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Individual differences and emotion regulation through music

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Abstract

Many individuals manipulate and change emotions using music. People may use different strategies to regulate emotions; some strategies may be adaptive in nature by producing positive emotions, or maladaptive, producing negative affect. Researchers have identified how different populations are likely to use music to regulate emotions and which strategies are commonly utilised by different groups of people. This is an active area of research, but no consensus has been achieved regarding the results of this field; thus, this thesis combines the data collected in previous studies into three meta-analyses, focussing on personality, mental health, and other demographics. A discussion of previous literature contextualises these results, focussing on other uses of music, namely cognitive and background uses, and genre preferences. Of the five traits of the Five-Factor Model of personality, neuroticism correlated the most with the regulation of emotions with a positive and medium-to-large correlation, suggesting that individuals with unstable emotions are more likely to regulate mood through music. Individuals with depression or stress are also likely to use music to regulate emotions with a small-to-medium correlation, further portraying that individuals with negative emotions are more likely to need to use regulatory strategies. Age negatively correlates with emotion regulation use with music, suggesting that as individuals get older, they are less likely to need to regulate emotions. This thesis recommends that the adaptive strategies reappraisal, the process of interpreting stressful situations in positive ways, and problem solving, adapting thought processes about stressful events, can be used in therapeutic settings as these techniques may change negative mood states into positive emotions, improving long-term subjective wellbeing. Future research is needed to focus on the effectiveness of applied emotion regulation through music on wellbeing, and whether certain genres of music in particular may help produce positive affect via music regulatory techniques.

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1. Introduction

Emotions, complicated within themselves, involve sensory perceptions, physiological changes, and conscious feelings (Tappolet, 2016). For many individuals, the need to exert control over emotions is necessary; this process is known as emotion regulation (Gross, 1998). Emotion regulation refers to the ‘processes by which people influence which emotions they have, when they have them, and how they experience or express these emotions’ (Gross & Thompson, 2007). Individuals may use different strategies to regulate emotions; some of these may be adaptive in nature (changing emotions in a positive way) or maladaptive (changing emotions in a negative way) (Gross & John, 2003).

Emotions can be regulated using various different tactics, such as music, sport, and film; individuals may have preference for different tactics depending on which activities they find enjoyable (Dhaka & Kashyap, 2017; Dennehy, 2014). People may need to regulate emotions if they want to change an unpleasant mood into a positive one, maintain positive emotions, or intensify negative emotions (Saarikallio, 2008). Individual differences often influence which type of regulation individuals will choose to use (Chamorro-Premuzic and Furnham, 2007).

1.1. Background of emotion regulation research

Research on emotion regulation began during the rise of psychoanalysis during the 1920s to late-1950s. Relating to anxiety, Sigmund Freud analysed ways in which anxiety can be regulated before anxiety-inducing events, helping individuals with this condition to function better in social situations (Gross, 1998). Psychologists began to focus explicitly on emotion regulation research in the latter half of the twentieth-century (Ibid.). Contemporary literature focusses on a range of different research areas, including how emotion regulation impacts parent psychology, sleep quality, and relationship satisfaction (Hughes & Gullone, 2010;

Vantieghem et al., 2016; Vater & Schröder-Abé, 2015). As emotion regulation through music began to interest researchers, studies identified that music listening is an effective regulatory strategy (Gallup & Castelli, 1989). In the past decade, it has been noted that the use of music in mood regulation is widely recognised, hence numerous psychologists and musicologists focus on this interdisciplinary field (Saarikallio, 2008).

Personality psychology is one area of research focus regarding emotion regulation, with studies previously analysing the influence of personality on the control over external events and internal psychological processes (Bandura, 1997; Logan & Cowan, 1984). Recently, research has indicated trends between the traits postulated by McCrae and Costa (1985) and emotion regulation use through music (e.g. the work of Chamorro-Premuzic). However, inconsistencies between these correlations mean that it is not apparent if an effect does in fact exist. To alleviate this problem, part of this dissertation will focus on personality and emotion regulation through music.

Mental health and emotion regulation use has also been of keen interest to researchers; Gross (1998) noted how emotion regulation is a ‘staple of psychotherapy’, showing the importance of emotion regulation research of informing therapeutic practices. Depression and stress are common facets in which researchers have focussed on in regard to emotion regulation through music (e.g. Vella & Mills, 2017; Thomson et al., 2014; Getz et al., 2012). This dissertation will further discuss the implications of these two mental health problems in regulatory processes, since music is becoming recognised as a useful tool to alleviate symptomology of mental health issues (NHS, 2018e).

Other demographics and correlations between emotion regulation have also been researched extensively, with particular focus on gender and age (Kwon et al., 2013; Nolen-Hoeksema & Aldao, 2011; Côté et al., 2011). Correlations with emotion regulation use through

music are inconsistent, particularly in relation to gender, therefore this dissertation will also identify whether an effect exists and why trends may exist regarding demographics.

1.2. Measurements of emotion regulation use through music

There are two predominant measurements of emotion regulation through music usage: the Music in Mood Regulation Scale and the Uses of Music Inventory. The Music in Mood Regulation Scale was first postulated by Saarikallio (2008), and considers ‘mood regulation as processes of satisfying personal mood-related goals with specific regulatory strategies’. The model comprises seven regulatory strategies:

- entertainment (‘creating a nice atmosphere and a happy feeling in order to maintain or enhance current positive mood’);
- revival (‘represents personal renewal: relaxing and getting new energy when feeling stressed or tired’);
- strong sensation (‘searching for intense emotional experiences’);
- diversion (‘forgetting unwanted thoughts and feelings with the help of pleasant music’);
- discharge (‘emotional disclosure, releasing anger or sadness through music that expresses these emotions’);
- mental work (‘using music as a framework for mental contemplation and reappraisal of emotional preoccupations’);
- and solace (‘searching for feelings of being accepted and understood when feeling sad or troubled’).

Some of these strategies, then, can be either adaptive (such as entertainment, to enhance a positive mood) or maladaptive (such as discharge, to release negative mood) (Conklin et al., 2015).

The Uses of Music Inventory was created by Chamorro-Premuzic and Furnham (2007) to measure three different uses of music: emotional uses ('the extent to which music is used for inducing moods that change an individual's experienced emotionality'); cognitive uses ('the extent to which an individual listens to music in an intellectual or rational manner, analysing the structure of the composition or parts played by different instruments'); and background uses ('the extent to which an individual uses, tolerates, and enjoys music while working, studying, socialising, or performing other tasks'). The scale contains fifteen items to measure these three uses of music. Unlike Saarikallio's scale, however, mood regulation strategies are not measured; thus, in relation to emotion regulation use with music, the Music in Mood Regulation Scale is more descriptive. This project focusses primarily on studies that utilise either one of these scales.

1.3 Reasons for research

I was attracted to this research topic because I frequently used music to regulate emotions during my teenage years. Music was incredibly important to me because of this reason, and now, given the opportunity to conduct a large research project, I was interested to learn more about the different regulatory strategies and reasoning behind the need for using music to regulate emotions.

During the first stages of research for this project, a lack of consensus between different studies and their results was apparent. Additionally, no meta-analysis had been performed on the relationship between emotion regulation and individual differences. Thus, this project is unique in tying quantitative research on emotion regulation with music into a meta-analysis. Meta-analyses are useful in research as they offer the opportunity to combine evidence that has been previously accumulated across multiple studies (Evangelou, 2011). A meta-analysis may find statistical significance across studies, and eliminate bias which may be present in studies by comparing numerous different effect sizes (DeMaria, 2008). The results of the meta-

analyses help inform how emotion regulation through music may be applied to therapeutic settings, such as cognitive-behavioural therapy and self-therapies, since establishing appropriate regulation goals for different clients is often a problem that clinicians face (Gross, 1998). Understanding which individuals are likely to benefit from using emotion regulation through music may help combat this challenge. This project also includes various discussions of literature, which informs the quantitative findings of the meta-analyses. In addition, the discussion of qualitative materials may help the reader understand other trends in the literature that are not quantifiable.

1.4. Structure of dissertation

This project is divided into four main chapters, the first three of which focus on individual differences regarding regulating emotions with music. The first chapter focuses on personality traits and how individuals with different traits may use music to regulate their emotions in different ways. The second chapter analyses how people with mental disorders may interact with music to regulate emotions. The third chapter focuses on demographics, such as age and gender, and how these factors may predict music emotion regulation use. The final chapter notes how different strategies may cause negative or positive affect, and whether emotion regulation through music is a healthy tool that can be applied in therapeutic settings. To end this dissertation, limitations of this project are stated, recommendations for future research are detailed, and an overall conclusion is made about the research discussed in this paper.

2. Personality traits and emotion regulation through music

The links between personality and music have been of recent interest to researchers, with topics in the field including music preferences, uses of music in everyday life, and how personality impacts music performance (Chamorro-Premuzic and Furnham, 2007). This chapter aims to address how individuals with differing traits interact with emotional regulation and music. The first section of this chapter aims to answer *who* uses music to regulate emotions through a meta-analysis examining personality traits and emotional regulation use. The second section will then move on to answer *how* and *why* individuals would use music to regulate emotions whilst looking at correlations between different personality traits.

2.1. Personality traits and taxonomies

One key psychologist in developing trait theory was Gordon Allport, who in 1937 claimed that traits are mental structures which differ between individuals and initiate and guide behaviour (McLeod, 2017). There are several taxonomies of personality that measure traits, the most common taxonomy being the Five-Factor model of personality, first postulated by McCrae and Costa (1985). The model measures five broad personality traits: neuroticism, openness to experience, agreeableness, extraversion, and conscientiousness. Neuroticism is associated with emotional instability: individuals that score highly on this trait often experience negative emotion. Those who score highly on trait openness to experience are interested in trying new things and often have a broad range of interests. Agreeableness relates to trustworthiness, and individuals who score highly on this trait are commonly regarded as helpful and likeable. Extraversion is associated with sociable and assertive individuals, and individuals who score highly on this trait often experience positive emotion. Lastly, trait conscientiousness relates to competent, ordered, and self-disciplined individuals.

2.2. Meta-analysis

This meta-analysis documents the Pearson correlations and p-values of studies that have analysed the correlations between neuroticism, extraversion, and openness to experience with music emotional regulation. Effect sizes, or the ‘magnitude of the difference between groups’, can be represented through different statistical methods; in this meta-analysis, Pearson correlations (r), one type of effect size measurement, is utilised since the majority of studies in this area of academia also use this measurement (Sullivan & Feinn, 2012). P-values were also calculated, which reveal whether an effect exists, but not the size of the effect (Ibid.). For example, a high p-value suggests that an effect is likely to occur by chance. When conducting a quantitative study, a low p-value is sought to indicate that the obtained result is significant rather than spurious (Ibid.). Conscientiousness and agreeableness are not included in this meta-analysis due to the lack of research of these traits; only one study documented how agreeableness and conscientiousness correlated with music emotional regulation usage (Chamorro-Premuzic et al., 2009a).

2.2.1. Method

To properly conduct a meta-analysis, we must be sure to find all existing works to avoid any selection bias. To collect data for the meta-analysis, four main strategies were used. Firstly, a search for published articles on PsycINFO was conducted (up to the second week on June 2019). Secondly, a consultation of the citations of the Miranda and Blais-Rochette (2018) was performed. Thirdly, the Baltazar and Saarikallio (2016) literature review of music emotional regulation was referred to. These two studies concisely review previous literature regarding emotion regulation through music. Lastly, references from other articles were consulted.

2.2.1.1. Literature search

Four combinations of keywords were entered into the PsycINFO database; the following were searched for selectively in the abstract of articles to keep the search results relevant:

1. music AND emotion* regulation AND (personality (OR traits OR five factor OR big five OR neuroticism OR emotional stability OR extraversion OR conscientiousness OR openness OR agreeableness))
2. music AND mood regulation AND (personality (OR traits OR five factor OR big five OR neuroticism OR emotional stability OR extraversion OR conscientiousness OR openness OR agreeableness))
3. music AND emotion* management AND (personality (OR traits OR five factor OR big five OR neuroticism OR emotional stability OR extraversion OR conscientiousness OR openness OR agreeableness))
4. music AND mood management AND (personality (OR traits OR five factor OR big five OR neuroticism OR emotional stability OR extraversion OR conscientiousness OR openness OR agreeableness))

Inclusion criteria for searched articles contained quantitative studies, studies in the English language, studies that used self-report methods, articles from peer-reviewed articles, and articles that researched how individuals interact with music both to manage mood and in everyday life.

Articles were excluded from the meta-analysis if the research was qualitative, focused on personality disorders and interactions with music, based on music genre preference, or analysed music for therapy.

2.1.1.1.1 Search results

In total, 114 studies were found from PsycINFO (n = 13), the Miranda and Blais-Rochette (2018) study (n = 65), and the Baltazar and Saarikallio study (n = 35). With the inclusion and exclusion criteria applied, a total of 8 studies were applicable for the meta-analysis. The majority of these excluded studies were rejected due to the criterion for quantitative results.

2.1.1.1.2. Study characteristics

Table 1 indicates the studies used in the meta-analysis for each trait. Seven of the studies used in the analysis are cross-sectional and one is longitudinal, and all of the studies have been published in peer-reviewed journals. Five studies included university student populations, and three studies collected data via the internet or through leaflets. Three studies used the NEO-FFI, two studies used the IPIP, and the TIPI, BFQ, and BFI were used in three separate studies to measure personality.

2.1.1.2. Conducting the meta-analysis

A random-effects model¹ was used, as it was assumed that the effect sizes would differ between studies in a random way, rather than being dominated by systematic differences between methodologies. To find an overall p-value for the articles, the Fisher combined test² was used. First, a chi-squared (χ^2), a measure of the agreement between samples, is found using

Equation 1:
$$\chi^2 = -2 \times \sum \log_e(p)$$

where $\sum \log_e(p)$ represents the sum of the natural log of all p-values. The conversion between χ^2 and an overall p-value was done using an online calculator³, where the degrees of freedom (DF) is defined as the number of studies multiplied by 2.

¹ By using a random-effects model, the researcher assumes that the effect sizes of the studies used in a meta-analysis are heterogeneous (Haidich, 2010).

² Informed by Wolf, F. M., 1986. *Meta-analysis: quantitative methods for research synthesis*. California: Sage.

³ Social Science Statistics, n.d.. P-value from chi-square calculator. [Online] Available at: https://www.socscistatistics.com/pvalues/chidistribution.aspx?fbclid=IwAR1WB8m4tfnCncMMY_SjmigAQ0WOWorRSMahUNTPBCGdIPkSKwQcrUyh5gk

Table 1: Characteristics of the studies used in the meta-analysis (personality)

Study	Sample	Age (years)	Measures	Traits measured and used in meta-analysis
Blais-Rochette and Miranda (2016)	<ul style="list-style-type: none"> • 397 participants • 320 female • Undergraduate students • Location in Canada 	<p>$M = 19.17$ $SD = 1.55$</p>	<ul style="list-style-type: none"> • ERQ • TIPI 	<ul style="list-style-type: none"> • Extraversion
Carlson et al. (2015)	<ul style="list-style-type: none"> • 123 participants • 68 female • Location in Finland 	<p>$M = 28.8$ $SD = 8.89$</p>	<ul style="list-style-type: none"> • BFQ • MMR 	<ul style="list-style-type: none"> • Neuroticism
Chamorro-Premuzic and Furnham (2007)	<ul style="list-style-type: none"> • 341 participants • 241 female • University students • Location in Britain and USA 	<p>$M = 19.9$ $SD = 2.9$</p>	<ul style="list-style-type: none"> • NEO-FFI • ERM 	<ul style="list-style-type: none"> • Neuroticism
Chamorro-Premuzic et al. (2009a)	<ul style="list-style-type: none"> • 245 participants • 227 female • University students • Location in Spain 	<p>$M = 20.1$ $SD = 1.7$</p>	<ul style="list-style-type: none"> • NEO-FFI • ERM 	<ul style="list-style-type: none"> • Neuroticism • Extraversion • Openness to experience
Chamorro-Premuzic et al. (2009b)	<ul style="list-style-type: none"> • 227 participants • 165 female • University students • Location in Malaysia 	<p>$M = 21.5$ $SD = 0.88$</p>	<ul style="list-style-type: none"> • NEO-FFI • ERM 	<ul style="list-style-type: none"> • Neuroticism • Extraversion
Chamorro-Premuzic et al. (2010)	<ul style="list-style-type: none"> • 100 participants • 58 female • Internet-based 	<p>$M = 23.9$ $SD = 7.4$</p>	<ul style="list-style-type: none"> • IPIP • ERM 	<ul style="list-style-type: none"> • Neuroticism • Extraversion • Openness to experience

Table 1 continued

Chamorro-Premuzic et al. (2012)	<ul style="list-style-type: none"> • 535 participants • 170 female • Location in Britain and other (internet-based) 	$M = 24.2$ $SD = 7.9$	<ul style="list-style-type: none"> • IPIP • ERM 	<ul style="list-style-type: none"> • Neuroticism • Extraversion • Openness to experience
Vella and Mills (2017)	<ul style="list-style-type: none"> • 122 participants • 90 female • Undergraduate students 	$M = 21.45$ $SD = 5.75$	<ul style="list-style-type: none"> • BFI • ERM 	<ul style="list-style-type: none"> • Neuroticism • Extraversion • Openness to experience

SD: standard deviation; ERQ: Emotional Regulation Questionnaire; TIPI: Ten-Item Personality Inventory; NEO-FFI: NEO Five-Factor Inventory; BFQ: Big Five Questionnaire; MMR: Music in Mood Regulation; USA: United States of America; ERM: Emotion Regulation through listening to Music; IPIP: International Personality Item Pool; BFI: Big Five Inventory.

The Pearson correlation⁴ \bar{r} is defined as the mean of all r -values weighted by the number of participants used in each study, i.e.

Equation 2:
$$\bar{r} = \frac{\sum(r \times w)}{\sum(w)}$$

where w is the square-root of the number of participants for each study (see *Table 3* for full calculations).

The Blais-Rochette and Miranda (2016) study detailed how those who score highly on trait extraversion use music to regulate emotions through reappraisal ($r = .16$; p -value ≤ 0.01) and suppression ($r = -.43$; p -value ≤ 0.01) techniques. The medium of these two scores was

⁴ Informed by Wolf, F. M., 1986.

calculated to produce an overall r -value ($r = -.14$; p -value ≤ 0.01) to represent music emotional regulation use by extraverts.

2.2.2. Results

The eight studies used in the meta-analysis comprised 1695 participants for trait neuroticism, 1369 for extraversion, and 745 for openness to experience. The weighted mean correlations for trait neuroticism, extraversion, and openness to experience are detailed in *Table 2*. The weighted mean correlation between music emotional regulation use and neuroticism, calculated across seven studies, is an effect of $r = .26$.

With a total of six studies, the weighted mean correlation for extraversion and music emotional regulation use is a small effect size of $r = .02$. Lastly, it was found that there was a small weighted mean correlation openness to experience of $r = .04$, calculated from a total of four studies.

The p -values for neuroticism and extraversion are ≤ 0.00001 , meaning the likelihood that the effect sizes of these traits are affected by chance is 0.0001%, which shows that these effect sizes are unlikely to have been calculated by chance. The p -value for openness to experience is ≤ 0.002323 , showing that there is a 0.02% chance that the effect size is coincidental. The p -values were assumed to be ≤ 0.05 of Chamorro-Premuzic et al.'s studies, since no p -values were provided.

2.2.2.1. Publication bias

Publication bias may occur when journals do not publish articles because they report small or insignificant effect sizes (Ioannidis, 2005), which could give a false impression of large effects since many studies reporting small effects are suppressed, therefore severely affecting any meta-analysis. It's difficult to test for publication bias (Razali et al., 2011). However, if we assume a random-effects model, then multiple measurements of the same effect will form a normal distribution in values of r in the absence of publication bias (Ibid.). There are numerous

Trait	Pearson correlation	Weighted p-value
Neuroticism	0.26	≤ 0.00001
Extraversion	0.02	≤ 0.00001
Openness to experience	0.04	≤ 0.002323

statistical methods to test for normality in a distribution, one of these being the Shapiro-Wilk test, argued to be the most effective and reliable (Ibid.).

The calculations for this test were completed using the `scipy.stats` module in Python. Since few studies were included for each trait in the meta-analysis, they were combined to produce a more accurate result. From the seventeen studies used in the meta-analysis, a p-value of ≤ 0.0187 was found, meaning there is more than a 5% chance there is publication bias in this meta-analysis since the p-value is below the ≤ 0.05 threshold.

2.2.3. Discussion

The meta-analytical findings show that there is a medium-to-large effect size of neuroticism and music emotional regulation use ($r = .26$), whereas extraversion and openness to experience yielded a small effect. It is important to note that an r -value of .10 equates to a small correlation, .20 is a typical effect size, and .30 is a large effect size (Gignac & Szodorai, 2016).

2.2.3.1. Neuroticism and emotional regulation

There was a significant correlation between neuroticism and emotional regulation detailed from the meta-analysis, with an overall effect size of $r = .26$. This finding is consistent with Miranda and Blais-Rochette's 2018 meta-analysis on emotional regulation and music, which found an overall r -value of .22 for individuals who scored highly on neuroticism. This finding is perhaps constant due to the emotional instability of those who score highly on trait neuroticism.

Table 3: Results from studies regarding music emotional regulation use and trait neuroticism, extraversion, and openness to experience

<i>Neuroticism</i>			
Study	<i>r</i>-value	N (no. of participants)	p-value
Carlson et al. (2015)	0.20	123	≤0.026
Chamorro-Premuzic and Furnham (2007)	0.30	341	≤0.01
Chamorro-Premuzic et al. (2010)	0.21	100	≤0.05
Chamorro-Premuzic et al. (2009a)	0.28	247	≤0.01
Chamorro-Premuzic et al. (2012)	0.28	535	≤0.01
Chamorro-Premuzic et al. (2009b)	0.26	227	≤0.01
Vella and Mills (2017)	0.20	122	≤0.025
<i>Extraversion</i>			
Study	<i>r</i>-value	N (no. of participants)	p-value
Chamorro-Premuzic et al. (2009b)	0.19	227	≤0.01
Chamorro-Premuzic et al. (2009a)	0.20	247	≤0.01
Chamorro-Premuzic et al. (2010)	-0.16	341	≤0.05
Chamorro-Premuzic et al. (2012)	0.10	35	≤0.05
Vella and Mills (2017)	0.09	122	≤0.05
Blais-Rochette and Miranda (2016)	-0.14	397	≤0.01
<i>Openness to experience</i>			
Study	<i>r</i>-value	N (no. of participants)	p-value
Chamorro-Premuzic et al. (2012)	0.08	35	≤0.05

<i>Table 3 continued</i>			
Chamorro-Premuzic et al. (2010)	-0.11	341	≤ 0.05
Chamorro-Premuzic et al. (2009a)	0.09	247	≤ 0.05
Vella and Mills (2017)	0.20	122	≤ 0.05

2.2.3.2. Extraversion and emotional regulation

It was interesting to find such a difference in effect size between Chamorro-Premuzic et al. (2009b) and Chamorro-Premuzic et al. (2010) for the extraversion trait. The highest effect size reported was $r = .19$ (Chamorro-Premuzic et al., 2009b), whereas the lowest effect size detailed in Chamorro-Premuzic et al. 2010's study was an r -value of $-.16$. Overall, the effect size was reported at $r = .02$. This score is not representative of the data found in the numerous studies included in the meta-analysis, judging from the highest and lowest scores reported in these two studies. It is unclear why this may be the case, as both negative and positive correlations of these traits are not consistent between methodologies. For example, Chamorro-Premuzic et al. (2010) reported a small-to-medium negative effect size of $r = -.16$, using the IPIP and ERM to measure personality and emotional regulation usage respectively. However, in Chamorro-Premuzic et al.'s 2012 study, using the same measurements and participants with similar demographics, they found an effect size of $r = .10$, a small positive effect correlation. Despite the meta-analytical findings, then, we can conclude that there is no effect, thus no correlation between extraversion and emotion regulation through music.

2.2.3.3. Openness to experience and emotional regulation

There was a small correlation between openness to experience and emotional regulation, with an r -value of $.09$. This is unsurprising, since other research has yielded small correlations regarding openness to experience and emotional regulation (Connor-Smith & Flachsbar, 2007;

and Barańczuk, 2019). This implies that people who score highly on trait openness to experience are no more or less likely to regulate their emotions through music.

2.2.3.4. Agreeableness, conscientiousness and emotional regulation

Due to a lack of research, trait agreeableness and conscientiousness are excluded from the meta-analysis. More research should detail effect sizes of these traits in regard to correlations between music emotional regulation use. Only one study from the eight found in the literary search detailed effect sizes for agreeableness and conscientiousness. The researchers found an effect size of $r = -.09$ for agreeableness and music emotional regulation use and $r = -.22$ for conscientiousness (Chamorro-Premuzic & Furnham, 2010). More research should detail r -values for these traits in order to find a consensus between studies, especially since conscientiousness has been found to have a negative-typical effect size in regards to emotional regulation use.

2.2.3.5. Criticism of sources

The reliability of the sources used in this meta-analysis may be questioned, as some variables may interfere with the results. For example, Carlson et al. (2015) measured each participant's musicianship, but did not include this when measuring effect sizes between variables. Additionally, Chamorro-Premuzic et al. (2009b) identified the different religions of participants in their study, but failed to apply this to any statistical information. In Chamorro-Premuzic et al.'s 2012 study, education level was measured, but was again not applied statistically to their study. Therefore there may be control variables present in these studies which have not been overtly addressed, causing the reliability of these effect sizes to be unreliable.

Furthermore, in Chamorro-Premuzic et al.'s 2009b and 2010 studies, the location of participants is not stated. The location of participants may also be regarded as a control variable, as people from different cultures may use music in different ways; however, this is

not addressed in either study, further adding unreliability to these effect sizes. Additionally, these studies may be biased as they do not portray correlations between the variables successfully. For example, in their 2010 study, Chamorro-Premuzic et al. measured how extraversion and openness to experience correlated with background and cognitive uses of music, but not how they relate to emotional uses. The graphs used to present their data adds to further confusion; if tables were used, this would both lessen the suspicion of bias and make it clearer to the reader how variables interact with one another.

Lastly, it is unfortunate that none of the studies identify *how* individuals use music to regulate emotions. Musicians may play certain pieces, for example, when attempting to reach a certain emotional goal; some individuals may attend a concert, and some may passively listen to music. In all of the studies used in this meta-analysis, the researchers assume that individuals use music passively to regulate emotions, avoiding other musical regulatory tactics. Although this will not affect the reliability of the effect sizes, it is misleading to state that all music regulation strategies are performed through music listening techniques alone.

2.3. Discussion of literature

In this section, correlations are drawn between traits and emotion regulation strategies. A discussion of correlations between personality traits and music preference identifies which types of music may be listened to when individuals use music to regulate emotions.

2.3.1. Correlations between personality traits and emotion regulation strategies

2.3.1.1. Neuroticism

Neuroticism positively and strongly correlated with music emotional regulation use in the meta-analysis ($r = .26$). It has also been noted in previous literature how those with higher neuroticism and engage in emotion regulation have a tendency to use maladaptive rather than adaptive techniques (Yoon, 2013). Neuroticism has also been found to positively correlate with avoidance ($r = .31$), a strategy which relates to avoiding both internal psychological events and

external situations, worry ($r = .59$), the process of thinking about the negative impacts of current situations, and rumination ($r = .47$), a strategy used when individuals focus attention on situations, emotional experiences, and their outcomes (Barańczuk, 2019). A small-to-medium effect size was also found between neuroticism and suppression of thoughts and emotions when using mood regulation ($r = .21$) (Barańczuk, 2019). In relation to music emotion regulation use, Carlson et al. (2015) noted that discharge, which refers to the release of sadness and/or anger whilst listening to music portraying these same emotions (Saarikallio, 2008), was positively correlated to neuroticism.

Individuals who score highly on trait neuroticism often experience unstable emotions, indicating that individuals with this trait may need to regulate mood more than others (McCrae and Costa, 1985).

2.3.1.2. Extraversion

The Pearson correlation of music emotion regulation use with extraversion was a non-significant finding ($r = .02$). However, the largest effect size from the studies was $r = .20$ (Chamorro-Premuzic et al., 2009a) and the lowest effect size was $r = -.16$ (Chamorro-Premuzic et al., 2010). It is unclear why this inconsistency exists, but it has been noted that extraverts who do use emotional regulation do so through adaptive strategies (Connor-Smith & Flachsbar, 2007). Extraversion has been commonly linked to cognitive change strategies, a technique where individuals change their thoughts about situations and experiences to reduce negative emotion (Purnamaningsih, 2017; Connor-Smith & Flachsbar, 2007). Reappraisal, a type of cognitive change strategy where an individual will change the thoughts about an experience or event by trying to reduce its emotional impact, also positively correlates with extraversion with an effect size of $r = .22$ (Barańczuk, 2019; Purnamaningsih, 2017).

Extraversion has been found to strongly and negatively correlate with suppression of thoughts and emotions ($r = -.37$) and rumination ($r = -.20$), suggesting that extraverts do not

experience negative emotions often, since these two strategies are associated with negative affect (Aldao et al., 2010; Kelley et al., 2019). Perhaps low extraversion predicts high neuroticism, meaning that introverts are also likely to experience unstable emotions.

2.3.1.2. Openness to experience

Similar to extraversion, in the meta-analysis openness to experience was not significantly correlated to music emotion regulation use ($r = .04$). Despite the non-significant correlation, some studies did find small-to-medium effect sizes (ranging from $r = -.11$ from Vella and Mills's 2017 study, to $r = .20$ from Chamorro-Premuzic et al.'s 2010 study). Openness has been linked to situation modification strategies, whereby an individual modifies an environment to alter its emotional impact (Purnamaningsih, 2017). For example, an individual who scores highly on openness might stop listening to subjective sad music if they start to feel sad themselves. Additionally, openness has been correlated to both adaptive and maladaptive emotion regulation use strategies. The adaptive strategy reappraisal has been positively and strongly correlated with openness ($r = .20$), and the maladaptive strategy rumination has also been found to strongly and positively correlate to openness, with an effect size of $r = .22$ (Barańczuk, 2019). Furthermore, sensation seeking, a technique in which individuals want to experience intense emotions (Saarikallio, 2008), was correlated with openness in both UK and Thai participants in one study which focused on music emotion regulation use (Yomaboot, 2016).

It seems unclear why those who score highly on openness to experience and use emotion regulation techniques use both adaptive and maladaptive strategies. Those who are open tend to have a wide range of interests, and perhaps this is why individuals also regulate emotions in a wide variety of ways (McCrae and Costa, 1985). Open individuals are keen to engage with various different experiences (Ibid.), which may also indicate why adaptive and maladaptive techniques are often used to regulate mood by these individuals.

2.3.1.3. Agreeableness

Agreeableness was not analysed in the meta-analysis due to lack of research into the relationship between this trait and emotional regulation. However, one study did report that agreeableness positively correlates with music emotion regulation use with an effect size of $r = .09$ (Chamorro-Premuzic et al., 2010). This trait is the least likely to predict emotion regulation use, but it has been noted that there are some small positive correlations between agreeableness and adaptive emotion regulation use: situation modification techniques have been found to positively correlate with agreeableness, but only by a small effect (Purnamaningsih, 2017). Moreover, cognitive change emotional regulation strategies have also been found to positively correlate with agreeableness, but, again, only by a small effect size (Ibid.).

Since those who score highly on trait agreeableness are often optimistic and get along well with others (McCrae & Costa, 1985), individuals who score highly on this trait may not need to regulate emotions due to a more positive outlook on life. Agreeable individuals may accept felt emotions as a part of everyday existence, meaning they do not feel motivated to adapt or change the impact of emotional experiences through music listening.

2.3.1.4. Conscientiousness

Similar to agreeableness, conscientiousness was not included in the meta-analysis due to a lack of research. However, unlike agreeableness, conscientiousness has been found to negatively and strongly correlate with music emotion regulation use, with an effect size of $r = -.22$ (Chamorro-Premuzic et al., 2010). Despite this, correlations have been found between conscientiousness and which strategies conscientious individuals are likely to use when emotion regulation does occur. Adaptive strategies are more commonly used than maladaptive strategies by conscientious individuals, and individuals are likely to use problem solving

techniques ($r = .29$) and cognitive change strategies to alter emotional states (Purnamaningsih, 2017; Barańczuk, 2019).

It is not obvious why such a significant negative effect size was found in Chamorro-Premuzic et al.'s 2010 study regarding conscientiousness and emotion regulation through music. Future research needs to be conducted so a Pearson correlation can be obtained and analysed. In terms of emotion regulation strategies, the engagement with adaptive regulation techniques is consistent with facets of conscientiousness, such as competence and dutifulness, which are both useful when solving problems (McCrae & Costa, 1985).

2.3.2. Other uses of music

It is beneficial to recognise other correlations with traits and music uses to further understand why certain individuals would use emotional regulation through music. Background music is often employed when socialising with family and friends, where music is not the focus of the attention, whereas cognitive uses of music include thinking deeply about music and dissecting a song or piece's musicological elements (Chamorro-Premuzic et al., 2010).

Neuroticism strongly correlates with emotional regulation music uses, but Chamorro-Premuzic et al. (2010) have noted how neuroticism does not correlate with the background use of music ($r = .03$) and cognitive uses of music ($r = .00$). This further demonstrates the importance of music to regulate emotions for many individuals with high trait neuroticism, and the lack of background and cognitive music use portrays how those with this trait are not motivated to use music in other ways apart from in an emotional context.

The meta-analysis indicated no correlations between extraversion and emotion regulation. However, it has been noted that extraversion correlates positively with background uses of music, with effect sizes measuring at $r = .14$ and $r = .25$ (Chamorro-Premuzic et al., 2009b; Chamorro-Premuzic et al., 2010). This result is consistent with the facets of extraversion, particularly the sociable aspect, as extraverts will often instigate events with

others meaning more opportunities to play or listen to music in the background (McCrae & Costa, 1985). Extraversion has also been found to negatively correlate with cognitive uses of music ($r = -.17$; Chamorro-Premuzic et al., 2012); this may be due to the contemporary and conventional music preferences of extraverts, which perhaps has fewer complex musicological aspects compared to other genres of music, such as bebop and avant-garde classical music (Schafer & Mehlhorn, 2017).

From the meta-analysis, openness to experience did not correlate with music emotion regulation, however openness has been found to positively correlate with cognitive uses of music with reported effect sizes of $r = .15$ and $r = .32$ (Chamorro-Premuzic et al., 2009b; Chamorro-Premuzic et al., 2010). These results are consistent with the facets of openness, as individuals who score highly on this trait have a variety of interests (McCrae & Costa, 1985), meaning open individuals may be interested in the relationship of different musicological aspects. Furthermore, researchers have concluded that there is no correlation between openness and background uses of music, identifying an effect size of $r = .01$ (Chamorro-Premuzic et al., 2009b).

Agreeableness has been noted to not correlate with emotional music use, and the same has been found in terms of cognitive and background uses of music. Chamorro-Premuzic et al. (2010) noted that agreeableness was not correlated with background uses ($r = .00$) and cognitive uses ($r = -.01$), further displaying how agreeableness does not predict how individuals interact with music.

Lastly, research has also shown that conscientiousness does not correlate with cognitive uses of music ($r = .04$), but does negatively correlate with background uses of music, with a small effect size of $r = -.15$ (Chamorro-Premuzic et al., 2010). It is not obvious why conscientiousness and background uses of music is negatively correlated, and suggests that

conscientious people in general tend not to listen to music through instrumental means, instead enjoying music intrinsically.

2.3.3. Traits and music preference

What types of music do individuals listen to when regulating emotions? The answer is mostly unclear due to a lack of research in the field (Chamorro-Premuzic et al. being the only researchers to publish their results in this area of academia), but many researchers have studied the relationship between personality traits and music preference in relation to emotion regulation. Noting these correlations will help gain an understanding of what music may be likely to be used in emotional regulation.

2.3.3.1. Neuroticism

It has been previously discussed that Chamorro-Premuzic et al. (2010) found a medium correlation between neuroticism and emotion regulation use through music ($r = .26$); the researchers also found that neuroticism correlated with a preference for subjective “sad” music. This is perhaps unsurprising considering the previous discussion on how neuroticism correlates with maladaptive strategies. However, what genre or type of music is identified as “sad” is not detailed in the study, something which would have been beneficial to musicologists wanting to continue research on the relationship between neuroticism and “sad” music.

Neuroticism also predicts a preference for “urban” music (defined by the researchers as including hip-hop, rap, soul, and blues genres). “Urban” music is non-significantly and positively related to young adolescent music preferences, whereas the opposite is true regarding older adolescent age groups (Delsing et al., 2017). These findings may just portray how preferences change between age groups, not between traits. More research should focus on this relationship to further our understanding on the relationships between traits, age, and preferences.

2.3.3.2. Extraversion

There is no published work on correlations between music preference, emotion regulation use through music, and extraversion. However, Chamorro-Premuzic et al. (2010) did find that extraverts who used music to listen to in the background would often listen to subjective “happy” music ($r = .34$). Like the “sad” music that individuals who score highly on neuroticism are likely to listen to, the definition of “happy” music is relative and alters between individuals.

Furthermore, trait extraversion correlates with a music preference for “elite” music (defined by the researchers as including classical, jazz, and gospel genres), positively when in relation to older adolescents and negatively regarding younger adolescents (Delsing et al., 2017). Similarly to neuroticism, this correlation indicates how age group differences can impact music preference within different personality traits.

As noted previously, extraversion has been found to correlate with “conventional” and contemporary genres of music with an effect size of $r = .12$ (Schafer & Mehlhorn, 2017; Rentfrow & Gosling, 2003). These findings are consistent with facets of extraversion, particularly the sociable aspect of the trait, as extraverts enjoy interacting with other individuals (McCrae & Costa, 1985); being knowledgeable about chart music is an easy way to connect to many individuals in social occasions due to the popularity of this type of music.

“Energetic” and “upbeat” music preference has also been found to correlate with trait extraversion, with an effect size of $r = .37$ (Vella & Mills, 2017). This may be due to the current popularity of dance music in the charts (Doward & Baldassari, 2018), relating to the last point that extraverts enjoy communicating with other people, hence would listen to popular music in order to socialise and have common-ground between others (McCrae & Costa, 1985). Thus, extraverts may use popular, contemporary, and “upbeat” music when regulating emotions.

2.3.3.3. Openness to experience

Genres for emotion regulation use through music in regard to openness to experience may include rock, which has been found to positively correlate with openness to experience (Rentfrow & Gosling, 2003) with effect sizes of $r = .16$ for soft rock (Schafer & Mehlhorn, 2017) and $r = .27$ for “rebellious” rock music such as heavy metal (Vella & Mills, 2017).

Furthermore, correlations have been found between openness to experience and a preference for “sophisticated” music such as classical, jazz, and blues (Rentfrow & Gosling, 2003), with effect sizes including $r = .24$ (Chamorro-Premuzic et al., 2010), $r = .37$ (Vella & Mills, 2017), $r = .21$ (Schafer & Mehlhorn, 2017) and $\beta = .18$ (Bonneville-Roussy et al. 2013). “Conventional” music preference has also been shown to negatively correlate with openness with an effect size of $r = -.36$ reported by Vella and Mills (2016).

It seems that open individuals prefer music that is not “mainstream”, which is in line with trait openness, as individuals high in this trait are open to a wide range of experiences and interests (McCrae & Costa, 1985). Rock music seems like the most probable choice of genre that individuals who score highly on openness to experience would listen to if they chose to regulate emotions through music.

2.3.3.4. Agreeableness

Agreeableness has been found to not correlate with any uses of music, so it is perhaps unnecessary to detail music preference due to the unlikely nature of an agreeable individual listening to music to regulate emotions. However, it should be briefly mentioned out of curiosity’s sake that it has been noted that agreeable individuals are likely to prefer “conventional”, country, or rock ‘n’ roll music (Rentfrow & Gosling, 2003; Schafer & Mehlhorn, 2017; Bonneville-Roussy et al., 2013). It is not obvious why these correlations have been found, but perhaps, for similar reasons to extraverts, agreeable people like to interact with

others, which is perhaps why there has been correlations identified between “conventional” music preference and this trait.

2.3.3.5. Conscientiousness

Those who score highly on the conscientious scale are not likely to use music for emotional regulation. Despite this, the music preferences of conscientious individuals are noted, in the case that people with this trait do use music to regulation emotions; it is thus necessary to indicate correlations between preference and conscientiousness to further understand the relationship between traits and emotion regulation through music. “Elite” music preferences have been found to positively correlate for younger adolescents and negatively for older adolescents (Delsing et al., 2007). Heavy metal and punk music preference has also been noted to negatively correlate with conscientiousness (Bonneville-Roussy et al., 2013). These results show that an individual who scores highly on the conscientious scale may be likely to use classical or jazz for emotional regulation if the individual is a young adolescent, but it is unlikely that individuals would listen to punk or heavy metal music to regulate emotions.

2.4. Conclusion

The meta-analysis of this chapter shows that neuroticism correlates with emotion regulation through music the strongest. The trait relates to emotional instability and negative emotion, meaning that those who are more neurotic may need to find ways to regulate mood more than those who score highly on other traits. There is no effect or relationship between either extraversion or openness to experience and emotion regulation through music, despite some studies finding significant correlations between these two traits and regulatory techniques.

Additionally, neurotic individuals are likely to use discharge, avoidance, suppression, and rumination techniques to regulate emotions through music, whereas extraverts are more likely to use adaptive strategies, such as cognitive change and reappraisal, to regulate emotions. Individuals who score highly on trait agreeableness and conscientiousness are also likely to use

adaptive techniques when regulating emotions, such as situation modification and cognitive change. Those who score highly on trait openness to experience may use both adaptive and maladaptive strategies, as correlations were found between this trait and reappraisal, situation modification, and rumination. This is perhaps due to the variation of experiences that open individuals are likely to encounter.

Neuroticism was found to not correlate with either background or cognitive uses of music, showing how emotion regulation is of importance to neurotic individuals when listening to music. Extraversion correlates with background uses of music, perhaps reflecting the sociability of extraverts, who may encounter more occasions to play music in the background during social situations. Openness to experience correlates with cognitive uses of music, portraying how open individuals may be interested in analysing the aspects of music, as these individuals are likely to have many interests and hobbies. Agreeableness did not correlate with any uses of music, suggesting that this trait does not have any impact on how individuals interact with music. Conscientiousness negatively correlates with background uses of music, suggesting that conscientious individuals may not listen to music instrumentally but intrinsically.

Furthermore, individuals who score highly on trait neuroticism and who regulate emotions through music are also likely to listen to subjective “sad” music, in comparison to extraverts who are more likely to listen to subjective “happy” music when manipulating emotions. Openness to experience correlates with a preference for rock music; the opposite finding is apparent for those who score highly on the conscientious trait. Additionally, agreeableness was found to correlate with country and rock ‘n’ roll music. These findings may indicate which genres individuals with certain traits are likely to listen to when using music to regulate emotions.

3. Mental health and emotion regulation through music

The previous chapter detailed how personality traits and individual differences affect emotional regulation use; this chapter aims to discuss how mental health can predict emotion regulation use through music, focussing on depression and stress, since these are the only two disorders that have been researched with sufficient quantifiable data. The data from this chapter may be applied to therapeutic settings, discussed further in the fifth section of this dissertation. Similarly to the previous chapter, the first section of this chapter will focus on a meta-analysis of previous research on emotion regulation use through music, detailing correlations with depression and stress, and the second section will focus on how individuals with depression and stress use emotion regulation. Music preferences will also be discussed, which may predict the music depressed and stressed individuals listen to when regulating emotions. The chapter will finish with some concluding thoughts on mental health and the results found in this chapter.

3.1. Mental health, depression, and stress: assessment and definitions

In the UK, assessments for mental disorders can be administrated by nurses and psychologists, amongst other health professionals (NHS, 2019b). The Diagnostic and Statistical Manual (DSM) and the International Classification of Diseases (ICD) are utilised by medical professionals in the USA and UK respectively to define both mental disorders and other health conditions (Cherry, 2019; OCD UK, n.d.). In the ICD, recurrent depressive disorder, formerly known as “depression”, is defined as ‘repeated episodes of depression [...] lowering of mood, and decrease in activity’ (World Health Organisation, 2016, F32; F33). Depressed individuals may also experience disturbed sleep and reductions of enjoyment, concentration, and appetite (Ibid.).

Although stress is not technically a mental disorder, it may lead to medical conditions such as depression and anxiety (Shiel, n.d.). Stress is characterised as a ‘physical, mental, or

emotional factor that causes bodily or mental tension'. Stress may be caused by both internal (e.g. illness) or external (e.g. workplace) situations and can lead to health problems such as high blood pressure and irritable bowel syndrome (Ibid.).

There are various methods of measuring mental health problems. The most common measurement of depression is perhaps the Beck Depression Scale, which is a survey comprised of 21 statements, each with a 4-point Likert scale, measured from 0 to 3 (Beck et al., 1988). Other methods of measurement include the Depression Anxiety Stress Scales, which also measures, unsurprisingly, anxiety and stress also (Nieuwenhuijsen et al., 2003) through a 42-item survey. The Perceived Stress Scale is perhaps the most common stress scale, comprised of a 10-item Likert scale (Cohen et al., 1983).

3.2. Meta-analysis

A meta-analysis was used to portray whether those with depression and stress interact with music to regulate emotions and to what scale. The Pearson correlations and weighted p-values were calculated for these two demographics.

3.2.1. Method

To collect data for the meta-analysis, I searched for published articles on the database PsycINFO and additionally found references from articles that related to the research topic.

3.2.1.1. Literature search

The following combination of keywords were entered into the PsycINFO database, selectively from abstracts:

1. music AND emotion* regulation AND (depress* OR stress OR anxiety OR mental health OR mental illness)
2. music AND mood regulation AND (depress* OR stress OR anxiety OR mental health OR mental illness)

3. music AND emotion* management AND (depress* OR stress OR anxiety OR mental health OR mental illness)
4. music AND mood management AND (depress* OR stress OR anxiety OR mental health OR mental illness)

Inclusion criteria for the study included quantitative studies, studies in the English language, studies that use self-report methods, studies in peer-reviewed journals, studies that depict how individuals interact emotionally with music, and studies that measured mental health and/or stress.

Studies were excluded from the meta-analysis if they were qualitative, were not in the English language, were not published in peer-reviewed journals, did not depict how individuals interact with music emotionally, and did not measure mental health of individuals.

3.2.1.1.1. Search results

53 studies were produced from the search criteria above through the PsycINFO database. From these, three were used in the meta-analysis, and one study derived from references was also included in the study.

3.2.1.1.2. Study characteristics

Table 4 portrays the different studies used in the meta-analysis and their different characteristics. All four studies are cross-sectional and published in peer-reviewed journals. Three studies used undergraduate participants, and one researched how veterans use emotion regulation usage. Two studies were performed in America, one in Australia, and in one study the location was not detailed. Three of the studies used young adults in the research (ranging

Table 4: Characteristics of the studies used in the meta-analysis (mental health)

Study	Sample	Age (years)	Measures	Disorders measured and used in meta-analysis
Vella and Mills (2017)	<ul style="list-style-type: none"> • 122 participants • 90 female • Undergraduate students 	$M = 21.45$ $SD = 5.75$	<ul style="list-style-type: none"> • The Beck Depression Scale • Perceived Stress Scale • The Uses of Music Inventory 	<ul style="list-style-type: none"> • Depression • Stress
Thomson et al. (2014)	<ul style="list-style-type: none"> • 146 participants • 93 female • University students • Australia 	$M = 20.81$ $SD = 1.96$	<ul style="list-style-type: none"> • Depression Anxiety Stress Scales • Music in Mood Regulation 	<ul style="list-style-type: none"> • Depression • Stress
Zoteyeva et al. (2016)	<ul style="list-style-type: none"> • 223 participants • 20 female • Veterans • Australia 	$M = 59.57$ $SD = 0.83$	<ul style="list-style-type: none"> • Australian National Depression Index • Perceived Stress Scale • Music in Mood Regulation 	<ul style="list-style-type: none"> • Depression • Stress
Getz et al. (2012)	<ul style="list-style-type: none"> • 154 participants • 123 female • Undergraduates • America 	$M = 18.95$ $SD = 0.96$	<ul style="list-style-type: none"> • Uses of Music Inventory • Perceived Stress Scale 	<ul style="list-style-type: none"> • Stress

from a mean age of 18.95 to 21.45), and one study used an adult population (mean age of 59.57). To measure stress, three studies used the Perceived Stress Scale and one used the Depression Anxiety Stress Scales. In regard to depression, one study used the Beck Depression Scale, one used the Australian National Depression Index, and one used the Depression Anxiety Stress Scales to measure mental health disorders. Two studies used the Uses of Music

Inventory to measure music use, and two studies used the Music in Mood Regulation scale. Three studies were used to measure depression, and four were used to measure stress in the meta-analysis.

3.2.1.2. Conducting the meta-analysis

The same calculations were used in this meta-analysis as the methods in the previous section, by using *Equation 1* and *Equation 2* to calculate a Pearson correlation and an overall p-value respectively.

3.2.2. Results

The four studies used in the meta-analysis comprised 491 participants for the depression category and 645 participants for the stress category. The Pearson correlations for depression and stress and music emotion regulation use is detailed in *Table 5*. The weighted mean correlation between music emotional regulation use and depression calculated across three studies was an effect of $r = .14$. From a total of four studies, the weighted mean correlation for the stress category was also an effect size of $r = .14$.

The p-values of the depression and stress scales measured below ≤ 0.0017 , meaning it is unlikely that the effect is coincidental. The p-values of both Thomson et al.'s results and the stress variable of Zoteyeva et al.'s study was assumed to be ≤ 0.05 , as p-values were not indicated in the original articles.

Category	Pearson correlation	Weighted p-value
Depression	0.14	≤ 0.000102
Stress	0.14	≤ 0.001694

Table 6: Results from studies regarding music emotional regulation use and depression and stress

<i>Depression</i>			
Study	r-value	N (no. of participants)	p-value
Vella and Mills (2017)	0.28	122	≤0.01
Thomson et al. 2014	-0.03	146	≤0.05
Zoteyeva et al. (2016)	0.18	223	≤0.05
<i>Stress</i>			
Study	r-value	N (no. of participants)	p-value
Getz et al. (2012)	0.16	154	≤0.001
Vella and Mills (2014)	0.20	122	≤0.05
Thomson et al. (2014)	0.04	146	≤0.05
Zoteyeva et al. (2016)	0.16	223	≤0.05

3.2.2.1. Publication bias

The same calculations for publication bias were used in this meta-analysis as the previous analysis. From six studies, a p-value of ≤ 0.0349 was calculated, meaning there is a 5% chance of publication bias in this meta-analysis, as the p-value falls below the ≤ 0.05 threshold.

3.2.3. Discussion

The meta-analysis findings portray that there is a small-to-medium effect for both depression and stress with an effect size of $r = .14$. Indeed, Gignac and Szodorai (2016) note that results with an r -value of 0.10 portrays a small correlation, 0.20 represents a medium effect, and 0.30 indicates a large effect.

3.2.3.1. Depression and emotional regulation

As noted, there was a small-to-medium effect regarding depressed individuals and emotion regulation through music. Depressed individuals may use these mechanisms to help control low mood that is often experienced in depressive episodes. Due to the negative states associated with depression, we can hypothesise that depressed individuals will use adaptive strategies less when using music to regulate emotions. This topic will be discussed further on in this section.

3.2.3.2. Stress and emotional regulation

The meta-analysis revealed a small-to-medium effect regarding stressed individuals and the use of emotion regulation through music. Like depressive states, stress may often be associated with negative states, hence why some individuals may need to regulate emotions through the use of music. Again, since negative states are associated with stress, we can hypothesise that maladaptive emotion regulation strategies will be used more than adaptive strategies when stressed individuals use music to regulate emotions.

3.2.3.3. Criticisms of sources used in meta-analysis

The methodology of the studies used in this meta-analysis are successful in portraying how different variables interact with emotional regulation. In the cited studies, different demographics were depicted statistically, albeit these were sometimes not correlated with other variables, for example in Zoteyeva et al.'s study. This means that demographics may act as control variables.

Similarly to the studies used in the previous meta-analysis, the way individuals used music to regulate emotions was not identified. In Getz's study, different musical activities were reported using the Music in Everyday Life scale, but the results from this survey were not presented through statistics and effect sizes, therefore it is unclear whether individuals use other musical activities aside from passive listening to regulate emotions.

3.3. Discussion of literature

The meta-analysis detailed that depressed and stressed individuals may be likely to use music to regulate emotions. This section aims to discuss the correlations between depressed and stressed individuals and different music emotion regulation strategies, whilst also discussing correlations with anxiety, another researched mental disorder in this area of academia.

3.3.1. *Correlations between mental states and emotion regulation strategies*

3.3.1.1. Depression

As aforementioned in the previous section, depressed individuals are likely to experience low mood, and it was hypothesised that depressed individuals may use maladaptive strategies more so than adaptive strategies when using music to regulate emotions. Indeed, medium-to-large effect sizes have been found in regard to depression and discharge strategy: Thomson et al. (2014) found an effect size of $r = .25$, while Zoteyeva et al. (2016) found an effect size of $r = .23$. Additionally, the strategy strong sensation, when an individual wants to ‘lose themselves’ in emotions (Saarikallio, 2008), can be both adaptive and maladaptive depending on the emotions that an individual wants to intensify. Researchers have found a small effect size for depressed individuals to use this strategy when using music to regulate emotions ($r = .15$ found by Thomson et al., 2014, and $r = .10$ found by Zoteyeva et al., 2016). In relation to adaptive techniques, there have been both small and medium to large results regarding depression. Depressed individuals have been found to use diversion as a music emotion regulation strategy, with researchers finding an effect size of $r = .18$ (Thomson et al., 2014); however, other studies have found no significant findings in relation to depression and diversion strategy (Zoteyeva et al., 2016). Additionally, entertainment, a strategy associated with positive emotion (Saarikallio, 2008) was found to strongly and negatively correlate with depression (Thomson et al., 2014), but also to correlate with depression with a small effect size (Zoteyeva et al., 2016). Since Thomson et al. (2014) studied emotion regulation through music with young

adults and Zoteyeva et al. (2016) studied a population with a mean age of 59.57, perhaps there are age differences in how depressed individuals use music emotion regulation strategies.

Further research in relation to general emotion regulation may also indicate other ways depressed individuals may use music to regulate emotions. Avoidance-distraction techniques have been found to strongly and positively correlate with depression (Aldao et al., 2010; Cantanzaro, 1997), perhaps a strategy used by depressed individuals to help disassociate from negative states. Suppression techniques has been found to also positively and strongly correlate with depression, perhaps due to the same reason as using avoidance-distraction strategies (Ibid.). Rumination has also be found to strongly and positively correlate with depression (Ibid.). Depression has been found to predict anxiety, Thomson et al. finding an effect size of $r = .64$, which may indicate why depressed individuals have a tendency to ruminate, as individuals may worry about past events.

3.3.1.2. Stress

Individuals who are stressed are likely to use music as an emotional regulation tool, as detailed in the previous meta-analysis. Similar to depression, it was hypothesised that stressed individuals are likely to use maladaptive techniques rather than adaptive strategies in emotion regulation use due to the negative impact that stress can have on the body. Indeed, it has been found that stressed individuals are likely to use music to discharge emotions, with effect sizes of $r = .32$ and $r = .23$ reported by Thomson et al. (2014) and Zoteyeva et al., (2016) respectively. Other correlations are inconsistent, particularly in regard to mental work. Thomson et al. (2014) found no correlation between this strategy and stress ($r = .01$), but Zoteyeva et al. (2016) found a strong and positive correlation ($r = .27$). Again, this result may indicate how age interferes with emotion regulation through music. Additionally, there have inconsistent results concerning strong sensation: studies have reported both a medium negative correlation and a medium positive correlation (Thomson et al., 2014; Zoteyeva et al., 2016). This suggests that

younger individuals with stress do not want to increase awareness of the experience of negative emotion, whereas older individuals do. More research needs to be completed to fully understand the relationship between age, stress, and emotion regulation through music. Lastly, unlike depression, there have been no significant findings regarding stress and entertainment strategy regarding emotion regulation through music, meaning that individuals with stress may not experience positive emotion frequently (Thomson et al., 2014).

3.3.1.3. Anxiety

Anxiety, in this dissertation meaning the generalisation of anxiety disorders such as social anxiety and generalised anxiety disorder (NHS, 2018c), has also been linked with music emotion regulation use, although not as extensively as stress and depression. Thomson et al. (2014) found that anxious individuals are likely to use discharge methods predominantly in music emotion regulation usage ($r = .33$), and are unlikely to use entertainment ($r = -.18$) and strong sensation ($r = -.15$) strategies. Anxious individuals are also likely to use avoidance ($r = .37$), rumination ($r = .42$) and suppression ($r = .29$) strategies (Aldao et al., 2010), further supporting the idea that anxious individuals use maladaptive techniques to cope with emotions.

3.3.2. Other uses of music and mental health

It is evident that some depressed and stressed individuals use music to regulate emotions, but to gain a better understanding on how individuals with depression and stress interact with music, it necessary to analyse other uses of music and correlations with these mental health problems. Two other uses of music include background (often utilised when socialising where music is not the focus of attention) and cognitive uses (thinking about music in depth and analysing musical elements) (Chamorro-Premuzic et al., 2010).

Depression has been found to have a medium and positive correlation with cognitive uses of music ($r = .15$; Vella & Mills, 2017) whilst some studies have shown a small effect ($r = .08$; Zoteyeva et al., 2016). Perhaps education may impact depression and cognitive use

correlation, since Vella and Mills (2017) were using a population of undergraduates, whereas Zoteyeva et al. (2016) were using a population where a minority had any higher education qualifications. More research into this field needs to be completed to make a reliable conclusion.

Contrary, Zoteyeva et al. (2016) found that stressed individuals were likely to use music for cognitive reasons ($r = .21$), whilst Vella and Mills (2017) found a small correlation ($r = .04$). If education did play a role in cognitive uses of music, why did these researchers find the opposite in correlation for stressed individuals compared to depressed individuals? Further research in the field needs to be completed in order to make a reliable conclusion.

Furthermore, a large and positive correlation has been found between depression and background uses of music, with an effect size of $r = .31$ (Vella & Mills, 2017). However, Zoteyeva et al. ((2016) only found a small-to-medium effect size of $r = .14$. It seems unclear why Vella and Mills (2017) found such a large effect size; perhaps age, again, can have an effect on depression and different uses of music, with younger individuals more likely to play music in the background due to studying or socialising. Similar findings were detailed in regard to stress: medium and positive correlations were found from both Zoteyeva et al.'s 2016 study and Vella and Mills's 2017 study. No findings have been detailed regarding cognitive and background uses of music and any other mental health conditions.

3.3.3. Mental health and music preference

To understand what kind of music depressed, stressed, and anxious individuals may listen to when listening to music to regulate emotions, it is informative to detail what music preference individuals with these mental health problems have. Two genre categories have been found to correlate with depression, stress, and anxiety: "upbeat-conventional" (researchers, Getz et al., 2014 for example, define this as an umbrella term for country, soundtrack, and pop genres);

and “intense-rebellious” (an umbrella term comprised of rock, heavy metal, hip-hop). These correlations are detailed below.

3.3.3.1. Depression

Those with depression are less likely to prefer music that is “upbeat-conventional” ($r = -.14$; Vella & Mills, 2017). Additionally, girls with depression were predicted to dislike soul ($r = -.24$), whereas there was a small negative correlation for preference for soul for boys ($r = -.05$) in a sample of adolescents (Miranda & Claes, 2008). In addition, individuals who were not at risk of depression in one study were predicted to prefer “Western pop” (Ekinici et al., 2013), although the researchers are not clear on the definition of this genre, therefore generalising popular music.

Furthermore, “intense-rebellious” music has been found to correlate with both individuals at risk of depression and those who are not at risk (Ekinici et al., 2013). Additionally, one study found that as general depression increases, the liking of music that induces sadness also increases (Hogue et al., 2016). These results suggest that depressed individuals are unlikely to listen to “upbeat” music, and may prefer music with slower tempi. Thus, depressed individuals may use this type of music when regulating emotions through music.

3.3.3.2. Stress

Unlike depressed individuals, stressed individuals have been found to prefer music that is “upbeat-conventional” ($r = .25$; Getz et al., 2014). However, unlike depressed individuals, stressed individuals are predicted to not like “intense-rebellious” music ($r = -.12$; Ibid.). It is unclear whether stressed individuals would listen to these types of music when using music to regulate emotion, especially since stressed individuals are likely to use discharge strategy, which is linked to negative affect (Carlson et al., 2015). It seems unlikely that “upbeat” music would elicit negative emotions.

3.3.3.3. Anxiety

The only correlation found for anxious individuals and music preference is that boys are more likely to listen to soul than girls (Miranda & Claes, 2008). It is perhaps disillusioned to say anxious males would listen to soul in particular when using music to regulate emotions, especially since only one study have identified music preference for anxious individuals. Thus, more research needs to study the relationship between anxiety and music preference.

3.4. Conclusion

This chapter identified a small-to-medium positive correlation between depression, stress, and music emotion regulation use. Pearson correlations for other mental disorders and emotion regulation through music is unknown due to the lack of quantifiable data.

The most common method used by depressed, stressed, and anxious individuals is discharge, portraying that individuals with these mental health problems are likely to use maladaptive techniques to deal with emotions. Individuals with depression or anxiety are also likely to use rumination and suppression strategies, suggesting that individuals with these mental health issues do not have the desire to achieve positive emotion.

Small correlations were found overall regarding background and cognitive uses of music and depression and anxiety. It seems that other demographics, such as age and education, impact uses of music more so than these two mental disorders. Stressed individuals are likely to listen to music in the background, but it is not obvious why this correlation exists.

Several studies have detailed that depressed individuals are likely to dislike “upbeat” music, whereas stressed individuals are likely to listen to “upbeat” genres. Few correlations were found between anxiety and music preference, suggesting that more research needs to be completed to fill this gap in the literature.

4. Demographics and emotion regulation through music

The previous sections detailed how personality and mental disorder can predict the use of music to regulate one's emotions. This section aims to focus on how different demographics, namely age and gender, can also predict how likely an individual would use music to regulate emotions. The meta-analysis in this chapter will show statistics on relationships between gender, age, and emotion regulation through music, and the literature section will discuss different strategies and how different demographics, including gender, age, intelligence, emotional intelligence, and education, can predict emotion regulation use through music.

4.1. Definitions

Although it is more accepted nowadays that gender is a social construction, it is necessary to first define some demographics that will be included in this chapter.

Emotional intelligence is the 'capacity to be aware of, control, and express one's emotions, and to handle interpersonal relationships judiciously and empathetically' (Lexico, n.d.). It seems necessary, then, to analyse this trait in relation to emotion regulation use as emotion regulation is, of course, directly related to emotion and mood.

This chapter will also discuss IQ and intelligence. IQ, short for intelligence quotient, is a 'number representing a person's reasoning ability (measured using problem-solving tests) as compared to the statistical norm or average for their age, taken as 100' (Lexico, n.d.). It seems that researchers in fields of psychology and music both have interest in finding trends between emotion regulation and intelligence, hence why it is included in this chapter on demographics.

4.2. Meta-analysis

This meta-analysis displays the effect sizes which are represented through Pearson correlations, shown as r . This type of effect size measurement is utilised many times across academia (Sullivan & Feinn, 2012). P-values are also included in this meta-analysis, to reveal whether effect exists, but not the size of the effect.

4.2.1. Method

4.2.1.1. Literature search

To produce articles for the meta-analysis, a literature search was conducted on the database PsycINFO. Sources were also used from previous chapters that detailed demographic information.

The following keywords were inputted into PsycINFO, searching in the abstracts of articles:

- music AND emotion* regulation AND (age OR gender OR sex OR intelligence OR IQ OR emotional intelligence OR education OR cultur* OR nationality OR race)
- music AND mood regulation AND (age OR gender OR sex OR intelligence OR IQ OR emotional intelligence OR education OR cultur* OR nationality OR race)
- music AND emotion* management AND (age OR gender OR sex OR intelligence OR IQ OR emotional intelligence OR education OR cultur* OR nationality OR race)
- music AND mood regulation AND (age OR gender OR sex OR intelligence OR IQ OR emotional intelligence OR education OR cultur* OR nationality OR race)

Articles were included from the criteria if they were quantitative, in the English language, used self-report methods, were peer-reviewed, portrayed how individuals interact with music to control emotions, and measured demographics.

Articles were excluded from the criteria if they were qualitative, were not in the English language, were not peer-reviewed, showed no interaction of music and emotion regulation use, showed no measure of demographics, or related to therapy.

4.2.1.1.1. Search results

From the literature review, 34 results were found from the database PsycINFO. With the inclusion and exclusion criteria applied, only three articles were found to be suitable for the meta-analysis.

4.2.1.1.2. Study characteristics

Study characteristics are detailed in *Table 7*. Two studies used the Uses of Music Inventory to measure emotion regulation with music, whilst one study used the Music in Mood Regulation scale. Two studies did not indicate how the researchers measured demographics, and one utilised a questionnaire, but it is unclear in which method the researchers used (i.e. paper, online, or interview). Two studies used university student populations, and one used an online demographic, with people from various jobs and education backgrounds. In terms of age, two studies' mean age was between 20 to 21, and one study's mean age was 24.2 with a standard deviation of 7.9.

Table 7: Characteristics of the studies used in the meta-analysis (demographics)

Study	Sample	Age (years)	Measures	Demographics measured and used in meta-analysis
Chamorro-Premuzic et al. (2009a)	<ul style="list-style-type: none"> ● 245 participants ● 227 female ● Undergraduate students ● Location in Spain 	<p>$M = 20.1$ $SD = 1.7$</p>	<ul style="list-style-type: none"> ● Uses of music inventory ● Demographics: not stated 	<ul style="list-style-type: none"> ● Age ● Gender
Chamorro-Premuzic et al. (2012)	<ul style="list-style-type: none"> ● 535 participants ● 170 female ● Online-based (Britain and other) 	<p>$M = 24.2$ $SD = 7.9$</p>	<ul style="list-style-type: none"> ● Uses of music inventory ● Demographics: not stated 	<ul style="list-style-type: none"> ● Age ● Gender
Thomson et al. (2014)	<ul style="list-style-type: none"> ● 146 participants ● 93 female ● University students ● Australia 	<p>$M = 20.81$ $SD = 1.96$</p>	<ul style="list-style-type: none"> ● Music in Mood Regulation ● Questionnaire (demographics) 	<ul style="list-style-type: none"> ● Age ● Gender

4.2.1.2. Conducting the meta-analysis

To produce this meta-analysis, the same calculations were used as in the previous two sections by calculating the Pearson correlation and overall p-value by using *Equation 1* and *Equation 2* respectively.

4.2.2. Results

From a total of 926 participants over three studies, the overall r -value of age and music emotion regulation use is $-.09$ with a p-value of ≤ 0.06 , and for gender the r -value is $.01$ with a p-value of ≤ 0.003288 . All of the r -values reported in the meta-analysis in relation to age are negative, the most significant being $-.14$ with a p-value of ≤ 0.05 (Chamorro-Premuzic et al., 2009a) and the least significant being $-.01$ with a p-value of ≤ 0.89 . The latter p-value indicates that there is a 89% likelihood that the effect occurs randomly.

Concerning gender, the most significant r -value calculated was $.20$ with a p-value of ≤ 0.01 (Chamorro-Premuzic et al., 2009a) and the least significant being $.05$ with a p-value of ≤ 0.05 . This suggests that gender may play a role in predicting emotion regulation in Spanish participants but not in British participants.

The weighted p-value for the age factor is quite high with a 6% chance that the effect is coincidental. This means that although there is a negative correlation between age and emotion regulation use, there is a chance that there is in fact no effect.

4.2.2.1. Publication bias

Using the same tests as in the previous two sections, across the six studies used in this meta-analysis a p-value of 0.107 was calculated, meaning there is less than a 5% chance of publication bias in this meta-analysis, since the p-value is above the ≤ 0.05 threshold.

Category	Pearson correlation	Weighted p-value
Age	-0.09	≤ 0.06
Gender	0.01	≤ 0.003288

<i>Gender</i>			
Study	<i>r</i> -value	N (no. of participants)	p-value
Chamorro-Premuzic et al. (2009a)	0.20	245	≤ 0.01
Chamorro-Premuzic et al. (2012)	-0.14	535	≤ 0.01
Thomson et al. (2014)	0.05	146	≤ 0.05
<i>Age</i>			
Study	<i>r</i> -value	N (no. of participants)	p-value
Chamorro-Premuzic et al. (2009a)	-0.14	245	≤ 0.05
Chamorro-Premuzic et al. (2012)	-0.10	535	≤ 0.05
Thomson et al. (2014)	-0.01	146	≤ 0.89

4.2.3. Discussion

The meta-analysis found a small negative effect in relation to age and emotion regulation use through music and a small and positive effect in relation to gender and emotion regulation through music. It should be noted, as in previous chapters, that an *r*-value of 0.10 shows a small

correlation, a r -value of 0.20 shows a medium effect, and a correlation of 0.30 shows a large effect (Gignac & Szdorai, 2016).

4.2.3.1. Gender and emotional regulation

In regard to gender, a positive correlation would mean that men are predicted to use music to regulate emotion, whereas a negative score would indicate a predictability that women would use music to regulate music more. In this meta-analysis, it was found that there was a small and positive effect, meaning that gender did not predict emotion regulation use in regard to music. Interestingly, it was found that there was a medium and positive effect in one study (Chamorro-Premuzic et al., 2009a). Since this study was conducted in Spain, perhaps it is more likely that Spanish men would use music to regulate emotions in comparison to women. As portrayed in Chamorro-Premuzic et al.'s 2012 study, there was a negative and small correlation in relation to women and emotion regulation use through music, meaning British women may be more inclined than Spanish women to use this regulatory technique. It is not clear why this is the case, hence more research needs to be conducted that analyses the relationship between gender and music emotion regulation use across cultures.

4.2.3.2. Age and emotion regulation

The meta-analysis found a negative and small correlation for age and music emotion regulation use. The negative score means that as age increases, likelihood to use music to regulate emotions decreases. These findings are consistent across all of the studies, since all three studies, although varying in significance, all portrayed negative effect sizes. It is interesting that the p -value of Thomson et al.'s 2014 is so high, suggesting that the effect size listed in this study is limited. The overall effect size may indicate that younger people have more trouble with emotions and expressing them, turning to music to help feel understood and to interpret their moods.

4.2.3.3. Criticisms of studies in meta-analysis

The studies used in this meta-analysis are successful in portraying how age and gender correlate with the regulation of emotions using music. Other demographics could have been measured, however. In Chamorro-Premuzic et al.'s 2012 study, they identified the different nationalities and education levels of participants, but failed to show how these demographics correlated with emotion regulation through music. Additionally, in Thomson's study, musical behaviours were measured, but they were not included in any statistical material, thus it is unclear how these behaviours correlate with emotional regulation.

Similarly to the previous two meta-analyses, these studies did not portray how individuals use music to regulate emotions. It is again assumed that individuals passively listen to music, with researchers ignoring other forms of musical regulation. Despite this, the meta-analytical effect sizes are reliable due to the unbiased methodology that the authors utilised in their respective studies.

4.3. Discussion of literature

This section will investigate how previously mentioned demographics gender and age predict which strategies individuals use to regulate emotions through music, whilst analysing other demographics including education, intelligence, and emotional intelligence. This section will also discuss the relationship between these demographics and other uses of music and how music preference may be influenced through these demographics, which may inform researchers of what music is listened to when individuals regulate their emotions.

4.3.1. Correlations between demographics and emotion regulation strategies

4.3.1.1. Age

Researchers are keen to use adolescents as a target population for research that analyses emotion regulation through music (Saarikallio, 2007). As mentioned in the previous section, age is negatively correlated with music emotion regulation use, hence when individuals get

older it is less likely for them to use music to regulate emotions. Some argue that as adolescents progress from childhood to adulthood, their use of music for regulation also increases (Saarkallio, 2006). This may be due to new experiences and responsibilities, which may produce negative emotion that needs to be controlled. However, older individuals may still use music to regulate emotions, and it has been argued that older and younger adults will use different strategies to do so (Gross & Levenson, 1993).

One strategy, rumination, has been identified to have a negative relationship with age ($\beta = -.30$) in relation to adults, suggesting that younger people overthink situations and events more so than older adults (Leipold & Loepthien, 2015). Additionally, older people are more likely to reappraise emotions in a positive or cognitive way, suggesting that older individuals think more carefully about emotions and have a more positive response to them (Charles & Carstensen, 2007; John & Gross, 2004). This idea is supported additionally as researchers have found that the suppression of emotions tends to decrease with age (John & Gross, 2004).

However, some researchers believe that although younger people may use more maladaptive and negative uses of music to regulate emotions, these strategies, such as revival and diversion, help improve emotional life of individuals (Sarrikallio, 2007).

4.3.1.2. Gender

In relation to gender, there seems to be less research on the relationship between this demographic and emotion regulation through music. In the meta-analysis, it was detailed that there was a small correlation between women and emotion regulation use, but in some studies a larger effect was found suggesting women are more likely to use music to regulate emotions than men in the UK. Indeed, it seems that women are more likely to use maladaptive strategies in music emotion regulation than men, as some researchers have identified a higher score for females using diversion techniques than men (Carlson et al., 2015). Women have also been found to be more likely to use rumination techniques, meaning that women may have a

tendency to worry and overthink situations and events more so than men (Kwon et al., 2013). Suppression techniques have also been found to correlate more with women than men, one study suggesting that women are more likely to use music to suppress anger than men (Kwon, et al., 2013). In addition, men have been found to be more likely to use discharge techniques than women (Carlson et al., 2015). This suggests that women are more likely to downplay anger through suppression techniques, whereas men are more likely to relieve and display anger through discharge techniques. Revival techniques have also been found to correlate with men more than women (Saarikallio, 2012).

Despite these correlations, some strategies have been found to have no relationships with gender. Reappraisal and solace have been found to show no significant correlations between gender and emotion regulation use, which, aside with the results from the meta-analysis, portray that often gender does not predict emotion regulation use through music and music strategies (Ibid.).

4.3.1.3. Other demographics

There has been little research on other demographics and music emotion regulation strategies. However, some researchers have documented effect sizes of different demographics and emotion regulation through music. Intelligence, measured through IQ, education, and trait emotional intelligence were all found to not predict emotion regulation use (Chamorro-Premuzic and Furnham, 2010; Chamorro-Premuzic et al., 2012). Despite this correlation between IQ and music emotion regulation use, Chamorro-Premuzic and Furnham (2010) did find a small-to-medium correlation between individuals' enjoyment of intellectual activities and emotion regulation through music (measured from the Typical Intellectual Engagement scale) with an r -value of .15. However, since this is the only study to report this finding, it is unclear whether this result is reliable as it cannot be compared with the results of other studies.

4.3.2. *Other uses of music and demographics*

It is interesting to note other uses of music, namely background uses and cognitive uses of music, in relation to demographics to see if there are any correlations, as this may impact researchers' views on interactions of demographics and emotion regulation use.

In regard to age, researchers have found that there is a negative correlation between this demographic and background uses of music with a small-to-medium effect (Chamorro-Premuzic et al., 2012). This suggests that young people are more likely to use music as background music, perhaps as there are more opportunities to do so, for example whilst studying. Researchers have found no correlation between age and cognitive uses of music (Chamorro-Premuzic et al., 2012), suggesting that age does not correlate with how individuals think about music intellectually.

In relation to gender, two studies have found a non-significant correlation between background uses of music and this demographic (Chamorro-Premuzic et al., 2012; Chamorro-Premuzic et al., 2009a). However, in regard to cognitive uses of music, inconsistencies are displayed, as one study found a medium and positive effect, whilst another found a small negative effect (Chamorro-Premuzic et al., 2012; Chamorro-Premuzic et al., 2009a). Again, since the latter study was conducted in Spain, perhaps women are more likely to engage with music cognitively than men, and vice versa in the UK. It is not clear why this inconsistency may exist.

Unsurprisingly, IQ has been found to positively correlate with cognitive uses of music both on a medium and large effect scale (Chamorro-Premuzic et al., 2012; Chamorro-Premuzic et al., 2009a). This suggests that those with a higher IQ dissect and think about the components of music more than those with a lower IQ. In regard to background uses, no significant correlations have been found (Ibid.). Again, demographics may often not predict how individuals will interact with music.

Emotional intelligence has been found to have small negative correlations with both background and cognitive uses of music (Chamorro-Premuzic et al., 2012). This suggests that individuals who are emotionally intelligent are less likely to listen to music cognitively and in the background, and as the previous results portrayed, are more likely to interact with music in an emotional way. This is perhaps unsurprising due to the nature of emotional intelligence, as individuals with high emotional intelligence are more in tune with their emotions and the emotions of other people (Lexico, n.d.).

In relation to education, Chamorro-Premuzic et al. (2012) found that education level negatively correlates with background use of music, meaning that individuals with fewer formal education qualifications are more likely to use music in the background. In addition, they found a non-significant correlation between education and cognitive uses of music. Since only one study has demonstrated the interaction between education and cognitive and background uses of music, it is unclear whether this study is reliable and consistent.

Lastly, intellectual activity has been found to strongly correlate with cognitive uses of music, with an r -value of .51 (Chamorro-Premuzic and Furnham, 2010). Since education did not predict cognitive uses of music, and IQ did but to a lesser degree, this suggests that people who listen to music in a cognitive way actively seek out and participate in this activity, rather than participate subconsciously. Additionally, there was a small correlation with participating in intellectual activities and background uses of music (Ibid.).

4.3.3. Demographics and music preference

No research has detailed the music that is likely to be listened to in music emotion regulation use across the analysis of demographics. However, some researchers detail correlations between demographics and music preference, which may inform what music individuals with certain demographics are likely to use when listening to music to regulate emotions.

4.3.3.1. Age

Bonneville-Roussey et al. (2013) found that certain music preferences increase or decrease with age. They found that “intense” (e.g. rock) and “contemporary” (e.g. chart pop) decrease in preference as individuals age, whereas genres that are “sophisticated” (e.g. classical) increase in preference as age increases. This finding is interesting, as previously it was found that cognitive uses of music were not correlated with age. Since some individuals may recognise classical music to often be more complex than chart pop music, these findings, then, seem inconsistent.

In addition, researchers argue that adolescents favour people who like the same musical style that they do (North and Hargreaves, 1999). This suggests that interactions with music may also be affected by identity and image – more research should analyse this relationship.

4.3.3.2. Gender

Researchers have found that men may tend to prefer “intense” genres of music, such as hard rock, whereas women may not prefer this genre as much as other genres (Colley, 2008; Nater et al., 2006). Researchers have also indicated a correlation between preference for “sophisticated” music, namely classical, with women (Nater et al., 2006). In addition, women have been found to prefer “contemporary” genres, such as chart pop (Colley, 2008). However, other studies have found no correlation between pop music preference and gender (Nater et al., 2006). This portrays that more research needs to analyse the relationship between gender and music preference.

4.3.3.3. Intelligence/IQ

Researchers have found that IQ and preference for “intense” and “complex” genres of music and positively correlated. Perhaps the latter of these is linked with the cognitive uses of music, which correlates with IQ, since “complex” music will be of interest to those who dissect and cognitively interact with music.

4.3.3.4. Education

North and Hargreaves (2007c) researched how music preference is affected by education. “Sophisticated” genres, particularly the genres of classical, opera, jazz, and classical, are correlated with individuals who go to a fee-paying school; blues is also correlated with individuals with a PhD or Master’s degree. Interestingly, hip-hop is also correlated with individuals who went to a fee-paying school. This portrays that the stereotypes that individuals who attend private schools indulge in “high art” are not always true. In addition, “contemporary” is also correlated with individuals who went to state schools and individuals with no education qualifications.

4.4. Conclusion

The meta-analysis of demographics and music emotion regulation use found a small negative correlation for age and a non-significant positive correlation with gender. This suggests that as individuals get older they do not use music to regulate emotions as much as younger individuals, meaning older individuals may be able to control and identify emotions without the need of regulation. Gender perhaps does not predict emotion regulation use, although some studies have found that women are more likely to use music to regulate emotions more than men. More research should be conducted that details statistics on age, gender, and other demographics to be able to understand how individuals use music to regulate emotions.

As age increases, individuals are less likely to use maladaptive techniques such as rumination and suppression when regulating emotions through music, suggesting that younger people experience more negative affect. Additionally, women are more likely use diversion strategies, whereas men are more likely to use discharge techniques, suggesting that women are more likely to not express anger than men when regulating emotions.

Younger people are more likely to play music in the background compared to older people, suggesting that younger people have more opportunities to use music in this way.

Inconsistent correlations exist between background and cognitive uses of music and gender, suggesting that gender cannot predict how men and women will listen to music in relation to background and cognitive uses. Cognitive uses of music correlate with IQ, suggesting that those with a higher IQ enjoy dissecting and thinking about different musicological elements.

In addition, as age increases, the preference for “intense” music decreases and the preference for “sophisticated” music decreases, suggesting that younger individuals may use rock music and other similar genres to regulate emotions. Men tend to prefer “intense” genres, which perhaps reflects how men are more likely than women to regulate emotions through discharge strategies. More research should also indicate which genres are used in music emotion regulation, as no studies have indicated what type of music is used in this process.

5. Affect and application of emotion regulation through music

The previous three sections have indicated which populations are likely to regulate emotions through music and through which strategies. Individuals who score highly on trait neuroticism and who are liable to depression, anxiety, and stress, are likely to use maladaptive techniques when regulating emotions. In addition, older adults and individuals who score highly on trait extraversion are likely to use adaptive techniques when regulating emotions. This dissertation has yet to focus on the effectiveness of adaptive and maladaptive techniques to produce positive affect; hence, this section will discuss how different emotion regulation strategies impact affect and wellbeing, and suggest how strategies that produce positive affect can be applied in therapeutic settings.

5.1. Adaptive regulatory techniques and impact on affect

As opposed to maladaptive strategies, which tend to facilitate despairing states, adaptive techniques reflect resilience and advanced coping skills (Joelson, 2019). Adaptive strategies include, but are not restricted to, diversion, reappraisal, problem solving, entertainment, and strong sensation techniques (Aldao & Nolen-Hoeksema, 2012).

5.1.1. Diversion and distraction

Diversion technique, which involves using music to distract an individual from unwanted negative emotions, thoughts, and worries, has been linked with alleviation of negative mood states (Drwal, 2008). In this section, the terms “diversion” and “distraction” will thus be used interchangeably.

In one study, diversion was found to correlate positively with Negative Mood Regulation (NMR)⁵, with an effect size of $r = .49$ (Ibid.). Therefore, diversion and distraction

⁵ NMR: ‘The expectancy that some behaviour and cognition will alleviate a negative mood state.’

(Brockmeyer, et al., 2012)

techniques are likely to lead to positive affect. Additionally, Baltazar and Saarikallio (2019) argue that a combination of distraction and cognitive work⁶ technique may lead to a disengagement from undesired emotions, thoughts, and feelings, supporting positive emotional states after regulatory sessions.

As aforementioned in the mental health and emotion regulation section of this dissertation, individuals with depression are likely to use diversion techniques when using music to regulate emotions. Some researchers have concluded that distraction is an effective technique in repairing negative affect, decreasing depressed mood of depressed individuals (Nolen-Hoeksema & Morrow, 1993). Furthermore, in experiments in which negative moods were induced upon depressed individuals, distraction frequently proved to reduce negative affect (Morrow & Nolen-Hoeksema, 1990).

However, the effectiveness of distraction inducing positive affect has to be questioned, as the technique has been correlated to an increasing proneness to anxiety (Carver & Scheier, 1998). Distraction has been postulated as an avoidant technique, thus meaning individuals who use this strategy are likely to want to avoid pain and negative emotions (Thomson et al., 2014; Freud, 1958). Avoidance techniques have been associated with low NMR among students, meaning that distraction may not be effective in eliminating negative affect (Catanzaro & Greenwood, 1994). Since this research was applied in a general context, unrelated to depression, perhaps it can be concluded that distraction is an effective strategy in gaining positive affect depending on what the individual is trying to distract themselves from. Depressed individuals may use diversion to distract themselves from problematic *thoughts*; however, using distraction to divert attention from problematic *situations* may instil negative

⁶ Cognitive work ‘can be seen as an effort of gaining new meanings before a total response takes place’ (Baltazar & Saarikallio, 2019)

affect. Thus, distraction may be effective in gaining positive affect if an individual is distracting themselves from internal problems rather than external problems.

5.1.2. Reappraisal

Reappraisal involves ‘generating benign or positive interpretations of a stressful situation as a way of reducing stress’ (Gross, 1998). This strategy has not only been linked with reduced negative affect; researchers have found reappraisal to have immune benefits (Randall et al., 2014; Gross & John, 2003). Stress has been linked to problems with the immune system, meaning reappraisal may reduce negative mental thought processes that may lead to stress (Goliszek, 2014). Using reappraisal to regulate emotions may also decrease felt pain among individuals with musculoskeletal illness and related pain (Talaie-Khoei et al., 2017). In addition, reappraisal strategy has been associated with psychological benefits, some researchers finding individuals show a decreased probability of future health problems when using reappraisal techniques to regulate emotions (Augustine & Hemenover, 2009). This is perhaps why those with mental health problems and stress are not likely to use this strategy when using music to regulate emotions. Perhaps most significantly, reappraisal techniques have been associated with higher subjective wellbeing, suggesting that this technique can be implemented by individuals to help maintain positive affect after the regulation of stressful emotions (Ibid.).

In the previous meta-analysis, it was postulated that as age increases, the likelihood of using reappraisal strategies for regulating emotions also increases. Indeed, in one study which focussed on emotion regulation, age, and affect, during the period from early to later adulthood, lower levels of negative emotion was reported (John & Gross, 2004). This correlated with the use of reappraisal, portraying how positive affect and reappraisal are interlinked. Furthermore, in the personality section of this dissertation, it was shown that extraversion correlates with reappraisal technique when individuals use music to regulate emotions; researchers have also found a resulting positive affect from using reappraisal techniques by extraverts (Ibid.).

5.1.3. Entertainment

Entertainment is a strategy whereby individuals try to maintain positive emotions by enhancing current feelings and creating a pleasant atmosphere (Saarikallio, 2008). There has been less research on this strategy due to the direct link with music and emotion regulation, since this strategy was borne from the Music in Mood Regulation scale. However, since this strategy builds upon pre-existing positive emotions, entertainment upholds positive affect after the regulation of emotions using music. This is why some negative correlations have been found between entertainment strategy and depression and anxiety, since individuals with these disorders presumably encounter more negative moods compared to individuals who do not have depression or anxiety (Thomson et al., 2014). Thus, entertainment is a more accessible strategy to those who experience frequent positive mood (Ibid.). Unlike reappraisal, individuals with low subjective wellbeing would perhaps find it difficult to implement this strategy when regulating emotions as they would not be in a positive mood to begin with.

5.1.4. Strong sensation

Strong sensation involves the ‘induction and strengthening of intense, positive emotions’ (Thomson et al., 2014). Like entertainment, strong sensation involves pre-existing positive emotions for individuals to be able to use this strategy. Researchers have again identified that young people who frequently use maladaptive techniques, but not strong sensation, when regulating emotions through music are more likely to experience depression, stress, and anxiety symptomology (Thomson et al., 2014), which may indicate why there was a negative correlation identified with this strategy and mental health disorders in the mental health section of this dissertation. Indeed, those experiencing depression experience joy and positive emotions to a lesser extent than what is classed as the norm (Nolen-Hoeksema & Girgus, 1994), portraying why individuals with this disorder are unlikely to use strong sensation strategies when regulating emotions with music. Similar to entertainment, then, strong sensation may

only produce positive affect when an individual is experiencing positive affect in the first instance.

5.1.5. Problem solving and situation modification

Problem-solving strategies incorporate attempts to adapt or change a stressful situation by thinking about the event differently (Billings & Moos, 1981). Since situation modification also involves the modification of situations and the emotional impact of events, this strategy will be discussed interchangeably with problem-solving techniques. Problem-oriented coping has been shown to correlate with NMR ($r = .27$), and has been associated with higher wellbeing when individuals use this technique to regulate emotions through music (Drwal, 2008; Miranda & Claes, 2009). As discussed in the personality section of this dissertation, conscientiousness correlates with the use of situation modification techniques; this is perhaps due to links with a goal-focussed mindset and the organisational skills of individuals with trait conscientiousness (Kandler & Bleidorn, 2015), meaning individuals are likely to cognitively regulate emotions and think deeply about situations and how to resolve them.

5.2. Maladaptive regulatory techniques and impact on affect

Maladaptive strategies are used commonly to regulate emotions when an individual's goal is to intensify a problem rather than resolve it (Joelson, 2019). In regard to music, individuals who use maladaptive techniques may experience increased negative moods after the regulation of emotions (Carlson, 2015). Since adaptive strategies are unlikely to be used by depressed and anxious people, it is perhaps unsurprising that individuals who are vulnerable to these disorders are likely to use maladaptive strategies to deal with emotions (Frenandez-Berrocal et al., 2006). Maladaptive strategies include rumination, suppression, and discharge techniques (Aldao & Nolen-Hoeksema, 2012), which will be further discussed in their relation to affect in this section.

5.2.1. Rumination

Rumination involves a deep and repetitive focus on negative emotion created through experiences and situations (Aldao et al., 2010). Rumination is often associated with negative affect, and has correlated negatively with NMR ($r = -.51$; Drawl, 2008). This strategy has also been linked to increasing negative affect during and after the regulation of negative emotions, thereby worsening pre-existing negative moods (Lischetzke & Eid, 2003). Indeed, ruminating strategies have been linked to distress and argued to be life-restricting (Kashdan et al., 2006).

As postulated in the third section, individuals with depression and anxiety are likely to use rumination to regulate emotions. Some researchers found that when they induced negative mood upon depressed individuals, and asked participants to ruminate, a more intense negative mood was reported than prior to the regulation of their emotions (Morrow & Nolen-Hoeksema, 1990). Researchers have further argued that ruminating may lead to the functional impairment often observed in those who have a diagnosis of an anxiety disorder (Kashdan et al., 2006). This portrays how rumination is a detrimental technique, reinforcing negative affect. Perhaps rumination can be seen as the opposite of entertainment and strong sensation techniques – those who ruminate show increases in pre-existing negative affect, whereas those who use entertainment and strong sensation strategies increase pre-existing positive affect.

5.2.2. Suppression

Suppression involves ‘inhibiting or suppressing an emotional experience once it has been activated or solidified’ (Kelley et al., 2019). Suppression has been linked to negative affect, with a correlation of $r = .19$ among those who use music to regulate emotions in this way (Randall et al., 2014). Researchers have argued that the suppression of emotions often leads to more intense physiological problems than if an individual allowed themselves to cry, thus releasing negative emotion (Augustine & Hemenover, 2009). Additionally, researchers have found that even individuals who do not tend to suppress emotion may express as much negative

emotion as frequent suppressors when encouraged to use the technique in laboratory settings (John & Gross, 2004). It is perhaps not surprising, then, that suppression and the repair of negative emotion is negatively correlated with an effect size of $r = .26$ (Gross & Oliver, 2003). Despite the supporting evidence that suppression does not relieve negative affect, but causes it, some researchers have found through individual self-report measures that suppression may reduce negative affect (Larsen & Prizmic, 2004). It seems unclear why this inconsistency between research exists, however; Larsen and Prizmic (2004) also found that individuals may experience higher levels of negative emotional arousal following the use of suppression. Perhaps self-report methods, then, are unreliable in portraying how suppression affects mood.

In previous sections, it was noted that depression and anxiety predicted the use of suppression strategies when using music to regulate emotions. Some researchers have indeed found that a chronic or overuse of suppression strategy may lead to increases in psychopathology, with an increased likelihood of depression and anxiety symptomology (Thomson et al., 2014). Additionally, extraversion was found to negatively correlate with the use of suppression techniques; Chervonsky and Hunt (2017) found that a greater use of suppression was linked to poorer social support and satisfaction, perhaps why introverts are more likely than extraverts to use suppressive strategies when regulating emotions.

5.2.3. *Discharge*

Discharge strategy is associated with the need to listen to subjective aggressive or sad music to express pre-existing negative moods (Carlson et al., 2015). Discharge has often been associated with negative affect, Fichman et al. (1999) identifying an effect size of $r = .25$ in relation to discharge and negative affect. Recent studies have also concluded that discharge and venting strategies increase aggressive feelings rather than reduce them (Bushman, 2002), further indicating how discharge strategies may be detrimental to mood. However, McFerreean (2010) identified that discharge may be psychologically beneficial, providing individuals can ‘move

beyond' negative states. Negative affect after using discharge strategies to regulate emotions, then, seems to occur when individuals cannot consciously use discharge to relieve negative moods. Using discharge as a form of catharsis, then, appears to be an effective way to reduce negative affect (Thomson et al., 2014).

As previously discussed in the mental health section of this dissertation, depression, stress and anxiety correlated with the use of discharge strategy to regulate emotions. The use of discharge has been further linked with long-term negative impacts on mental health, demonstrating that the use of discharge techniques, similar to ruminating tendencies, may increase the likelihood of the development of depression and anxiety (Carlson et al., 2015). Therefore, those with or who are liable to depressive and anxious tendencies may not be able to use discharge as a cathartic method of regulating emotions, instead focussing on negative affect.

5.3. Length of emotion regulation and the impact on effectiveness

Aside from using different techniques to regulate emotions, length of regulatory sessions may also have an impact on the affect experienced after listening to music to regulate emotions (Webb et al., 2012). Augustine and Hemenover (2009) found that the individual goals of regulation were met more frequently with shorter regulatory sessions. Although the researchers did not indicate any correlation on the affect, we may assume that both positive and negative affect may be produced by using adaptive and maladaptive strategies respectively in a short period of time.

5.4. Goals of emotion regulation and applications in therapy

This section has identified that adaptive strategies often lead to positive affect and maladaptive techniques may produce and enhance negative affect. Some adaptive techniques require a pre-existing positive mood; however, reappraisal and problem-solving may produce positive affect when an individual is in a pre-existing negative mood. Can these strategies, then, be applied in

a therapeutic setting, given that they may produce positive affect which is correlated with general subjective happiness (Blais-Rochette & Miranda, 2016)? This section argues that using music to regulate emotions can be recommended by therapists or be used as a self-help therapy. Although music therapy has been proven to be an effective tool in improving symptomology of various mental disorders, particularly Alzheimer's disease (Banker, 2019), this chapter will focus on how music can also be used effectively outside of this particular clinical setting through passive music listening, a more accessible route of therapeutic intervention.

5.4.1. Cognitive-behavioural therapy

Cognitive behavioural therapy (CBT) is the most common form of therapy in the UK (Baker, 2018). CBT addresses unhelpful behaviours and thought processes, targeting ways to improve an individual's state of mind on a daily basis (Chawathey & Ford, 2016; NHS, 2019a). CBT may be used to treat and manage depression, anxiety, as well as other mental disorders. Through the attendance of CBT sessions, performed by a therapist, individuals may learn how to change unhelpful thought patterns (NHS, 2019a). It is also noted that CBT tackles the unhelpful ways that individuals react to situations (Aschim et al., 2011); perhaps listening to music to regulate emotions would help reinforce positive outlooks on such situations. Indeed, a goal could be set between the therapist and client so when troublesome thoughts or events occur the client could use music to regulate emotions through reappraisal and problem-solving techniques, as these are commonly associated with positive affect.

5.4.2. Self-help therapies

Music may also be used by individuals who do not want to participate in traditional therapies, such as CBT. Self-help therapies⁷ have become increasingly popular, portrayed through the increase of sales of books in the mindfulness and meditation sector (Flood, 2017). It seems that

⁷ Self-help therapy is a type of therapy that individuals can perform on their own in their own time to help deal with negative mental states and problems (NHS, 2018e).

individuals, in the UK in particular, have a growing desire to detach themselves from reality and focus on internal thought systems. Music has been postulated as one form of escapism (Schäfer, et al., 2013), and this could be capitalised upon through self-therapy. Individuals could consciously use reappraisal and problem-solving strategies to regulate emotions, with the aim to create more instances of positive affect in their lives.

The NHS have approved of several apps that utilise music as a way to improve mood among those with and without diagnosed mental disorders (NHS, 2018e). *Cove* is one such app: users can create their own music through different pre-composed elements to express various different moods, both positive and negative in nature (Ibid.), and has been identified as one of the best mental health apps in 2017 by *The Guardian* (Thomas, 2017). Using this app makes it easier for individuals who struggle to communicate emotions express what they are feeling in an accessible and non-intrusive manner. However, if users regulate emotion through *Cove*, it may cause increasing amounts of negative affect, as the app allows individuals to create “angry-sounding” music. Discharge technique has been correlated with use of angry music, as aforementioned, meaning individuals may not be benefitting from this app in regard to positive emotion. Two other apps, *Feeling Good: Positive Mindset* and *Stress & Anxiety Companion* both incorporate “relaxing” music to help ‘build confidence, energy and a positive mindset’ (NHS, 2018b; NHS, 2018d). Although what is classed as “relaxing” music is subjective, research has shown that in general, what individuals perceive to be relaxing music can ease muscle tension, reduce stress and anxiety, and trigger oxytocin, a “sleep-friendly” hormone (Breus, 2018).

These three apps portray how there is a growing desire to use music as a self-help tactic. Perhaps an app can be generated that encourages users to regulate emotions through reappraisal and problem-solving techniques, giving recommendations of either pre-existing or newly

composed pieces. Future research should focus on what music works well for reappraisal and problem-solving techniques in gaining positive affect for the individual.

5.5. Conclusion

Adaptive techniques often create positive affect after regulating emotions using these strategies. Problem-solving, distraction, and reappraisal techniques can be used after a stressful event to create positive emotions, whilst strong sensation and entertainment techniques help enhance pre-existing positive moods. Distraction may also lead to negative affect if used to avoid thinking about negative situations that are external to the individual, but when used as a technique to dissociate from reality and troublesome internal events, the strategy may lead to positive affect. Entertainment and strong sensation strategies are beneficial in enhancing positive affect, but an individual, in order to utilise these techniques, has to be in a positive mood to begin with.

Maladaptive techniques often cause negative affect, especially rumination and suppression strategies. Discharge may also lead to negative affect; however, some individuals may find this strategy useful if they can utilise discharging emotion to move beyond their negative state.

Reappraisal and problem-solving techniques can perhaps be applied in therapeutic settings more successfully than other techniques, as reappraisal and problem-solving require an individual to change their outlook on stressful or troublesome situations, creating positive affect after the regulation of negative moods and emotions. Future research should focus on how these methods can be applied in CBT and self-help therapy, perhaps with a focus on curating an app that encourages users to regulate their emotions through listening to music.

6. Limitations of research

This project has several limitations, discussed through focussing on the first three meta-analyses, as these sections focus on previous research and literature. A general focus of limitations conclude this section.

6.1. Limitations with personality and emotion regulation research

The relationship between different personality traits was not discussed in this project, meaning it is not clear whether interactions between traits influence correlations between personality and emotion regulation through music. However, if the relationships between traits was discussed in this project, the length of the meta-analysis would have increased to such an extent that this topic alone could have sufficed as a thesis.

Additionally, only three traits were measured in the meta-analysis (neuroticism, extraversion, and openness to experience). This was due to the lack of quantifiable data of conscientiousness and agreeableness traits; more research needs to be conducted to fill this gap in the literature and to inform future meta-analyses.

6.2. Limitations with mental health and emotion regulation research

The studies cited in this project in regard to depression do not indicate what type of depression they are analysing, limiting the scope of results. For example, seasonal affect disorder, postnatal depression, and clinical depression are all different types of depression; these different disorders are not addressed in these studies (NHS, 2016).

There was only one mental disorder included in the meta-analysis (depression), with a focus on stress, which is not defined as a mental disorder. More studies should focus on different mental disorders, such as OCD, bipolar disorder, and schizophrenia, when researching relationships between mental health and emotion regulation to fill gaps in literature.

6.3. Limitations with demographics and emotion regulation research

The main limitation of this section is the lack of research. Only three studies and two demographics were detailed in the meta-analysis due to this problem. Many studies that have been cited in this essay indicate demographic information, particularly age and gender, however, few researchers included effect sizes of demographics. By including demographic information in effect sizes, more correlations, if they exist, will be found between demographics and music emotion regulation use. The lack of studies in this meta-analysis also means that the overall Pearson correlation may be unreliable.

6.4. General limitations

The main limitation to this project is that few studies were included in the three meta-analyses, meaning the reliability of the Pearson correlations may be limited. Unpublished articles were also not included in this project due to financial reasons, which may have alleviated this problem. However, since the studies used in the meta-analyses are published in peer-reviewed journals, the methods adopted by the researchers are more reliable.

The studies used in this project may also be limited. All studies referenced in this dissertation assume that individuals only regulate emotions through passive music listening; there is no mention of other musical activities, such as performing and composing, that individuals may partake in to regulate mood. The studies also do not detail the duration of emotion regulation sessions, even though some researchers have identified that the duration of sessions may affect the effectiveness of regulation sessions (Webb et al., 2012; Augustine & Hemenover, 2009). Individuals may also not be aware that they are regulating emotions through music, meaning that results from studies may be inaccurate due to fewer reports of regulation use. Therefore, regulatory activities, duration of sessions, and the awareness of regulating emotions may act as control variables in studies, affecting effect sizes and other results.

Furthermore, there are few consistencies between the definitions of emotion regulation strategies. For example, distraction and diversion denote the same process, but have two different labels. Some studies also note trends between demographics and avoidance techniques, but since “avoidance” is an umbrella term that refers to many different strategies, it is unclear what strategies researchers are directly referring to. This also means that many studies are not replicable and comparable.

The definition of some genres are also questionable. For example, “elite” music, postulated by Rentfrow and Gosling (2003), is an umbrella term comprising of classical, jazz, and gospel. The choice of using “elite” in itself is problematic, especially regarding gospel, since the authors are suggesting that these genres are associated with superiority. Additionally, an individual may enjoy gospel music, but not listen to classical; in this sense, these umbrella terms are not representative of individuals’ music preferences. There is also a tendency to ignore world music and non-Western music, which should be corrected in future research by including these categories in studies.

The Uses of Music Inventory postulated by Chamorro-Premuzic and Furnham is restrictive. The inventory supposes that music can only be listened to in three ways (cognitive, background, and emotional), but ignores listening to music for enjoyment and listening through contextual situations, such as in concert, through religious contexts, among other uses. This simplification means that other correlations between demographics and other uses of music may be apparent.

The definition of gender is also problematic in the studies cited in this dissertation, as all the studies only recognise two genders. All research papers should be inclusive of all genders, since many individuals do not identify as “female” or “male”. Researchers who work with data relating to human participants should be respectful and inclusive in future studies.

7. Future research

Future research in the field of emotion regulation through music may be completed by either musicologists or psychologists, depending on researchers' specialities. Both psychologists and musicologists may want to identify the genres, songs, and pieces of music that are commonly used by individuals who use music to regulate emotions. Musicologists may also want to analyse the results from this research, identifying how different components of music may be widely used in the music of particular strategies or by individuals with certain characteristics.

Researchers may also want to focus on how people perform and compose music to regulate emotions, to understand how different musical activities may affect effectiveness of emotion regulation through music.

The most widely researched area in this field is personality, particularly neuroticism. Other traits, such as openness to experience and extraversion, which has had some attention, should also be researched more. Agreeableness and conscientiousness seem to have been ignored in this field; researchers should also, then, refrain from bias when conducting research in this field.

The research conducted on mental health and emotion regulation with music is disappointing. More research should indicate trends with various mental health disorders, such as anxiety, mood disorders, schizophrenia, and OCD, and the regulation of emotions with music. Studies may also want to focus on applied uses of emotion regulation in therapeutic settings and whether encouraging clients to use adaptive techniques to regulate negative emotions leads to positive affect and increases subjective wellbeing. Thus, researching trends between mental disorder and emotion regulation through music may indicate which individuals would benefit from using regulatory techniques in therapeutic settings.

In addition, researchers are consistent in indicating demographics in their research. However, rarely do they indicate trends between demographics and emotion regulation with

music. More quantifiable research should indicate these trends, especially since indicating age and gender is a common requirement in primary studies. Researchers should also ask participants how long they usually spend regulating emotions, since duration of sessions may impact the effectiveness of regulatory strategies (Webb et al., 2012).

8. Conclusion

Many individuals view music as an important aspect of their lives, some using the art form to help control unwanted, or sometimes desirable, moods and emotions. This project used meta-analyses to identify correlations between individual differences and emotion regulation use through music. From this research it has been found that individuals with high levels of reported neuroticism, depression, and stress are likely to use music to regulate emotions, and as age increases, individuals are less likely to regulate emotions. Negative mood states are often experienced by those who score highly on neuroticism and people who encounter depression and stress; thus, it seems that these types of emotions are most commonly regulated as individuals want to feel more control over their unstable moods. Age may negatively correlate with emotion regulation use as young people experience unstable emotions also. The meta-analyses also identified no correlations between emotion regulation through music and extraversion and openness to experience. The former, however, did correlate with background uses of music, and the latter demographic correlated with cognitive uses of music, perhaps reflecting the sociability and intellectual interest of these types of individuals respectively.

Different demographics also correlate with different regulatory strategies. Maladaptive strategies, which may cause prolonged negative affect, such as rumination, suppression and discharge are likely to be used by younger people, individuals with either depression, stress, or anxiety, and individuals who score highly on trait neuroticism. Furthermore, affective strategies, such as diversion, reappraisal, strong sensation, and situation modification are likely to be used by older individuals and individuals who score highly on trait extraversion, openness to experience, agreeableness, and conscientiousness. These findings perhaps reflect how those who frequently experience negative emotions due to inherent personality traits or mental health disorders are likely to want to endure or intensify negative states, whereas those who are not usually prone to negative emotions tend to regulate emotions to create positive affect.

Adaptive strategies have been associated with positive subjective wellbeing, suggesting that using music to regulate emotions through these techniques may help those who are prone to negative states improve individuals' outlook on life. A growing number of apps have been created, and approved of by the NHS, that incorporate music to relieve negative states. Emotion regulation strategies perhaps could also be incorporated into an application to improve individuals' wellbeing. Cognitive-behavioural therapists may also recommend using adaptive strategies to regulate emotions to individuals who are likely to use music for regulatory purposes, as shown through the meta-analyses of this project.

Limitations of this project include a lack of quantifiable data used for the meta-analyses, suggesting that the effect sizes calculated in this dissertation are not as reliable as they could have been if more research was published on this area of research.

Future research should focus on different topics depending on the researcher's specialism. Psychologists may want to study applied emotion regulation and whether this may be an effective tool for a therapeutic intervention. Other demographics should also be included in future studies, such as agreeableness, conscientiousness, OCD, schizophrenia, bipolar, and cultural background. Analysing how individuals regulate emotions using different musical activities, such as performing and composing, will also help fill gaps in the literature. Duration of emotion regulation sessions should also be noted in all future research on this topic. Psychologists should also note what type of music individuals listen to when regulating emotions. This dissertation notes how different preferences correlate with demographics, but does not indicate how this data directly links with emotion regulation; thus, musicologists may want to use the data from future studies that focus on this topic to identify trends with demographics, preferences, and uses of emotion regulation through music.

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