The relationship between depression, anxiety and music preference

Josh Kennedy

X18107117

Supervisor: Dr. Michelle Kelly

B.A (Hons) in Psychology

National College of Ireland (N.C.I)

March 2021

Submission of Thesis and Dissertation

National College of Ireland
Research Students Declaration Form
(Thesis/Author Declaration Form)

Name: Joshua Kennedy

Student Number: x18107117

Degree for which thesis is submitted: B.A (Hons) Psychology

Title of Thesis: The relationship between depression, anxiety and music preference

Date: 23/03/2021

Material submitted for award

A. I declare that this work submitted has been composed by myself. ☐x

B. I declare that all verbatim extracts contained in the thesis have been distinguished by quotation marks and the sources of information specifically acknowledged. ☐x

C. I agree to my thesis being deposited in the NCI Library online open access repository NORMA. ☐x

D. ***Either*** *I declare that no material contained in the thesis has been used in any other submission for an academic award.
Or *I declare that the following material contained in the thesis formed part of a submission for the award of

_____
(State the award and the awarding body and list the material below) ☐x

Acknowledgements

Firstly, I would like to thank my thesis supervisor Dr. Michelle Kelly for all the time, patience and help you have given throughout this whole process and a special thanks for all the check ins they were much appreciated. Secondly, I would like to thank my fellow classmates with a special shoutout to Leah (we did it). Thirdly, I would like to thank all the participants for taking the time to take part in my research. Finally, I would like to thank my family and friends for putting up with listening to me talk about my thesis for the past year and my mam and sister especially for always listening even when you guys didn't want to haha.

Abstract

Aims: The current study sought to provide a greater understanding on disorders such as anxiety and depression and see how scores on self-report questionnaires directly impacted the ratings on happy and sad pieces of music and how these disorders can influence our musical preference. **Method:** Three individual questionnaires were administered to participants (n=195) through social media which included a scale on depression (BDI), anxiety (BAI) and a music scale that included 10 pieces of happy music and 10 pieces of sad music in which the participant did not know which was which. **Results:** Results showed that there was a small, negative correlation between Depression and Happiness music total ($r_s = -.174$, $n = 195$, $p < .015$) which indicates that lower levels of depression are associated with higher rankings of the happy music but anxiety did not predict the rating outcome of the happy music and neither depression nor anxiety predicted the rating outcomes for the sad music. **Conclusion:** Findings overall show that depression did predict the ratings on happy pieces of music but not to the same level that previous studies have found. The findings of this study challenge previous studies that have found different results and future studies should look at the inconsistencies in the research associated with this topic and may decide to focus on the conceptual aspects of research and music preferences along with disorders, personality and mood and if or how they directly impact our musical preference.

Table of Contents

Contents

Literature review

Music has been used for centuries as a way to enhance mood (Schaefer, 2017) and to relieve stress (Mok & Wong, 2003). One of the mechanisms through which this may occur is via the release of dopamine, as listening to music has been shown to increase dopamine levels in the brain (Ferreri et al., 2019). Research has shown that music affects every part of the brain but in different ways (Alluri et al., 2012). Different components of music such as rhythm, tone, and timbre differentially affect the brain with tone affecting the limbic part of the brain which is commonly associated with emotions. Music has also been shown to have many other health-related and psychological functions (Schäfer, Sedlmeier, Städtler & Huron, 2013).

The psychological benefits of music include stress reduction (Guetin et al., 2009) and the management of mental health problems such as anxiety and depression (Leubner & Hinterberger, 2017). In fact a 2004 study has shown music therapy to have a large positive outcome (ES=.61) and showed it to be statistically highly significant ($p < .001$) on children and teenagers who have psychopathology such as depression and anxiety (Gold, Voracek & Wigram, 2004). A study done by (Zhou et al., 2020) has also shown the impact music can have on mental health and physical health. The systematic review, which was done to look at the effect music intervention can have on mental health patients who suffer with diabetes mellitus, has shown how music intervention can have a strong positive effect on depression and/or anxiety, which is usually an outcome of having diabetes, which in turn has a direct impact on the diabetes as before the mixture of mental health issues and diabetes was leading to increased difficulties in alternative treatments which then increased mortality rates. Other studies have also shown that music interventions can have a direct impact on diabetes with lower blood glucose and HbA1c levels being noted (Mandel, Davis & Secic, 2013). Music has also shown to help with other illnesses such as Parkinson's, Dementia and Alzheimer's.

A study done on individuals with Alzheimer's has shown how music therapy actually improved cognitive, psychological and behavioural functions in the participants who suffered with mild to moderate Alzheimer's (Gómez Gallego & Gómez García, 2017) while similar studies have also been done on patients with Dementia (Van de Winckel, Feys, De Weerdt & Dom, 2004) and Parkinson's (Pacchetti et al., 2000). A study done by (Guetin et al., 2009) has shown how music has been used in a therapeutic setting to reduce the physical effects of stress, improve healing and help manage both Parkinson's disease and Alzheimer's disease and it has also been shown to help with certain disorders such as depression and anxiety.

Although previous research has shown the positive effects of music on certain disorders and mood it has also shown how music that has a mood-inducing positive effect for one person may have no effect on another person, simply due to their musical preferences. It is important therefore, to further explore the variables that may impact music preference, with a view to further discovering the context and conditions under which music may be beneficial to physical and mental health. Thus far, research suggests that music preference may be impacted by biological or environmental factors, or our emotional disposition or dominant mood.

A recent pilot study by McDermott, Schultz, Undurraga & Godoy (2016) explored whether music preference is biological or environmental. The study was conducted on the Tsimane tribe of the Amazon rainforest whose native chant is chanted in a dissonant chord, which is usually less pleasing to hear in comparison to a consonant chord. When questioned about which chord the participants preferred, they did not have a preference but they were able to tell the difference between the two. The results of the study indicated that our musical preference predominantly comes from our environment but also partially from our biology. Biology also plays a part in our musical preference with our individual personalities and mood influencing what we listen to and a study by (Vuoskoski & Eerola, 2011) shows

exactly how our personalities were directly related to music preference and our mood directly impacted on what was listened to, based on the mood of the song so for example if you are happy you preferred to listen to happy music. This indicates that musical preference may be influenced by our environment but also by our biology such as our personality traits and our dominant mood

In general people tend to listen to or prefer to listen to happy music (Khalfa, Roy, Rainville, Dalla Bella & Peretz, 2008; Hunter, Schellenberg & Schimmack, 2010; Husain, Thompson & Schellenberg, 2002) but a study done by Garrido & Schubert (2011) concluded that this may not always be the case. In fact, personality traits may impact music preferences. In their study, the participants were tested on individual differences in dissociation, absorption, fantasy proneness, empathy and rumination; and the researchers examined if this was related to the enjoyment of negative emotion in music. The results showed that people who ranked higher in empathy actually tended to prefer sad music over other genres as they had more empathy with the words and emotion in the song almost as if the song is about them or happening to them (Garrido & Schubert, 2011). Similar studies have also found that being introverted (Ladinig & Schellenberg, 2012) or being open-to-experiences (Ladinig & Schellenberg, 2012) can both tend to make an individual to prefer or enjoy sad sounding music.

As well as personality type, research shows that mood in general can dictate our choice in music (Vuoskoski & Eerola, 2011). In one study, which was divided up into three experiments, a total of 99 males and 158 females participated. Each experiment had a mood induction, which aimed to make half the participants sad and the other half was a neutral inductor. After this, each participant listened to upbeat happy songs and downbeat sad songs. The results showed that people who were in the sad group tended to prefer happy music more than those in the neutral group, due the fact that choosing sad music felt inappropriate

(Friedman, Gordis & Förster, 2012). Similar studies such as (Xue, Li, Yin, Zhu & Tan, 2018; Mornhinweg, 1992) also show this to be true but when this sadness doesn't ease and becomes regular it develops into depression (Mouchet-Mages & J. Baylé, 2008) and this is where we see this change in attitude towards sad music.

In addition to mood influencing our musical preferences, one's mental health status may also have an impact in what we choose to listen to. For example, a study by Millgram, Joormann, Huppert, & Tamir (2015) has shown how individuals who suffer with depression actually prefer to listen to sad music as a way to regulate their emotions but they choose to implement them in a direction that is likely to maintain or increase sadness rather than alleviate it while a study by Yoon, Verona, Schlauch, Schneider & Rottenberg (2020) has shown how individuals who suffer from major depression disorder actually listen to the music that has a lower tempo as it may induce calming affects for the individual. The outcome of this study completely goes against what previous studies such as Hunter, Schellenberg & Schimmack (2010) has told us about music preference and how it is not our mood that affects our musical preference but rather it's our perception of the music whether that be for happy or sad music that causes our musical preference.

This then brings up the question whether people who suffer with depression are more empathetic like the study by Garrido & Schubert (2011) mentions or does the music, be it up-tempo or downbeat, help regulate or deal with certain emotions. Future studies may wish to consider whether depressed people in general prefer sad music, and if so, researchers should explore the implications of this. In addition, this may be relevant to other disorders, which should also be considered.

Previous research has primarily focused on depression and how music can help individuals who suffer with depression (Yoon et al., 2020) or how mood can directly influence our musical preference (Magee & Davidson, 2002). If music can assist

interventions for those with depression, it is possible that interventions for other mental health problems or disorders may be able to incorporate music also. This requires further research. This study will focus on these gaps which will allow a clearer understanding on how other disorders may influence our music preference along with showing how people who score high on a self-report scale for anxiety and depression may differ in comparison to those who don't score high on a self-report scale for depression and anxiety.

The Current Study

This study will focus on disorders such as anxiety and depression and see how scores on self-report questionnaires directly impact the ratings of happy and sad music and how these disorders can influence our musical preference. This research will be important as currently not a lot of studies has been involved these key areas. The research aims to examine the relationship between depression, anxiety and music preference. There are two research questions for this study. The first research question is do scores on measures of anxiety and depression predict the rating outcome on happy pieces of music and the second question is do scores on measures of anxiety and depression predict the rating outcome on sad pieces of music. The two hypotheses are that levels of anxiety and depression will predict the rating outcome of happy music and also that levels of anxiety and depression will predict the rating outcome of sad music. This study will also demonstrate the importance of researching music and the affects music can have on people, especially the therapeutic value on those who suffer from disorders such as depression and anxiety.

Methods

Procedure

Data for this study was collected online through the use of a Google Forms survey. When the survey was complete and any issues or mistakes completely clear the link was posted online. The survey was posted on various social media sites including Facebook, Instagram, Snapchat and WhatsApp with a brief synopsis about what the study will involve, an estimated time frame and the eligibility criteria for who could take part and if the individual wanted to take part they could click the link. The first page of the link was the participant information sheet which went into a detailed synopsis of the study, what the study aims to find from the research and the eligibility requirements of the study. Participants were also informed that participation was voluntary and could withdraw from the study without any penalty any time before the study was completed as after completion, due to the anonymous nature of this study, it would be impossible to find their results. This page also included the information of the lead researcher and supervisor along with contact emails if further information was needed. To proceed to the next page of this study the participant needed to verify their age using the consent form, which could be found at the bottom of the first page, once the individual consented that they were over the age of 18 and had read the participant information form they could then proceed.

The next page of the study was the demographic part of the study which involved questions regarding age, gender, country of birth, marital status and level of education *(see Appendix 1)*. The next page is the Becks Depression Inventory *(See Appendix 2)* where participants needed to answer all statements if they wished to proceed, similarly the next page was the Becks Anxiety Inventory (*see Appendix 3*). The following page was the music scale where participants listened to both happy and sad music and rated each one on if they liked it or disliked it. The last page of this study contained the debriefing sheet which included details

on the nature of the study along with the hypotheses. This page also thanked the participants and had the contact details of the lead researcher in case the participant wants or needs support after taking the survey. Although this research study was approved by the National College of Ireland and was in line with The Psychological Society of Ireland Code of Professional Ethics links to various websites were also given in case the study has raised any negative feelings of depression or anxiety or caused distress of any kind. Overall the study took no longer than 12 minutes.

Participants

Participants were recruited using an opportunistic snowball sampling method. A description of the study and a link to the google forms questionnaire was uploaded to multiple social media channels such as Facebook, Instagram, Snapchat and WhatsApp, participants were also asked to pass the link on to anyone who may find the study interesting or want to participate. A standard multiple regression analysis was conducted in this study with a minimum of 107 participants needed. G*Power Calculator was used to determine the necessary sample sized needed to greatly reduce the likelihood of Type 1 Error and so there was a 95% chance that the R-squared value would significantly differ from zero with a sample size of 107 or over. The current study consisted of 195 participants which means we exceeded the amount needed according to the G*Power Calculator. No incentives were used for the recruitment process of this study.

Due to the nature of this study being non-biased meaning the study could have been done by anyone over the age of 18 and there was no exclusion criteria, the initial sample of 195 participants could be used. The final sample comprised of 195 individuals (36 males and 159 females), with a mean age of 31.71 years (SD = 11.27) ranging from 18 to 67.

Measures

Demographics. Participants where asked a few demographical questions at the start of the questionnaire which included their gender, age, country of birth, education level and marital status.

Becks Depression Inventory. The Becks Depression Inventory, created by Aaron T.Beck (Beck, et al., 1961), is a 21-item multiple choice self-report scale that helps determine participants' levels of depression and also the severity of the depression. Participants read the 21 multiple choice statements with a rating from 0-3 and participants then choose the answer that best describes them in that moment. The statements are based around symptoms of depression such as irritability and hopelessness, an example of a statement from the Becks Depression Inventory would be 0) I have not lost interest in other people, 1) I am less interested in other people than I used to be, 2) I have lost most of my interest in other people, 3) I have lost all of my interest in other people. The participant would then choose the answer that best describes them and the number correlating to each answer of the 21 statements is then added up to give the total number which can be then used to check their levels of depression. The Becks Depression Inventory has become one of the most widely used psychometric tests for measuring levels of depression this is due to its strong internal consistency, Cronbach's alpha value = 0.56 to 0.87. The scale also demonstrates high internal consistency among the psychiatric and non-psychiatric population with alpha coefficients of .86 and .81 respectively (Beck, Steer & Garbin, 1988). The Cronbach's Alpha score for the current study is .93 which indicates a strong level of internal consistency.

Becks Anxiety Inventory. The Becks Anxiety Inventory (Beck, Epstein, Brown & Steer, 1988) is a 21 -item multiple choice self-report scale that helps determine participants' levels of anxiety. Participants read the 21 common signs of anxiety and then rate how they feel from 0-3 within the past month with 0 being 'Not at all', 1 being 'Mildly, but it didn't

bother me much', 2 being 'Moderately – it was not pleasant at times' and 3 being 'Severely – it bothered me a lot'. The number that each participant chose for each answer is then totalled and that number can be used to check their levels of anxiety. The Becks Anxiety Inventory has become a widely used anxiety test for measuring levels of anxiety this is due to its strong internal consistency, Cronbach's alpha value = 0.92. The scale also has a strong Test-retest reliability (1 week) for the BAI = 0.75 (Beck, Epstein, Brown & Steer, 1988). The Cronbach's Alpha score for the current study is .94 which indicates a strong level of internal consistency.

Musical Scale. The musical scale that was used in this study was a 20 item musical scale that allowed users to listen to 10 pieces of Happy upbeat music and 10 pieces of sad down beat music and rate them using a Likert scale from 1-5 with 1 being I hate this piece of music, 2 being I dislike this piece of music, 3 being I neither like nor dislike this piece of music, 4 being I like this piece of music and 5 being I love this piece of music (*See Appendix 4*). The total for each happy song and each sad song was then totalled to see the participants preference in the music. The music pieces where selected based on their beats per minute with 80-120 being considered upbeat or happy and anything being lower than 60 being considered downbeat and sad. The Cronbach's Alpha score for the current study is .79 which indicates a strong level of internal consistency.

Design

The present study used a quantitative approach with a cross sectional within subject's design. This study was cross sectional because it took place at a single point in time, it did not involve active manipulation of variables and it considered several characteristics at once. There are two independent continuous variables in this study with depression being one and anxiety being the other. There is one dependant variable which is the rating of the music itself

through the use of a Likert scale. It is a within subject's design because all participants done the same survey and also filled out the same scales.

Results

Descriptive Statistics

The descriptive statistics for the demographics can be seen below in Table 1 and Table 2 and this is from a sample of 195 participants.

Table 1

Descriptive Statistics for Demographics – gender, education level, marital status & country of origin

Variable	Frequency	Valid %
Gender		
- Male	36	18.5
- Female	159	81.5
Education Level		
- Secondary Level	81	41.5
- Degree	93	47.7
- Master's	23	10.8
Marital Status		
- Single	77	39.5
- In a relationship	58	29.7
- Married	50	25.6
- Divorced	4	2.1
- Widowed	2	1.0
- It's complicated	4	2.1

Country of origin		
- Republic of Ireland	121	62.1
- United States	40	20.5
- United Kingdom	15	7.7
- France	3	1.5
- Canada	2	1.0
- Ecuador	2	1.0
- Other (Argentina, Australia, Croatia, Egypt, Jordan, Lithuania, Netherlands, Nigeria, Poland, Spain, Sweden, Tunisia)	12	6.0

Table 2

Descriptive Statistics and reliability of all continuous variables

Variable	*M* [95% CI]	*SD*	Range	Minimum	Maximum
Age	31.71[30.12, 33.30]	11.27	49	18	67
Depression total	14.88[13.31, 16.46]	11.16	51	0	51
Anxiety total	18.99[16.95, 21.04]	14.45	58	0	58
Happy music total	30.78[29.77, 31.80]	7.17	36	13	49

Sad music total	31.90[30.76, 33.05]	8.11	36	12	48

Inferential Statistics

The relationship between Depression and Happiness music total and Anxiety and Happiness music total was investigated using a Spearman's Rank Order correlation coefficient. There was a small, negative correlation between Depression and Happiness music total ($r_s = -.174$, $n = 195$, $p < .015$) and there was no correlation between Anxiety and Happiness music total ($r_s = -.131$, $n = 195$, $p < .067$). Results indicate that lower levels of depression are associated with higher rankings of the happy music. The relationship between Depression and Sad music total and Anxiety and Sad music total was also investigated using a Spearman's Rank Order correlation coefficient. There was no correlation between Depression and Sad music total ($r_s = .031$, $n = 195$, $p < .672$) and no correlation between Anxiety and Sad music total ($r_s = -.018$, $n = 195$, $p < .806$).

Multiple Regression Analysis

Multiple regression analysis was performed to discern if levels of anxiety and depression will predict the rating outcome of happy music.

Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. The correlations between the predictor variables and the criterion variable included in the study were examined (see Table 3 for full details). Depression was significantly correlated with the criterion variable while anxiety wasn't, and these significant effects ranged from $r = -.16$ (depression) to $r = -.13$ (anxiety). The correlations between the predictor variables were also assessed with r values ranging from .025 for depression to .067 for anxiety. Tests for multicollinearity also indicated that all Tolerance and VIF values were in an acceptable range. These results indicate that there was

no violation of the assumption of multicollinearity and that the data was suitable for examination through multiple linear regression analysis.

Table 3

Correlations between variables included in the model

Variable	1	*2*	3	4
Depression total	-			
Anxiety total	.73	-		
Happy music total	-.16	-.13	-	
Sad music total	-.01	.001	.004	-

Since no a priori hypotheses had been made to determine the order of entry of the predictor variables, a direct method was used for the analysis. The two predictor variables explained 2.6% of variance in the happy music rating levels ($F(2, 192) = 2.583$, $p < .078$). None of the variables were found to uniquely predict the Happy music rating levels to a statistically significantly level: depression ($\beta = -.89$, $p < .187$), anxiety ($\beta = -.02$, $p = .769$) (see Table 4 for full details).

Table 4

Multiple regression model predicting scores in Happy music

Variable	R^2	B	SE	β	t	p

Model	.03				
Depression total		-.89	.07	-.14	-1.32	.19
Anxiety total		-.02	.05	-.03	-.29	.77

Note. R = 0.03; β = standardized beta value; B = unstandardized beta value; SE = Standard errors of B; CI 95% (B) = 95% confidence intervals for B; N = 195.

A multiple regression analysis was also performed to discern if levels of depression and anxiety will predict the rating outcome of sad music.

Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. The correlations between the predictor variables and the criterion variable included in the study were examined (see Table 3 for full details). Both of the two predictor variables were significantly correlated with the criterion variable, and these significant effects ranged from r = -.01 (depression) to r = .001 (anxiety). The correlations between the predictor variables were also assessed with r values ranging from .025 for depression to .067 for anxiety. Tests for multicollinearity also indicated that all Tolerance and VIF values were in an acceptable range. These results indicate that there was no violation of the assumption of multicollinearity and that the data was suitable for examination through multiple linear regression analysis.

Since no a priori hypotheses had been made to determine the order of entry of the predictor variables, a direct method was used for the analysis. The two predictor variables explained 0.02% of variance in the sad music rating levels ($F(2, 192) = .016$, $p < .985$). None of the variables were found to uniquely predict the sad music rating levels to a statistically

significantly level: depression (β = -.01, p < .861), anxiety (β = .01, p = .890) (see Table 5 for full details).

Table 5

Multiple regression model predicting scores in Sad music

Variable	R^2	B	SE	β	t	p
Model	.00					
Depression total		-.01	.08	-.02	-.18	.86
Anxiety total		.01	.06	.02	.14	.89

Note. R = 0.00; β = standardized beta value; B = unstandardized beta value; SE = Standard errors of B; CI 95% (B) = 95% confidence intervals for B; N = 195.

Discussion

Participants listened to 20 musical excerpts, 10 happy pieces and 10 sad pieces, each varying in tempo and beats per minute. The happy pieces of music all varied in style but consistently had a range of over 100 beats per minute as this is what would be classed as upbeat while the sad pieces of music had lower than 100 beats per minute and also all varied in style from slow electronic beats to orchestra pieces. Listeners rated the pieces on how much they liked them and the current study looked at the relationship between depression, anxiety and how high the individual would rate the pieces of music in comparison to how high they scored on depression levels and anxiety levels and if they could predict the rating outcome on the happy and sad pieces of music. The study aimed to gain a deeper understanding on musical preference and how certain disorders can change or control what we listen to by examining if scores on measures of anxiety and depression predict the rating outcome on happy pieces of music and sad pieces of music.

Overall the results show that there was a small, negative correlation between Depression and Happiness music total ($r_s = -.174$, $n = 195$, $p < .015$) which indicates that lower levels of depression are associated with higher rankings of the happy music but anxiety did not predict the rating outcome of the happy music and neither depression nor anxiety predicted the rating outcomes for the sad music.

The first part of the first hypothesis which was that levels of anxiety will predict the rating outcome of happy music and my second hypothesis which was that levels of anxiety and depression will predict the rating outcome of sad music was inconsistent with the results of this study where levels of anxiety did not predict rating on happy pieces of music nor did levels of anxiety or depression predict the rating outcome on sad pieces. Our results raise the question of why did our results not replicate those found in similar studies such as (Millgram, Joormann, Huppert, & Tamir (2015). There are a few reasons why the results of this study

differed to past research on this topic. As music preference is considered subjective, the pieces of music that were used as samples may not have been liked by the participants in general (Schwartz & Fouts, 2003) and this could directly impact our results as the music choices that were used in this study may not have been what people particularly like and future studies could limit this by using more music pieces which may limit any subjective choices being used. Previous research also suggests that individuals may have already had a connection with one of the songs used and that music induced emotions are actually a causal effect from learned association with past experiences of emotional significance (Konecˇni, 2008) and this is what may hinder the outcome of the results and future studies could limit this by possibly using totally unknown pieces of music. Another study suggests that, in general, when a person is taking part in an online questionnaire may answer in a socially desirable way rather than truly how they are feeling (Bäckström, 2007; Bäckström, Björklund, & Larsson, 2009) and this has been shown to hinder results overall (Tourangeau & Yan, 2007) as mental health is still moderately stigmatised in general this could impact how the participant answered in this study as two of the three self-report questionnaires were on depression and anxiety and people may not have wanted to answer honestly due to the stigma attached and this could skew results and future studies would do well to use the example that was used in the study by(Vésteinsdóttir et al., 2018) that showed that moving the request for honest responding from the introduction to the surveys to the actual questioning part of the survey increases the chances of honest answering and decreases the chance of answering in a sociably desirable way.

Another reason why our results could have differed is that participants in this study where mostly female (N=159) and studies have shown women tend to be more extraverted (Weisberg, DeYoung & Hirsh, 2011) and individuals who are more extraverted tend to prefer more upbeat music (Ladinig & Schellenberg, 2012).

In support of the second half of the first hypothesis which is that levels of anxiety and depression will predict the rating outcome of happy music, results showed that depression was a moderate, negative predictor in ratings of happy music indicating that the lower an individual scores in depression levels the more likely they are to prefer to listen to happy music over sad music, alternatively this could also be interpreted by saying the more an individual scored in depression levels the less likely they were to listen to happy music. The findings are consistent with previous research which has suggested that in general people tend to prefer to listen to happy music (Khalfa, Roy, Rainville, Dalla Bella & Peretz, 2008; Hunter, Schellenberg & Schimmack, 2010; Husain, Thompson & Schellenberg, 2002) but are inconsistent with other previous research that suggest in general people who suffer with depression may prefer sad music over happy music to regulate emotions (Millgram, Joormann, Huppert, & Tamir, 2015) or because it induces a calming effect on the individual themselves (Yoon, Verona, Schlauch, Schneider & Rottenberg, 2020). A study by (Konecˇni, 2008) suggests that feelings induced by music will always be in-line with perceptions of the emotion conveyed by the music as previous learned associations for a song such as a connection with a death or a breakup can cause opposite emotions to what the song is actually trying to convey and this could be one possibility why this study differs from similar past study results.

Understanding the impact that music can have in not only a therapeutic setting for disorders such as depression or anxiety but also in a health and wellbeing perspective on an individual level is important. This results from this study, although non-significant, add to previous research and can show why it is important to research music preference and how certain disorders may impact it and future studies may want to look at the conceptual implications that this study raises.

Implications

Findings contained in this current study have conceptual and practical implications. The current study signifies the importance of looking into and examining the relationship between music and disorders as previous research shows that depression does directly impact our musical preference this study differs and future research should look into why this is. Conceptual papers may want to delve further into the importance of looking at musical preference in line with disorders and the contextual factors that may impact the differences of this topic. Due to the inconsistencies in the research associated with this topic future research may decide to focus on the conceptual aspects of research and music preferences along with disorders, personality and mood and if or how they directly impact our musical preference.

Findings obtained in this current study also has practical implications. The study added valuable and novel research to a fairly unresearched topic. This study demonstrates the importance of researching music and the affects music can have on people especially the therapeutic value on those who suffer from disorders such as depression and anxiety. More research is required to further examine how other mood disorders may affect our musical preference, it's also worth noting that a more longitudinal study would be worth looking at as this would allow a more detailed overview on an individual's mood and also preference on music as a short study may only show an individual's feelings right there and then which could be a bad day etc. for example, although depression was not a predictor of sad music in this study other studies such as (Millgram, Joormann, Huppert, & Tamir, 2015) has shown it to be a predictor so it would be worth researchinng other mood disorders to see if they could potentially influence our musical preference also.

Strengths and limitations

One of the strengths of this study is that it tries to expand on previous research in a novel way with variables that have not, to the researchers best knowledge, been explored before. Anxiety as a variable has not been researched in comparison with musical preference. Although no significant correlation was found between musical preference and anxiety in this study future studies could explore other mood disorders, as despite the amount of overwhelming evidence that musical therapy and music interventions has been shown to positively effect neurological disorders little to no research has been done to show the effects of music on disorders such as anxiety, depression, mood or emotion regulation or how they may affect our musical preference. Another strength to this study is that it had a good population sample which included participants from six continents which allows a better understanding overall of the general population.

This study also used self-report measures to determine levels of depression and anxiety. When using self-report questionnaires there is a possibility of individuals answering the questions according to how socially desirable it is to answer (Bäckström, 2007; Bäckström, Björklund, & Larsson, 2009) especially because the depression and anxiety questionnaires are so personal and these questions can hinder the outcome of the results (Tourangeau & Yan, 2007). Future studies would do well to use individuals who have been medically diagnosed with anxiety disorder and major depressive disorder this in turn will give a more accurate representation of the population.

Another limitation to this study is the small amount of males that took part. The current sample consisted of 36 males and a much higher number of 159 of females which may not give an accurate representation of the population. As previous research such as Weisberg, DeYoung & Hirsh, 2011) has highlighted women tend to be more extraverted and individuals who are more extraverted tend to prefer more upbeat music (Ladinig &

Schellenberg, 2012). Therefore having a more balanced sample size could have yielded results that matched previous research.

Conclusion

The present study found that depression was a significant predictor for happy music while anxiety was not a predictor for happy music and found that neither depression nor anxiety were significant predictor variables for sad music. While the study used novel variables that was attempting to expand on previous research, future studies would benefit by using a more longitudinal approach to the study as well as using more novel variables as this could benefit not only those who suffer from certain disorders but also looking at the broader implications that could be useful for those in music therapy. Another approach to this study would be using participants who have a medical diagnosis of depression such as major depressive disorder or anxiety this would then take out the need for self-report questionnaires which could in turn limit the amount of dishonesty in regards to results.

References

Alluri, V., Toiviainen, P., Jääskeläinen, I., Glerean, E., Sams, M., & Brattico, E. (2012). Large-scale brain networks emerge from dynamic processing of musical timbre, key and rhythm. *Neuroimage*, *59*(4), 3677-3689. doi: 10.1016/j.neuroimage.2011.11.019

Bäckström, M. (2007). Higher-order factors in a five-factor personality inventory and its relation to social desirability. *European Journal of Psychological Assessment*, *23*, 63–70. https://doi.org/10.1027/1015-5759.23.2.63

Bäckström, M., Björklund, F., & Larsson, M. R. (2009). Five-factor inventories have a major general factor related to social desirability which can be reduced by framing items neutrally. *Journal of Research in Personality*, *43*, 335–344. https://doi.org/10.1016/j.jrp.2008.12.013

Beck, A.T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961) An inventory for measuring depression. *Archives of General Psychiatry, 4*, 561-571.

Beck, A. T., Steer, R.A., & Garbin, M.G. (1988) Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review,* 8(1), 77-100.

Beck, A., Epstein, N., Brown, G., & Steer, R. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting And Clinical Psychology*, *56*(6), 893-897. doi: 10.1037/0022-006x.56.6.893

Ferreri, L., Mas-Herrero, E., Zatorre, R., Ripollés, P., Gomez-Andres, A., & Alicart, H. et al. (2019). Dopamine modulates the reward experiences elicited by music. *Proceedings Of The National Academy of Sciences*, *116*(9), 3793-3798. doi: 10.1073/pnas.1811878116

Friedman, R., Gordis, E., & Förster, J. (2012). Re-Exploring the Influence of Sad Mood on Music Preference. *Media Psychology*, *15*(3), 249-266. doi: 10.1080/15213269.2012.693812

Garrido, S., & Schubert, E. (2011). Individual Differences in the Enjoyment of Negative Emotion in Music: A Literature Review and Experiment. *Music Perception: An Interdisciplinary Journal*, 28(3), 279-296. doi: 10.1525/mp.2011.28.3.279

Gold, C., Voracek, M., & Wigram, T. (2004). Effects of music therapy for children and adolescents with psychopathology: a meta-analysis. *Journal of Child Psychology And Psychiatry*, *45*(6), 1054-1063. doi: 10.1111/j.1469-7610.2004.t01-1-00298.x

Gómez Gallego, M., & Gómez García, J. (2017). Musicoterapia en la enfermedad de Alzheimer: efectos cognitivos, psicológicos y conductuales. *Neurología*, *32*(5), 300-308. doi: 10.1016/j.nrl.2015.12.003

Guetin, S., Portet, F., Picot, M., Pommieacute;, C., Messaoudi, M., & Djabelkir, L. et al. (2009). Effect of Music Therapy on Anxiety and Depression in Patients with

Alzheimer's Type Dementia: Randomised, Controlled Study. Dementia and Geriatric Cognitive Disorders, 28(1), 36-46. doi: 10.1159/000229024

Hunter, P., Schellenberg, E., & Schimmack, U. (2010). Feelings and perceptions of happiness and sadness induced by music: Similarities, differences, and mixed emotions. *Psychology of Aesthetics, Creativity, And The Arts*, 4(1), 47-56. doi: 10.1037/a0016873

Husain, G., Thompson, W., & Schellenberg, E. (2002). Effects of Musical Tempo and Mode on Arousal, Mood, and Spatial Abilities. Music Perception, 20(2), 151-171. doi: 10.1525/mp.2002.20.2.151

Khalfa, S., Roy, M., Rainville, P., Dalla Bella, S., & Peretz, I. (2008). Role of tempo entrainment in psychophysiological differentiation of happy and sad music?. *International Journal of Psychophysiology*, 68(1), 17-26. doi: 10.1016/j.ijpsycho.2007.12.001

Ladinig, O., & Schellenberg, E. (2012). Liking unfamiliar music: Effects of felt emotion and individual differences. *Psychology of Aesthetics, Creativity, And The Arts*, 6(2), 146-154. doi: 10.1037/a0024671

Leubner, D., & Hinterberger, T. (2017). Reviewing the Effectiveness of Music Interventions in Treating Depression. *Frontiers in Psychology*, *8*. doi: 10.3389/fpsyg.2017.01109

Magee, W., & Davidson, J. (2002). The Effect of Music Therapy on Mood States in Neurological Patients: A Pilot Study. *Journal of Music Therapy*, *39*(1), 20-29. doi: 10.1093/jmt/39.1.20

Mandel, S., Davis, B., & Secic, M. (2013). Effects of Music Therapy and Music-Assisted Relaxation and Imagery on Health-Related Outcomes in Diabetes Education. *The Diabetes Educator*, *39*(4), 568-581. doi: 10.1177/0145721713492216

McDermott, J., Schultz, A., Undurraga, E., & Godoy, R. (2016). Indifference to dissonance in native Amazonians reveals cultural variation in music perception. *Nature*, 535(7613), 547-550. doi: 10.1038/nature18635

Millgram, Y., Joormann, J., Huppert, J., & Tamir, M. (2015). Sad as a Matter of Choice? Emotion-Regulation Goals in Depression. *Psychological Science*, *26*(8), 1216-1228. doi: 10.1177/0956797615583295

Mok, E., & Wong, K. (2003). Effects of Music on Patient Anxiety. *AORN Journal*, *77*(2), 396-410. doi: 10.1016/s0001-2092(06)61207-6

Mornhinweg, G. (1992). Effects of Music Preference and Selection on Stress Reduction. *Journal of Holistic Nursing*, *10*(2), 101-109. doi: 10.1177/089801019201000202

Mouchet-Mages, S., & J. Baylé, F. (2008). Sadness as an integral part of depression. *Dialogues In Clinical Neuroscience*, *10*(3), 321-327. doi: 10.31887/dcns.2008.10.3/smmages

Muntingh, A., van der Feltz-Cornelis, C., van Marwijk, H., Spinhoven, P., Penninx, B., & van Balkom, A. (2011). Is the beck anxiety inventory a good tool to assess the severity of anxiety? A primary care study in The Netherlands study of depression and anxiety (NESDA). *BMC Family Practice*, *12*(1). doi: 10.1186/1471-2296-12-66

Schaefer, H. (2017). Music-Evoked Emotions—Current Studies. *Frontiers in Neuroscience*, *11*. doi: 10.3389/fnins.2017.00600

Schäfer, T., Sedlmeier, P., Städtler, C., & Huron, D. (2013). The psychological functions of music listening. *Frontiers in Psychology*, *4*. doi: 10.3389/fpsyg.2013.00511

Schwartz, K., & Fouts, G. (2003). Music Preferences, Personality Style, and Developmental Issues of Adolescents. *Journal of Youth And Adolescence*, *32*(3), 205-213. doi: 10.1023/a:1022547520656

Tourangeau, R., & Yan, T. (2007). Sensitive questions in surveys. *Psychological Bulletin*, *133*, 859–883. https://doi.org/10.1037/0033-2909.133.5.859

Van de Winckel, A., Feys, H., De Weerdt, W., & Dom, R. (2004). Cognitive and behavioural effects of music-based exercises in patients with dementia. *Clinical Rehabilitation*, *18*(3), 253-260. doi: 10.1191/0269215504cr750oa

Vésteinsdóttir, V., Joinson, A., Reips, U., Danielsdottir, H., Thorarinsdottir, E., & Thorsdottir, F. (2018). Questions on honest responding. *Behavior Research Methods*, *51*(2), 811-825. doi: 10.3758/s13428-018-1121-9

Vuoskoski, J., & Eerola, T. (2011). The role of mood and personality in the perception of emotions represented by music. *Cortex*, *47*(9), 1099-1106. doi: 10.1016/j.cortex.2011.04.011

Weisberg, Y., DeYoung, C., & Hirsh, J. (2011). Gender Differences in Personality across the Ten Aspects of the Big Five. *Frontiers In Psychology*, *2*. doi: 10.3389/fpsyg.2011.00178

Xue, C., Li, T., Yin, S., Zhu, X., & Tan, Y. (2018). The influence of induced mood on music preference. *Cognitive Processing*, *19*(4), 517-525. doi: 10.1007/s10339-018-0872-7

Yoon, S., Verona, E., Schlauch, R., Schneider, S., & Rottenberg, J. (2020). Why do depressed people prefer sad music?. Emotion, 20(4), 613-624. doi: 10.1037/emo0000573

Zhou, L., Zhang, Y., Tian, Y., Fu, X., Wang, L., & Xie, C. (2020). Effect of music intervention on mental health in patients with diabetes mellitus: protocol for a

systematic review and meta-analysis of randomised controlled trials. *BMJ Open*, *10*(8). doi: 10.1136/bmjopen-2019-036268

Appendix

Appendix 1: Sample Questionnaire

What is your Gender?

1. Male
2. Female
3. Other

What is your age ?

: *(Participant entered in their age)*

What country are you from?

A – Z country list

Marital Status?

1. Single
2. In a relationship
3. Married
4. Divorced
5. Widowed
6. It’s complicated

Level of Education?

1. Secondary level
2. Degree
3. Masters
4. Doctorate

Appendix 2: Becks Depression Inventory

Beck's Depression Inventory

1.	0	I do not feel sad
	1	I feel sad
	2	I am sad all the time and I can't snap out of it
	3	I am so sad and unhappy that I can't stand it
2.	0	I am not particularly discouraged about the future
	1	I feel discouraged about the future
	2	I feel I have nothing to look forward to
	3	I feel the future is hopeless and that things cannot improve
3.	0	I do not feel like a failure
	1	I feel I have failed more than the average person
	2	As I look back on my life, all I can see is a lot of failures
	3	I feel I am a complete failure as a person
4.	0	I get as much satisfaction out of things as I used to
	1	I don't enjoy things the way I used to
	2	I don't get real satisfaction out of anything anymore
	3	I am dissatisfied or bored with everything
5.	0	I don't feel particularly guilty
	1	I feel guilty a good part of the time
	2	I feel quite guilty most of the time
	3	I feel guilty all of the time
6.	0	I don't feel I am being punished
	1	I feel I may be punished
	2	I expect to be punished
	3	I feel I am being punished
7.	0	I don't feel disappointed in myself
	1	I am disappointed in myself
	2	I am disgusted with myself
	3	I hate myself
8.	0	I don't feel I am any worse than anybody else
	1	I am critical of myself for my weaknesses or mistakes
	2	I blame myself all the time for my faults
	3	I blame myself for everything bad that happens
9.	0	I don't have any thoughts of killing myself
	1	I have thoughts of killing myself, but I would not carry them out
	2	I would like to kill myself
	3	I would kill myself if I had the chance

10.
0 I don't cry any more than usual
1 I cry more now than I used to
2 I cry all the time now
3 I used to be able to cry, but now I can't cry even though I want to

11.
0 I am no more irritated by things than I ever was
1 I am slightly more irritated now than usual
2 I am quite annoyed or irritated a good deal of the time
3 I feel irritated all the time

12.
0 I have not lost interest in other people
1 I am less interested in other people than I used to be
2 I have lost most of my interest in other people
3 I have lost all of my interest in other people

13.
0 I make decisions about as well as I ever could
1 I put off making decisions more than I used to
2 I have greater difficulty in making decisions more than I used to
3 I can't make decisions at all anymore

14.
0 I don't feel that I look any worse than I used to
1 I am worried that I am looking old or unattractive
2 I feel there are permanent changes in my appearance that make me look unattractive
3 I believe that I look ugly

15.
0 I can work about as well as before
1 It takes an extra effort to get started at doing something
2 I have to push myself very hard to do anything
3 I can't do any work at all

16.
0 I can sleep as well as usual
1 I don't sleep as well as I used to
2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep
3 I wake up several hours earlier than I used to and cannot get back to sleep.

17.
0 I don't get more tired than usual
1 I get tired more easily than I used to
2 I get tired from doing almost anything
3 I am too tired to do anything

18.
0 My appetite is no worse than usual
1 My appetite is not as good as it used to be
2 My appetite is much worse now
3 I have no appetite at all anymore

19.
0 I haven't lost much weight, if any, lately

1 I have lost more than five pounds
2 I have lost more than ten pounds
3 I have lost more than fifteen pounds

20. 0 I am no more worried about my health than usual
1 I am worried about physical problems like aches, pains, upset stomach, or constipation
2 I am very worried about physical problems and it's hard to think of much else
3 I am so worried about my physical problems that I cannot think of anything else

21. 0 I have not noticed any recent change in my interest in sex
1 I am less interested in sex than I used to be
2 I have almost no interest in sex
3 I have lost interest in sex completely

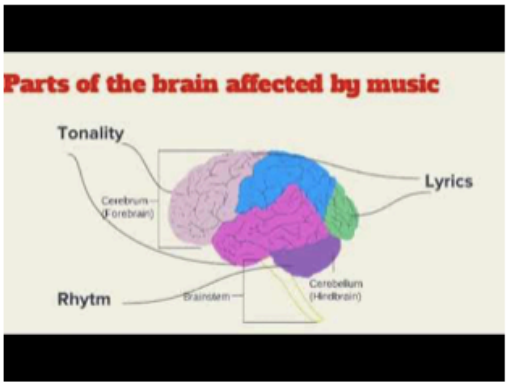
Appendix 3
: **Becks Anxiety Inventory**

	Not at all	Mildly, but it didn't bother me much	Moderately – It wasn't pleasant at times	Severely – It bothered me a lot
Numbness or tingling	0	1	2	3
Feeling Hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding / racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot / cold sweats				

Appendix 4: Music Scale

Please listen to each piece of music and select the number that suits how you feel about that piece of music.
1= I hate this piece of music
2= I dislike this piece of music
3= I neither like nor dislike this music
4= I like this piece of music
5= I love this piece of music

A Music



How would you rate this piece of music (A) *

	1	2	3	4	5	
I hate	○	○	○	○	○	I love

Appendix 5: Consent form

In agreeing to participate in this research I understand the following:

This research is being conducted by Josh Kennedy, an undergraduate student at the School of Business, National College of Ireland.

The method proposed for this research project has been approved in principle by the Departmental Ethics Committee, which means that the Committee does not have concerns about the procedure itself as detailed by the student. It is, however, the above-named student's responsibility to adhere to ethical guidelines in their dealings with participants and the collection and handling of data.

If I have any concerns about participation, I understand that I may refuse to participate or withdraw at any stage.

I have been informed as to the general nature of the study and agree voluntarily to participate. There are no known expected discomforts or risks associated with participation.

All data from the study will be treated confidentially. The data from all participants will be compiled, analysed, and submitted in a report to the Psychology Department in the School of Business. No participant's data will be identified by name at any stage of the data analysis or in the final report.

At the conclusion of my participation, any questions or concerns I have will be fully addressed.

I may withdraw from this study at any time and may withdraw my data at the conclusion of my participation if I still have concerns.

Signed: _____

Participant _____

Researcher _____ Date _____

Appendix 6: Participant Information Sheet

What is this study about? - My name is Josh Kennedy and I am a final year student in the BA in Psychology programme at the National College of Ireland. As part of our degree we must carry out an independent research project. For my project, I aim to investigate the relationship between depression, anxiety and music preferences.

What will taking part in the study involve? - If you decide to take part in this research, you will be asked to complete this questionnaire which will entail of some general questions as well as two questionnaires about depression and anxiety and you will also be asked to listen to 20 snippets of music which will play for between 10-15 seconds then you will rate these pieces of music from 1 – 5 with 1 being 'I hate this piece of music' , 3 being 'I feel indifferent towards this piece of music' and 5 being 'I love this piece of music'. This survey should take between 15 and 20 minutes.

Who can take part? - You can take part in this study if you are aged over 18.

Do I have to take part? - Participation in this research is voluntary; you do not have to take part, and a decision not to take part will have no consequences for you. If you do decide to take part, you can withdraw from participation at any time but once you have submitted the survey it will not be possible to withdraw your data from the study as the survey is anonymous and individual responses cannot be identified

What are the possible risks and benefits of taking part? - There are no direct benefits to you for taking part in this research. However, the information gathered will contribute to research that helps us to understand the relationship between depression, anxiety and our musical preferences. There is a small risk that some of the questions contained within this survey may cause minor distress for some participants. If you experience this, you are free to discontinue participation and exit the questionnaire. Contact information for relevant support services are also provided at the end of the questionnaire.

Will taking part be confidential and what will happen to my data? - The questionnaire is anonymous, it is not possible to identify a participant based on their responses to the questionnaire. All data collected for the study will be treated in the strictest confidence. Responses to the questionnaire will be stored securely in a password protected/encrypted file on the researcher's computer. Only the researcher and their supervisor will have access to the data. Data will be retained for 5 years in accordance with the NCI data retention policy.

What will happen to the results of the study? - The results of this study will be presented in my final dissertation, which will be submitted to National College of Ireland and the results of the project may also be presented at conferences and/or submitted to an academic journal for publication.

Who should you contact for further information?

Lead researcher: Josh Kennedy

Email: JoshKennedyNCI@gmail.com

Supervisor: Michelle Kelly

Email: Michelle.Kelly@ncirl.ie

Appendix 7: Debriefing Sheet

Thank you for participating in this study of the association between music genre and depression and anxiety.

The research aims to examine the relationship between depression, anxiety and music preference. There are two research questions for this study. The first research question is do scores on measures of anxiety and depression predict the rating outcome on happy pieces of music and the second question is do scores on measures of anxiety and depression predict the rating outcome on sad pieces of music The two hypotheses are that levels of anxiety and

depression will predict the rating outcome of happy music and also that levels of anxiety and depression will predict the rating outcome of sad music.

Thank you again for taking part in this study. If there is anything you would like to discuss in relation to this study, please feel free to do so by contacting the researchers this information will be given below.

Email: joshkennedyNCI@gmail.com

In the even you feel psychologically distressed by participating in this study, we encourage you to call Dr. Michelle Kelly using the information below.

Email: Michelle.Kelly@ncirl.ie

Phone: 014498787

The following websites are focused on the topic of the study please get in touch or have a read if you feel like it could be useful to you.

Websites:

https://www.aware.ie/

http://anxietyireland.ie/

https://www.samaritans.org/ireland/samaritans-ireland/

https://www.pieta.ie

Appendix 8: SPSS Outlook and data file