) = Neither like  
nor dislike

(4) = Dislike

(5) = Strongly  
dislike

Pop \_\_\_\_\_

Electronic/Dance \_\_\_\_\_

Hard Rock \_\_\_\_\_

Jazz \_\_\_\_\_

Easy-listening \_\_\_\_\_

Rap \_\_\_\_\_

Heavy Metal \_\_\_\_\_

Country \_\_\_\_\_

Oldies \_\_\_\_\_

Alternative \_\_\_\_\_

Punk \_\_\_\_\_

Classical \_\_\_\_\_

Gospel \_\_\_\_\_

Opera \_\_\_\_\_

**PLEASE DO NOT TURN OVER THE PAGE UNTIL YOU HAVE VIEWED THE VIDEO**

## PART 2

### Instructions

When providing your ratings, please describe how the music you listened 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	2	3	4	5
Not at all	Somewhat	Moderately	Quite a lot	Very Much

#### 1. Wonder

Filled with wonder, Dazzled, Moved 1 2 3 4 5

#### 2. Transcendence

Fascinated, Overwhelmed, Feelings of transcendence and spirituality 1 2 3 4 5

#### 3. Power

Strong, Triumphant, Energetic 1 2 3 4 5

#### 4. Tenderness

Tender, Affectionate, In love 1 2 3 4 5

#### 5. Nostalgia

Nostalgic, Dreamy, Melancholic 1 2 3 4 5

#### 6. Peacefulness

Serene, Calm, Soothed 1 2 3 4 5

#### 7. Joyful Activation

Joyful, Amused, Bouncy 1 2 3 4 5

#### 8. Sadness

Sad, Sorrowful 1 2 3 4 5

#### 9. Tension

Tense, Agitated, Nervous 1 2 3 4 5

**Please indicate the extent to which you enjoyed listening to the music using 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

---

Please indicate the extent to which you found the music “artistic” using 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

---

### Directions

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 feel this way during the present moment.

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

	<b>Very slightly or not at all</b>	<b>A little</b>	<b>Moderately</b>	<b>Quite a bit</b>	<b>Extremely</b>
21. Interested	1	2	3	4	5
22. Distressed	1	2	3	4	5
23. Excited	1	2	3	4	5
24. Upset	1	2	3	4	5
25. Strong	1	2	3	4	5
26. Guilty	1	2	3	4	5
27. Scared	1	2	3	4	5
28. Hostile	1	2	3	4	5
29. Enthusiastic	1	2	3	4	5
30. Proud	1	2	3	4	5
31. Irritable	1	2	3	4	5
32. Alert	1	2	3	4	5
33. Ashamed	1	2	3	4	5
34. Inspired	1	2	3	4	5
35. Nervous	1	2	3	4	5
36. Determined	1	2	3	4	5
37. Attentive	1	2	3	4	5
38. Jittery	1	2	3	4	5
39. Active	1	2	3	4	5
40. Afraid	1	2	3	4	5

Please write a number next to each statement to indicate the extent to which **you agree or disagree with that statement.**

1 Disagree Strongly	2 Disagree a little	3 Neither agree nor disagree	4 Agree a little	5 Agree strongly
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• **I am someone who...**

- \_\_\_\_\_ Tends to be lazy
- \_\_\_\_\_ Is emotionally stable, not easily upset
- \_\_\_\_\_ Is inventive
- \_\_\_\_\_ Has an assertive personality
- \_\_\_\_\_ Can be cold and aloof
- \_\_\_\_\_ Perseveres until the task is finished
- \_\_\_\_\_ Can be moody
- \_\_\_\_\_ Values artistic, aesthetic experiences
- \_\_\_\_\_ Is sometimes shy, inhibited
- \_\_\_\_\_ Is considerate and kind to almost everyone
- \_\_\_\_\_ Does things efficiently
- \_\_\_\_\_ Remains calm in tense situations
- \_\_\_\_\_ Prefers work that is routine
- \_\_\_\_\_ Is outgoing, sociable
- \_\_\_\_\_ Is sometimes rude to others
- \_\_\_\_\_ Makes plans and follows through with them
- \_\_\_\_\_ Gets nervous easily
- \_\_\_\_\_ Likes to reflect, play with ideas
- \_\_\_\_\_ Has few artistic interests
- \_\_\_\_\_ Likes to cooperate with others
- \_\_\_\_\_ Is easily distracted
- \_\_\_\_\_ Is sophisticated in art, music, or literature
- \_\_\_\_\_ Is talkative
- \_\_\_\_\_ Tends to find fault with others
- \_\_\_\_\_ Does a thorough job
- \_\_\_\_\_ Is depressed, blue
- \_\_\_\_\_ Is original, comes up with new ideas
- \_\_\_\_\_ Is reserved
- \_\_\_\_\_ Is helpful and unselfish with others
- \_\_\_\_\_ Can be somewhat careless
- \_\_\_\_\_ Is relaxed, handles stress well
- \_\_\_\_\_ Is curious about many different things
- \_\_\_\_\_ Is full of energy
- \_\_\_\_\_ Starts quarrels with others
- \_\_\_\_\_ Is a reliable worker
- \_\_\_\_\_ Can be tense
- \_\_\_\_\_ Is ingenious, a deep thinker
- \_\_\_\_\_ Generates a lot of enthusiasm
- \_\_\_\_\_ Has a forgiving nature
- \_\_\_\_\_ Tends to be disorganized
- \_\_\_\_\_ Worries a lot
- \_\_\_\_\_ Has an active imagination
- \_\_\_\_\_ Tends to be quiet
- \_\_\_\_\_ Is generally trusting.

