

Winter 4-30-2015

Effects of Music and Meditation on Mood and Stress Across Personality Traits

Rachel Sterling

King's University College, rsteril2@uwo.ca

Follow this and additional works at: https://ir.lib.uwo.ca/psychK_uht



Part of the [Psychology Commons](#)

Recommended Citation

Sterling, Rachel, "Effects of Music and Meditation on Mood and Stress Across Personality Traits" (2015). *Undergraduate Honors Theses*. 20.

https://ir.lib.uwo.ca/psychK_uht/20

This Dissertation/Thesis is brought to you for free and open access by the Psychology at Scholarship@Western. It has been accepted for inclusion in Undergraduate Honors Theses by an authorized administrator of Scholarship@Western. For more information, please contact tadam@uwo.ca, wlsadmin@uwo.ca.

Effects of Music and Mediation on Mood and Stress Across Personality Traits

by

Rachel Sterling

Honours Thesis

Department of Psychology

King's University College at Western University

London, Canada

April, 2015

Thesis Advisor: Dr. Mike Morrison

Abstract

This study analyzed the effects of music and meditation on mood and stress, with personality as a moderator, in 93 undergraduate students (57 females) at Western University. Participants ranged in age from 18 to 31 years old. Students were recruited through an advertisement posted on campus and online. Participants either listened to classical music for 5 minutes, completed a 5 minute meditation, or did not complete a relaxation activity (control condition) and subsequently completed the PANAS questionnaire, the Perceived Stress Questionnaire, Satisfaction with Life Scale, a filler "introspective thought" task, the Big Five Inventory of Personality, and a Music and Meditation Experiences survey. It was hypothesized that both music and meditation would have positive effects on mood and stress and that individuals scoring high on conscientiousness would experience more benefits from meditation than those in the control group. The hypotheses were not supported. Those exposed to a meditation exercise scored significantly lower on positive affect than those in the control group or those who listened to music and no differences were found for stress or negative affect. Interaction effects were found for the big five personality traits. Most notably, individuals scoring high on conscientiousness experienced greater negative affect after either listening to music or meditating, compared with those who did not complete a relaxation exercise. Discerning the impact of music or meditation on mood is limited due to the brief exposure of the relaxation exercises. Long-term effects and the role of personality can be explored further through a longitudinal study.

Effects of Music and Meditation on Mood and Stress Across Personality Traits

Stress is an inevitable part of life and everyone experiences it to varying degrees. It can greatly impact one's mood and if the stress continues for an extensive period of time, negative moods may become quite frequent. Common relaxation techniques used to reduce stress and improve mood include listening to music and meditation. For instance, people use music to regulate their emotions and improve their mood (Saarikallio, 2011), and listening to certain types of music has also been shown to reduce stress and anxiety (Labbé, Schmidt, Babin, & Pharr, 2007). More specifically, listening to classical music has been found to have a more positive effect on stress and relaxation compared with other music genres (Labbé et al., 2007). In addition to music, meditation has been found to improve emotional distress and mood (Van Gordon, Shonin, Sumich, Sundin, & Griffiths, 2014). Meditators also report higher well-being than non-meditators (Keune & Forintos, 2010), and perceived stress is lower for meditators compared with non-meditators (Hosemans, 2014).

Although the benefits of listening to music and meditation with respect to mood and stress have been documented, it is unclear which relaxation method is more beneficial for improving mood or reducing stress. Previous studies have not directly compared the effects of meditation with listening to music on mood and stress. Moreover, previous research has also not examined the benefits of listening to music versus meditating for individuals with different personality traits. The present study will determine which method has the greatest effect on mood and stress, across personality traits.

Research studying the relationship between personality and emotional reactions to music indicates that positive and negative emotions as a result of music listening may be related to personality traits, including neuroticism, extraversion, agreeableness, openness, and

conscientiousness (Liljeström, Juslin, & Västfjäll, 2013). Therefore, personality may act as a moderator between the effects of listening to music or meditating on mood and stress. By studying whether listening to music or meditating is more effective for different personality traits, individuals can potentially use this research to determine which method works better for them. This may have clinical implications for people who are typically stressed, those who commonly experience negative affect, or those who wish to enhance positive affect.

Music, Mood, and Stress

Music has the ability to improve mood through a variety of ways. Individuals report listening to music, playing an instrument, and singing as activities used for emotion regulation (Saarikallio, 2011). Emotion regulation in this context is the way in which individuals alter their emotional reactions by changing or manipulating them (Cole, Martin, & Dennis, 2004). Research indicates that individuals often listen to music in order to maintain a positive or happy mood, as well as for revival and relaxation. Some also listen to music for the purpose of releasing or venting anger and sadness through music that expresses those emotions (Saarikallio, 2011). In addition, adolescents who experience more happiness from music listening than sadness report higher emotional well-being than adolescents who experience more sadness from music listening than happiness (Miranda & Gaudreau, 2011).

Furthermore, individuals may manipulate their emotions through music listening when they have self-determined reasons for listening to music. Self-determined reasons for listening to music may include choosing to listen to music for the purpose of enhancing one's mood, or relieving stress. Morinville, Miranda, and Gaudreau (2013) found that adolescents who listened to music for self-determined reasons experienced higher positive affect, lower negative affect,

and higher life satisfaction. Therefore, the reasons a person listens to music are important in predicting outcomes of well being.

In addition to improving mood and well-being, listening to music can have a positive effect on the stress response. A study conducted by Thoma et al. (2013) compared the effects of relaxing music (Latin choral singing), the sound of rippling water, and a control condition with no sound to see which would result in the greatest decrease in stress after exposure to a stressful task. After exposure to the stressor, concentrations of cortisol were surprisingly highest for those in the relaxing music condition and lowest for those in the sound of rippling water condition. This implies that listening to acoustic sounds (which do not necessarily have to be music, but even just the sound of rippling water), can reduce the impact of stress on the body. However, after exposure to the stressor, baseline levels of stress were reached faster by those who listened to relaxing music than those who did not listen to anything. Even though listening to relaxing music did not prevent the stress response from starting up, it did help to calm stress more effectively than listening to nothing.

It is important to note that specific genres of music may be more beneficial for stress and relaxation than others. For instance, a study examining the effect of music genre on stress compared classical music, heavy metal, self-selected music, and no music (Labbé et al., 2007). Results revealed that those who listened to either classical music or self-selected music after exposure to a stressor experienced less anxiety and greater relaxation compared to participants who listened to heavy metal or no music.

Meditation, Mood, and Stress

Aside from listening to music, meditation also improves relaxation and reduces stress. These benefits of meditation may be explained through self-regulation theory. Self-regulation

encompasses the processes that individuals use to direct their feelings, thoughts, and behaviours (Hoyle, 2006). It involves being in control over oneself and being able to stay calm and alert (Keune & Forintos, 2010). It also includes knowing what one's goals are and directing one's learning and self-improvement to reach those goals. When applied to meditation, self-regulation involves mindfulness. Mindfulness involves self-regulating one's attention and being present and aware in the current moment (Hosemans, 2014). The concept of mindfulness has also been incorporated into Self-Determination Theory. This theory's approach to motivation states that the individual is a personal motivator for self-improvement by focusing on circumstances that allow for individual growth processes (Keune & Fortinos, 2010). Since Self-Determination Theory involves motivating oneself for self-enhancement, an individual choosing to practice mindfulness meditation may be more successful in enhancing his or her overall well-being. In fact, it has been found that individuals scoring high on mindfulness also score high on psychological well-being and lower on anxiety (Keune & Forintos, 2010).

Several studies look at meditation programs in which participants complete meditation training or meditate for a specified period of time over the course of several weeks or months (Van Gordon et al., 2014; Keune & Forintos, 2010). For example, one study demonstrates that participants who completed Meditation Awareness Training for 8 weeks showed significant improvements in pre-post scores of emotional distress, positive and negative affect, and mindfulness, compared with those who did not take part in the training (Van Gordon et al., 2014). In that study, Meditation Awareness Training was provided through a group program founded in Buddhist teachings. Training involved learning about meditative themes such as mindfulness, cultivating joy, generosity, ethical awareness, impermanence, emptiness, and letting go. Participants also completed guided meditation exercises or mindfulness exercises and

were encouraged to practise these exercises in their everyday lives. Another study compared students who participated in meditation courses as part of their school curriculum with students who did not meditate. The meditation courses used meditation styles that incorporated the use of mindfulness. Meditators scored higher on well-being than non-meditators (Keune & Forintos, 2010). Furthermore, meditators who practised meditation more frequently scored higher on measures of positive affect, attentiveness, and positive emotion.

The Moderating Role of Personality

Research studying the relationship between personality and emotional reactions to music has focused on the big five personality traits: neuroticism, extraversion, openness to experience, conscientiousness, and agreeableness. Komarraju, Karau, Schmeck, and Avdic (2011) explain the characteristics of each of these five personality traits. Neuroticism includes being emotionally unstable and anxious. Extraversion involves a high degree of assertiveness, sociability, and talkativeness. Openness includes a high degree of curiosity, and seeking new things, as well as variety. Conscientiousness is identified as being organized, disciplined, and achievement-oriented. Finally, agreeableness is characterized as being cooperative, helpful, and sympathetic towards others. These personality traits have been found to correlate with specific emotions following listening to music. For example, in a study conducted by Liljeström et al. (2013), listeners scoring high on neuroticism reported more negative emotions and fewer positive emotions. This may be consistent with the fact that emotional instability is associated with a neurotic personality trait. Listeners scoring high on extraversion, openness to experience, and agreeableness experienced more positive emotions and fewer negative emotions. Listeners scoring high on conscientiousness reacted with fewer negative emotions (eg. sadness-

melancholy, anger-irritation, and anxiety nervousness) than those scoring low on conscientiousness.

Personality traits have also been linked with self-regulation. Fein and Klein (2011) found that various facets of the personality traits conscientiousness, extraversion, and openness were strong predictors of behavioural self-regulation. Facets of conscientiousness were achievement-striving, deliberation, self-discipline, and dutifulness. Facets of extraversion were assertiveness and activity. The facet of openness that was examined was ideas. These sub-components of the three personality traits predicted individuals' abilities for self-regulating their behaviours. Overall, results revealed that conscientiousness is positively related to self-regulation. In addition, Hoyle (2006) states that conscientiousness is the personality trait most strongly linked with self-regulation. In relation to self-regulation, conscientiousness includes the manner through which individuals control their behaviour. Hoyle (2006) explains a model of the relationship between self-regulation and motivation developed by Sansone and Thoman. This model suggests that an individual's motivation to perform a behaviour may be affected by the degree to which the individual finds the behaviour to be interesting. The researchers note that individuals high in conscientiousness are motivated to perform the behaviour without regulating their interest. Therefore, a person high in conscientiousness does not need to be interested in an activity in order to be motivated to perform a certain behaviour, making the individual more likely to be successful with self-regulation.

With respect to neuroticism, research has produced mixed results on its association with self-regulation. Some research has indicated that higher self-regulation is negatively associated with neuroticism (Marqués, Ibáñez, Ruipérez, Moya, & Ortet, 2005), while other research has suggested that neuroticism is positively associated with the regulatory processes of planning

involved in self-regulation (Morossanova, 2003). Research has also found that self-regulation is positively associated with extraversion (Marqués et al., 2005). However, Morossanova (2003) found that both extraverts and introverts are able to self-regulate because extraverts are flexible with planning and introverts are successful with programming executive actions.

Although previous research has confirmed the positive benefits of listening to music and meditation with respect to mood and stress, research has not directly compared the two relaxation methods or how these effects are moderated by personality. Therefore, the present study will compare the effects of listening to music with a brief mindfulness meditation exercise on mood and stress. Since it has been suggested that classical music is more beneficial for lowering stress and inducing relaxation compared with other music genres (Labbé et al., 2007), classical music will be used in the music condition. The study will also analyze personality as a potential moderator using an exploratory approach.

Self-regulation has been linked with meditation, so individuals high in personality traits that are associated with self-regulation may benefit more from meditation. Based on previous research findings, individuals high in conscientiousness would benefit most from meditation because conscientiousness is strongly linked with self-regulation (Hoyle, 2006). Individuals high in openness, extraversion, and neuroticism may also benefit from meditation, although research has shown that both extraverts and introverts are able to self-regulate (Morossanova, 2003) and mixed results are found for neurotic individuals.

Based on previous research findings, it is hypothesized that listening to music and meditation will both have positive effects on mood and stress. The potential interaction effects across personality traits will also be examined to see if personality serves as a moderator for any effects of listening to music and meditation on well-being. It is also hypothesized that individuals

scoring high on conscientiousness will experience greater benefits to mood and stress from meditation than individuals in the control group, because conscientiousness is the trait most strongly related to self-regulation (Hoyle, 2006), which is important for successful mindfulness meditation. Aside from focusing on these two hypotheses, this study will also take an exploratory approach to examining potential interaction effects of the big five personality traits with relaxation method because previous research has not directly compared personality with both music and meditation. This study is a three groups, between-subjects design comprised of three experimental conditions: music, meditation, and a control. Participants in the music or meditation condition will partake in the relaxation activity for five minutes. Individuals in each condition will complete a series of questionnaires measuring their mood, stress levels, life satisfaction, and personality traits.

Methods

Participants

The participants in this experiment were 93 undergraduate students at Western University (57 females, 36 males, aged 18-31 years, $M = 20.63$, $SD = 2.68$). An advertisement on the King's University College SONA system was used to recruit Psychology 1000 students for this study. These students were offered 2.5% course credit towards their Psychology 1000 course for participating in this study and completing an assignment related to the study. An advertisement posted on Western University campus was also used to recruit any undergraduate students from Western University and any of the affiliate colleges. Students not receiving course credit towards a Psychology 1000 course received \$10 for participation. Students were randomly assigned to one of the three conditions of the experiment using a randomized condition sheet. There were 28

participants in the control condition, 32 participants in the music condition, and 33 participants in the meditation condition.

Materials

At the beginning of the study, participants were asked to provide demographic information, including their gender and age. Participants in the music and meditation conditions were given headphones connected to the computer.

Music exercise. Participants in the music condition listened to the first 5 minutes of Mozart's Sonata for Two Pianos in D Major, K. 488. Previous research suggests that listening to this classical piece improves mood (Thompson, Schellenberg, & Husain, 2001). The song length was cut down to 5 minutes from its original 7 minutes and 29 seconds in order to keep the length consistent with the meditation exercise.

Meditation exercise. Participants in the meditation condition were guided through a 5 minute mindfulness of breathing meditation exercise, in which they were asked to be mindful of each breath as it entered and left the body. The instructions were modelled on Krygier et al.'s (2013) study where this exercise predicted improved mood. At the start of the meditation, a female voice on the recording said, "*You will now perform an eyes closed meditation task. I would like you to close your eyes and fix your attention on the area below the nostrils and above the upper lip. Please breathe naturally and simply focus on each breath as it enters and leaves your nose. I will tell you when we have finished recording.*" At each minute time interval, the recording provided the reminder, "*Keeping your eyes closed, continue to fix your attention on the area below the nostrils and above the upper lip. Continue to breathe naturally and focus on each breathe as it enters and leaves your nose.*" This reminder recorded at 1 minute, 2 minutes, 3 minutes, and 4 minutes was added to the original meditation instructions in order to ensure

participants stayed on task during the meditation exercise. At the 5 minute time interval, the recording, "*The meditation has come to an end. You may open your eyes. Please press continue on the screen,*" was also added in order to signal the end of the meditation. Participants in the control condition were not given headphones and did not listen to music or meditation.

In all three conditions, participants completed the following scales:

PANAS. The PANAS, or Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988) measures an individual's mood. Participants were asked to use a 5-point rating scale to indicate the extent to which they were feeling various feelings and emotions in the present moment. The scale is made up of two subscales, the positive affect subscale and negative affect subscale, each consisting of 10 items. Items in the positive affect subscale include "interested" and "excited." Items in the negative affect subscale include "ashamed" and "nervous." Individuals must rate how accurately each item describes them on a 5-point scale ranging from 1 - *Very slightly or not at all* to 5 - *extremely*. The positive affect score was calculated by summing the scores of items 1, 3, 5, 9, 10, 12, 14, 16, 17, and 19. Scores ranged from 10 - 50, with higher scores representing higher levels of positive affect. The positive affect subscale had high reliability, $\alpha = 0.87$. The negative affect score was calculated by summing the scores of items 2, 4, 6, 7, 8, 11, 13, 15, 18, and 20. Scores ranged from 10 - 50, with lower scores representing lower levels of negative affect. The negative affect subscale also had high reliability, $\alpha = 0.88$.

The Perceived Stress Questionnaire. This questionnaire (Levenstein et al., 1993) was originally meant to measure an individual's perceived level of stress during the last year or two. For the purposes of the present study, the initial instructions and 4-point scale were modified to measure stress in an unspecified time frame (see Appendix A). Instead of instructing participants

to rate the extent to which the statements applied to them within the last year or two, the instructions for this study asked participants to indicate their agreement with each statement, without indicating a specific time frame. Since the instructions were changed, the 4-point rating scale was also adjusted. The original rating scale ranged from 1 - *Almost never* to 4 - *Usually*. The altered 4-point scale ranges from 1 - *strongly disagree* to 4 - *strongly agree*. Participants used this scale to rate the extent to which they felt that the 30 items applied to them. These items include, "You feel calm," and "You feel mentally exhausted." This questionnaire displayed high reliability, $\alpha = 0.92$. Negative items were reverse scored and then all items were summed. The raw score was subtracted by 30 and then divided by 90 to reach a score between 0 and 1, with a higher score indicating higher stress.

Satisfaction with Life Scale. This scale (Pavot & Diener, 1993) measures one's overall satisfaction with his/her life. Participants indicated their level of agreement with five statements using a 7-point scale. The statements include, "In most ways my life is close to my ideal," and "If I could live my life over, I would change almost nothing." Participants indicated the extent to which they agreed with each statement using a 7-point scale ranging from 1 - *Strongly Disagree* to 7 - *Strongly Agree*. This scale had acceptable reliability, $\alpha = 0.74$. Scores were determined by averaging the five item scores, with a higher score indicating greater satisfaction with life.

Introspective Thought. This is a filler task consisting of one open-ended question about participants' current thoughts (see Appendix B). This task was created solely for this study. The purpose of this exercise was to aid the cover story, which stated that participants were participating in a study related to personality and introspective thought. However, participants' responses to this exercise were not used in the data analysis.

The Big Five Inventory (BFI). This inventory (John & Srivastava, 1999) measures the big five personality traits: extraversion, neuroticism, agreeableness, conscientiousness, and openness, each on its own subscale. Participants used a 5-point scale to rate the extent that they felt each of the 44 items described them. The 5-point scale ranges from 1 - *Disagree strongly* to 5 - *Agree strongly*. Extraversion was measured by the average of eight items, with three being reverse-scored. An example of an item measuring extraversion is "generates a lot of enthusiasm." The extraversion subscale had acceptable reliability, $\alpha = 0.86$. Neuroticism was also measured by the average of eight items, with three being reverse-scored. An example of an item measuring neuroticism is "can be moody." The neuroticism subscale had acceptable reliability, $\alpha = 0.81$. Agreeableness was measured by the average of nine items, with four being reverse-scored. An example of an item measuring agreeableness is "has a forgiving nature." The agreeableness subscale had acceptable reliability, $\alpha = 0.78$. Conscientiousness was measured by the average of nine items, with four being reverse-scored. An example of an item measuring conscientiousness is "does a thorough job." The conscientiousness subscale had acceptable reliability, $\alpha = 0.79$. Openness was measured by the average of ten items, with two of these items reverse-scored. An example of an item measuring openness is "has an active imagination." The openness subscale also had acceptable reliability, $\alpha = 0.78$.

Music and Meditation Experiences. This survey was created solely for this study to gain an understanding of participants' prior meditation or music listening experiences, if they had any (see Appendix C). This scale consists of 6 questions. Some questions are yes/no questions, for example, asking whether the individual ever practises meditation. Other questions ask how often the participant practices meditation, ranging from *every day* to *less than once a month*. The final question asks how much the individual enjoys listening to classical music. For this question,

participants rated the extent of their enjoyment on a 5-point scale ranging from 1 - *Not at all* to 5 - *Very much*.

Procedure

Upon arrival at the psychology laboratory, participants were seated at a computer and first asked to read a letter of information about the study and then sign a consent form in order to participate. Participants in the music and meditation conditions were given a pair of headphones to wear for the entire duration of the study. Participants in the control condition were not offered headphones. Participants were first asked to provide demographic information, including their gender and age. Individuals in the control condition were not exposed to music or meditation and immediately began with the questionnaires after providing demographic information. However, those in the music and meditation conditions first completed a listening exercise before completing the questionnaires. After the demographic questions, participants in the music condition were exposed to the aforementioned five minutes of Mozart's Sonata for Two Pianos in D Major, K. 488. The music ended after five minutes and the next screen appeared to begin the questionnaires. Alternatively, participants in the meditation condition were exposed to the aforementioned five minute meditation task. In each experimental condition, participants were directed to complete The PANAS, The Perceived Stress Questionnaire, Satisfaction with Life Scale, Introspective Thought task, The Big Five Inventory, and then the Music and Meditation Experiences survey. After completing the scales, participants were thanked for participation and debriefed about the study. The researcher answered any questions the participants had.

Results

Analyses began with an examination of the effects of relaxation method on positive affect, negative affect, and stress via One-Way between subjects ANOVA tests, while

controlling for music and meditation experience. This was followed by an examination of interaction effects with personality traits. The means and standard deviations of positive affect, negative affect, and stress for each experimental condition can be found in Table 1.

Positive affect. A One-Way ANOVA conducted on participants' positive affect scores revealed a significant effect of relaxation method, $F(2, 90) = 5.73, p < 0.01$, partial $\eta^2 = 0.11$, power = 0.86. Tukey's HSD post-hoc tests revealed that participants in the meditation condition ($M = 25.30, SD = 7.99$) scored significantly lower on positive affect than participants in the music condition ($M = 30.72, SD = 7.04$), $t(62.43) = 2.90, p < 0.01$. Participants in the meditation condition also scored significantly lower on positive affect than participants in the control condition ($M = 30.61, SD = 6.77$), $t(59) = 2.81, p < 0.01$. In contrast, participants in the music condition did not differ significantly on scores of positive affect from those in the control condition, $t(58) = -0.06, p = 0.95$. A Factorial ANOVA was also conducted with relaxation method and gender as the independent variables and positive affect as the dependent variable. There was no significant main effect of gender, $F(1, 87) = 1.36, p = 0.25$. Positive affect scores for males ($M = 30.19, SD = 8.13$) did not differ significantly from positive affect scores for females ($M = 27.86, SD = 7.31$). There was no significant interaction of relaxation method and gender, $F(2, 87) = 0.36, p = 0.70$. We did not find a significant effect for age on positive affect, $F(1, 89) = 1.14, p = 0.29$.

We found a significant effect of previous meditation practice on positive affect, $F(1, 86) = 6.08, p = 0.02$, partial $\eta^2 = 0.07$, power = 0.68. Tukey's post-hoc tests indicate that participants in the meditation condition ($M = 25.30$) experienced decreased positive affect compared with those in the control ($M = 30.48$), $p = 0.02$, when controlling for whether or not participants practised meditation before. Tukey's post-hoc tests also indicate that participants in the music

Table 1

Means of Positive Affect, Negative Affect, and Stress By Experimental Condition.

Condition	Dependent Variables		
	Positive Affect	Negative Affect	Stress
Control	30.61 (6.77)	16.14 (6.60)	0.48 (0.18)
Music	30.72 (7.04)	14.91 (5.85)	0.47 (0.17)
Meditation	25.30 (7.99)	13.00 (4.79)	0.42 (0.16)

Note. Numbers in parentheses are standard deviations.

condition ($M = 30.72$) experienced greater positive affect compared with those in the meditation condition, $p < 0.01$, when controlling for whether or not participants practised meditation before. When controlling for whether participants practised meditation before, the overall effect of relaxation method on positive affect still existed, $F(2, 86) = 6.66$, $p < 0.01$, partial $\eta^2 = 0.13$, power = 0.91.

A regression analysis was conducted to control for how often meditators practised meditation. We found that previous time spent meditating had a significant effect on positive affect, $F(5,77) = 8.41$, $p < 0.01$, partial $\eta^2 = 0.69$, power = 1.00. When controlling for how often meditators practised meditation, the overall effect of relaxation method on positive affect still existed, $F(2, 77) = 10.23$, $p < 0.01$, partial $\eta^2 = 0.56$, power = 0.97.

We found that time spent listening to music did not have a significant effect on positive affect, $F(2, 85) = 2.10$, $p = 0.13$. When controlling for the amount of time spent listening to music, we still found a significant effect of relaxation method on positive affect, $F(2, 85) = 3.53$, $p = 0.03$, partial $\eta^2 = 0.08$, power = 0.64. The amount of time spent listening to music was associated with decreased positive affect for those in the meditation condition ($M = 25.30$) compared with those in the control condition ($M = 30.48$), $p = 0.02$. The amount of time spent listening to music also decreased positive affect for those in the meditation condition compared with those in the music condition ($M = 30.72$), $p = 0.01$.

We found a significant effect for participants using music for the purpose of improving mood, $F(1, 86) = 5.68$, $p = 0.02$, partial $\eta^2 = 0.06$, power = 0.65. Participants who reported listening to music for the purpose of improving their mood ($M = 29.76$, $SD = 8.02$) experienced greater positive affect than those who did not listen to music for the purpose of improving their mood ($M = 25.36$, $SD = 5.53$). In addition, after controlling for whether participants used music

to improve mood, there was no longer a significant effect of relaxation method on positive affect $F(2, 86) = 2.60, p = 0.08$.

Music genre preference did not have a significant effect on positive affect, $F(5, 76) = 0.32, p = 0.90$. When controlling for the genre participants most preferred listening to, there was no longer a significant effect of relaxation method on positive affect, $F(2, 76) = 2.41, p = 0.10$. Enjoyment of listening to classical music did not have a significant effect on positive affect, $F(4, 77) = 0.49, p = 0.74$. However, when controlling for the enjoyment level of listening to classical music, relaxation method still had a significant effect on positive affect, $F(2, 77) = 6.52, p < 0.01$, partial $\eta^2 = 0.47$, power = 0.84. Using Tukey's post-hoc tests indicate that participants in the meditation condition ($M = 25.30$) still scored significantly lower on positive affect than participants in the control condition ($M = 30.48$), $p = 0.03$, when controlling for enjoyment of classical music. In addition, participants in the meditation condition also scored significantly lower on positive affect than participants in the music condition ($M = 30.72$), $p = 0.01$, when controlling for enjoyment of classical music.

Negative affect. A One-Way ANOVA conducted on participants' negative affect scores revealed a non-significant effect of relaxation method, $F(2, 90) = 2.34, p = 0.10$. Negative affect scores of participants in the control condition ($M = 16.14, SD = 6.60$), music condition ($M = 14.91, SD = 5.85$), and meditation condition ($M = 13.00, SD = 4.79$) were not significantly different. A Factorial ANOVA was also conducted with relaxation method and gender as the independent variables and negative affect as the dependent variable. There was no significant main effect of gender, $F(1, 87) = 0.06, p = 0.81$. Negative affect scores for males ($M = 14.89, SD = 5.08$) did not differ significantly from negative affect scores for females ($M = 14.42, SD =$

6.29). There was no significant interaction of relaxation method and gender, $F(2, 87) = 0.35, p = 0.71$.

We did not find a significant effect for whether participants practised meditation before on negative affect, $F(1, 86) = 0.89, p = 0.35$. After controlling for whether or not participants practised meditation before, we also did not find a significant effect of relaxation method on negative affect, $F(2, 86) = 2.24, p = 0.11$. We did not find a significant effect of how often people meditated on negative affect, $F(5, 77) = 0.85, p = 0.54$. Controlling for how often participants meditated before did not result in a significant effect of relaxation method on negative affect, $F(2, 77) = 1.37, p = 0.29$.

We found that time spent listening to music did not have a significant effect on negative affect, $F(2, 85) = 0.77, p = 0.47$. When controlling for time spent listening to music, we also did not find a significant effect for relaxation method on negative affect, $F(2, 85) = 0.49, p = 0.61$.

Using music for the purpose of improving mood did not have a significant effect on negative affect, $F(1, 86) = 0.03, p = 0.86$. After controlling for whether participants used music for the purpose of improving mood, there was a marginally significant effect of relaxation method on negative affect, $F(2, 86) = 2.88, p = 0.06, \text{partial } \eta^2 = 0.06, \text{power} = 0.55$. Post-hoc tests using LSD indicate that participants in the control condition ($M = 17.16$) experienced increased negative affect compared with those in the meditation condition ($M = 13.00$), $p = 0.02$.

Music genre preference did not have a significant effect on negative affect, $F(5, 76) = 0.67, p = 0.65$. When controlling for music genre preference, there was still no significant effect of relaxation method on negative affect, $F(2, 76) = 1.07, p = 0.35$.

Stress. A One-Way ANOVA conducted on participants' stress scores revealed a non-significant effect of relaxation method, $F(2, 90) = 1.15, p = 0.32$. Stress scores of participants in

the control condition ($M = 0.48$, $SD = 0.18$), music condition ($M = 0.47$, $SD = 0.17$), and meditation condition ($M = 0.42$, $SD = 0.16$) were not significantly different. A Factorial ANOVA was also conducted with relaxation method and gender as the independent variables and stress as the dependent variable. There was no significant main effect of gender, $F(1, 87) = 0.38$, $p = 0.54$. Stress scores for males ($M = 0.45$, $SD = 0.19$) did not differ significantly from stress scores for females ($M = 0.47$, $SD = 0.16$). There was no significant interaction of relaxation method and gender, $F(2, 87) = 0.27$, $p = 0.76$.

We found a significant effect of previous meditation practice on stress, $F(1, 86) = 7.72$, $p < 0.01$, partial $\eta^2 = 0.08$, power = 0.79. After controlling for whether or not participants practised meditation before, we did not find a significant effect of relaxation method on stress, $F(2, 86) = 0.94$, $p = 0.39$. We found a significant effect of how often people meditated on stress, $F(5, 77) = 2.86$, $p = 0.05$, partial $\eta^2 = 0.49$, power = 0.68. After controlling for how often participants meditated before, we did not find a significant effect of relaxation method on stress, $F(2, 77) = 0.48$, $p = 0.63$.

We found that time spent listening to music had a marginally significant effect on stress, $F(2, 85) = 3.00$, $p = 0.06$, partial $\eta^2 = 0.07$, power = 0.57. After controlling for time spent listening to music, we did not find a significant effect of relaxation method on stress, $F(2, 85) = 0.48$, $p = 0.62$. Using music for the purpose of improving mood did not have a significant effect on stress, $F(1, 86) = 1.92$, $p = 0.17$. When controlling for using music for the purpose of improving mood, there was no significant effect of relaxation method on stress, $F(2, 86) = 2.03$, $p = 0.14$.

Music genre preference did not have a significant effect on stress, $F(5, 76) = 0.87, p = 0.50$. When controlling for music genre preference, there was still no significant effect of relaxation method on stress, $F(2, 76) = 1.03, p = 0.36$.

Life satisfaction. There was no significant effect of relaxation method on life satisfaction, $F(2, 90) = 0.22, p = 0.80$. Life satisfaction scores of participants in the control condition ($M = 4.84, SD = 1.13$), music condition ($M = 4.99, SD = 1.00$), and meditation condition ($M = 4.85, SD = 0.97$) were not significantly different. Therefore, life satisfaction will not be mentioned further.

Personality traits. We found no significant differences across conditions on any of the personality variables, with all p values > 0.31 .

The Relationship between personality traits and relaxation method on mood and stress. A series of regression analyses were conducted to examine potential interaction effects between relaxation method and the five personality variables on mood and stress.

We found meditation predicted increased negative affect among those scoring higher on conscientiousness compared with the control, interaction $\beta = 0.53, t(56) = 3.04, p < 0.01$. This regression analysis revealed that conscientiousness did serve as a moderator between participants in the meditation and control conditions on their scores of negative affect. For those scoring higher on conscientiousness, no relaxation method is more beneficial for negative affect than meditation. Figure 1 illustrates this relationship.

We also found music predicted increased negative affect among those scoring higher on conscientiousness compared with the control, interaction $\beta = 0.53, t(55) = 2.66, p = 0.01$. This regression analysis revealed that conscientiousness did serve as a moderator between participants in the music and control conditions on their scores of negative affect. For those scoring higher on

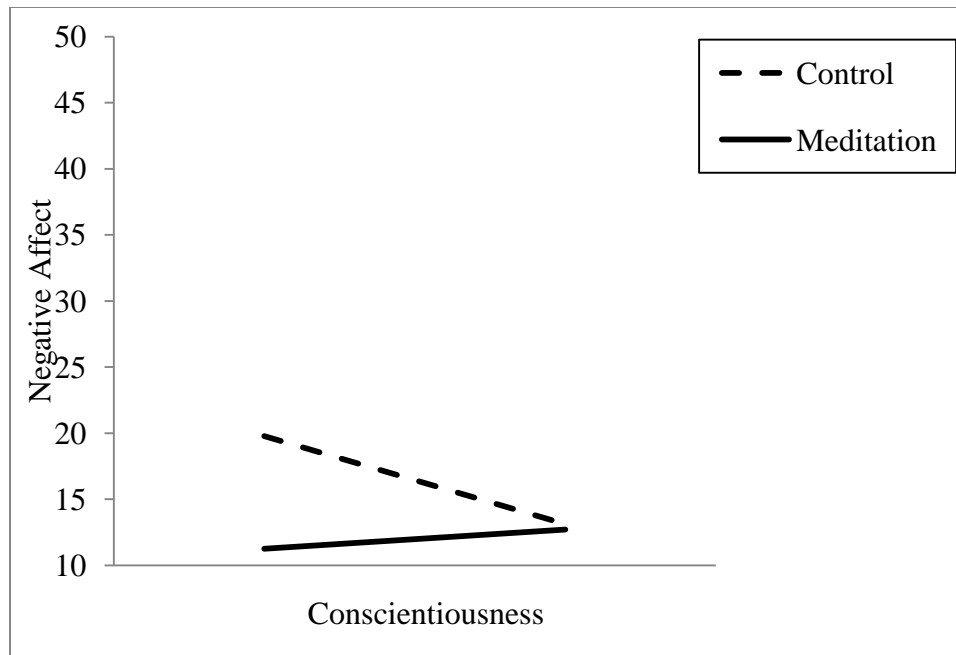


Figure 1. Interaction effect between conscientiousness and meditation versus control on negative affect.

conscientiousness, no relaxation method is more beneficial for negative affect than listening to music.

We found music predicted increased positive affect among those scoring higher on openness compared with the control, interaction $\beta = 0.39$, $t(55) = 2.50$, $p = 0.02$. This regression analysis revealed that openness did serve as a moderator between participants in the music and control conditions on their scores of positive affect. For those higher on openness, music is more beneficial for positive affect compared with no relaxation method.

We found music predicted decreased stress among those scoring higher on agreeableness compared with the control, interaction $\beta = -0.38$, $t(55) = -2.11$, $p = 0.04$. This regression analysis revealed that agreeableness did serve as a moderator between participants in the music and control conditions on their scores of stress. For those higher on agreeableness, music would be more beneficial for stress compared with no relaxation method.

We found music predicted marginally decreased stress among those scoring higher on agreeableness compared with meditation, interaction $\beta = 0.28$, $t(61) = 1.71$, $p = 0.09$. This regression analysis revealed that agreeableness may serve as a potential moderator between participants in the meditation and music conditions on their scores of stress. For those higher on agreeableness, music would be more beneficial for stress than meditation.

We found meditation predicted marginally decreased negative affect among those scoring higher on neuroticism compared with the control, interaction $\beta = -0.34$, $t(56) = -1.86$, $p = 0.07$. This regression analysis revealed that neuroticism may serve as a potential moderator between participants in the meditation and control conditions on their scores of negative affect. For those higher on neuroticism, meditation would be more beneficial for negative affect compared with no relaxation method.

We found meditation predicted marginally decreased stress among those scoring higher on neuroticism compared with the control, interaction $\beta = -0.33$, $t(56) = -1.93$, $p = 0.06$. This regression analysis revealed that neuroticism may serve as a potential moderator between participants in the meditation and control conditions on their scores of stress. For those higher on neuroticism, meditation would be more beneficial for stress compared with no relaxation method.

The difference between meditation versus music in predicting decreased stress among those scoring higher on neuroticism approached significance, interaction $\beta = -0.25$, $t(61) = -1.63$, $p = 0.11$. This regression analysis revealed that neuroticism may serve as a potential moderator between participants in the meditation and music conditions on their scores of stress. For those higher on neuroticism, meditation would be more beneficial for stress than music.

We found the difference between music and the control in predicting decreased negative affect among those scoring higher on neuroticism approached significance, interaction $\beta = -0.29$, $t(55) = -1.55$, $p = 0.13$. This regression analysis revealed that neuroticism may serve as a potential moderator between participants in the music and control conditions on their scores of negative affect. For those higher on neuroticism, music would be more beneficial for negative affect compared with no relaxation method.

No significant interaction effects were found for extraversion and relaxation method, all p values > 0.28 .

Discussion

The present study examined the effects of music and meditation on mood and stress and how these effects might be moderated by personality traits. We hypothesized that listening to music and meditating would both have positive effects on mood and stress. Our research findings

were not consistent with this hypothesis. Overall, we found that participants who listened to music or nothing at all experienced greater positive affect than participants who meditated. However, music did not increase positive affect more than listening to nothing. Therefore, neither meditation nor music was more beneficial for positive affect than taking part in no relaxation method, and meditation was actually less beneficial than listening to music or nothing. In addition, listening to music and meditating were not more beneficial for negative affect or stress compared with listening to nothing at all.

With respect to personality traits, our hypothesis that individuals scoring high on conscientiousness would benefit more from meditation than individuals who listen to nothing was not supported by our results. We actually found that individuals high on conscientiousness experienced greater negative affect when they meditated. In addition, we found that participants high on conscientiousness also experienced greater negative affect after listening to music, compared with those who listened to nothing. More significant results regarding other personality traits were found as well. Individuals scoring high on openness to experience experienced greater positive affect after listening to music, compared with those who listened to nothing. For participants scoring high on agreeableness, music was found to be associated with decreased stress more than listening to nothing. Although no statistically significant findings were present for differences between music and meditation, the difference between the two relaxation methods in predicting lower stress among people high on agreeableness approached significance, with marginal findings indicating that listening to music is more beneficial for stress than meditation for those high on agreeableness. Finally, marginally significant findings suggest that for those scoring high on neuroticism, meditation may be more beneficial than listening to nothing for decreasing negative affect and stress.

Although previous research supports the benefits of listening to music and meditating on mood and stress, there may be potential reasons why we did not find similar results. We found that after controlling for whether participants listen to music for the purpose of improving their mood, the effect of relaxation method on positive affect disappeared, indicating that having self-determined reasons for listening to music or meditating may play a role in promoting well-being. Moreover, one potential reason why listening to music was not beneficial for positive or negative affect compared with listening to nothing may be due to the fact that this study did not allow for the intentional use of music listening for emotional regulation because participants were simply told to listen to a particular piece of music with no reason provided. Research rooted in self-determination theory indicates that when people listen to music for self-determined reasons, such as for personal satisfaction, these people experience greater well-being in terms of affect and life satisfaction (Morinville et al., 2013). Self-Determination Theory suggests that the personal approach to human motivation focuses on the individual as a personal motivator for one's own self-enhancement (Keune & Forintos, 2010). This theory focuses on how people's psychological needs and personal growth influence their self-motivation. Motivation that is internally driven by the self rather than controlled by external factors contributes to enhanced well-being (Ryan & Deci, 2000). Self-determination theory states that an individual may do an activity, such as listening to music, for two different reasons relating to motivation (Morinville et al., 2013). One reason is due to autonomous motivation, meaning that an individual takes part in an activity such as listening to music because he or she wants to do so for personal satisfaction, or because he or she believes the music is personally meaningful. The other reason is due to controlled motivation, meaning that an individual takes part in an activity for external reasons which may stem from peer pressure or subjective norms. In this context, an individual might listen to music

because his or her peers listen to music and it is popular, or in the case of the present study, because he or she was told to listen to a particular piece of music. Overall, self-determined reasons for listening to music incorporate more autonomous motivation than controlled motivation. The present study lacked the opportunity to form self-determined reasons for listening to music, which have been linked to greater well-being (including greater positive affect, reduced negative affect, and greater life satisfaction), even when controlling for the amount of time that adolescents spent listening to music (Morinville et al., 2013). Therefore, the reason an individual listens to music is an important factor linking music listening with well-being. Participants in our study were not able to develop autonomous motivation for listening to the music they were provided.

Aside from not benefitting mood, music also did not have a significant effect on stress, contrary to findings from past research. Although previous research indicates that listening to classical music reduces stress more than listening to other genres of music, such as heavy metal, or no music, listening to self-selected music also reduces stress (Labbé et al., 2007). Since we gave participants a specific song to listen to, they were not able to select their own music. Perhaps having no choice in the music they listened to may provide a reason as to why listening to music did not benefit stress compared to listening to nothing.

It is interesting that meditation was not found to be beneficial for mood or stress compared with either listening to nothing or listening to music because research shows that meditation is beneficial for mood, stress, and overall well-being (Van Gordin, Shonin, Sumich, Sundin, & Griffiths, 2014; Keune & Forintos, 2010). However, in past studies meditation is usually practised for an extended period of time, such as on a weekly or daily basis. For instance, Van Gordin et al. (2014) found that individuals experienced improved mood and stress after 8

weeks of Meditation Awareness Training. In addition, research also indicates that meditating more frequently results in higher scores of positive affect (Keune & Forintos, 2010).

Furthermore, Lykins and Baer (2009) examined the benefits of long-term meditation practice, and suggest that long-term meditators experience greater well-being and less difficulties regulating their emotions than non-meditators. Perhaps meditation did not benefit mood or stress in the present study because the amount of time participants spent meditating was very brief. They only meditated once for a total of five minutes. Although the meditation task was based off of a research study in which a 5-minute meditation was also used (Krygier et al., 2013), participants completed the meditation task for 10 days rather than just one time.

Although our research findings regarding the links between meditation, music, and conscientiousness were contrary to our hypothesis, our results suggesting that individuals scoring high on conscientiousness experienced greater negative affect after meditation than those in the control condition are supported by a research study indicating that meditators scored significantly lower on conscientiousness than non-meditators (Van den Hurk et al., 2011). These researchers suggest that people scoring low on conscientious are not as achievement-oriented as those scoring high on conscientiousness, so they may be more willing to try mindfulness meditation, because when beginning meditation, the focus is on learning rather than reaching an immediate goal. Although this research is more geared towards long-term meditators or individuals who have practised mediation previously, it may help to explain the notion that individuals high in conscientiousness are more achievement-oriented, so they need a goal to strive for when meditating. However, our study did not provide an explicit goal for the meditators to strive for in order to improve their mood and lower their stress levels, so they may have mindlessly completed the meditation task.

We also noticed that individuals scoring high in conscientiousness experienced greater negative affect after listening to music compared with those who listened to nothing. This result is surprising and inconsistent with previous research indicating that individuals scoring high on conscientiousness experienced fewer negative emotions after listening to music than individuals scoring low on conscientiousness (Liljeström et al., 2013).

Our finding that individuals scoring high on openness experienced an increased positive mood after listening to music as opposed to those who did not listen to anything is consistent with research findings that people scoring high on openness experience more positive emotions (Liljeström et al., 2013). Some of our other findings are novel in exploring how personality traits interact with relaxation methods to predict levels of positive and negative affect and stress. For instance, although previous research indicates that individuals scoring high on agreeableness experience greater positive affect and lower negative affect after listening to music (Liljeström et al., 2013), our findings suggest that people scoring high on agreeableness also experience decreased stress compared with people who do not listen to anything.

Overall, it appears that when comparing music and meditation, self-determined reasons for listening to music might play an important role in determining the associated benefits to well-being. For meditation, long-term meditation and training in meditation may be more beneficial for well-being than one brief meditation task. It is important for people to learn the skill of meditating in order to be able to focus properly. It is also possible that people scoring high on conscientiousness may not benefit from mindfulness meditation in which there is no clear goal to strive for.

While we must exert caution in applying our findings, our results are relevant for individuals who experience high levels of stress, or just to individuals in general who wish to

improve their mood or decrease stress levels. Findings from this study suggest that neither meditation nor music are beneficial for mood and stress compared with no relaxation technique. However, if people are able to select their own music, it is possible they may experience better outcomes. In addition, having a predetermined reason for listening to music in order to improve mood or reduce stress may also aid in improving well being. For meditators, it may take time and repeated practice in order to see the benefits, because meditation is something that needs to be learned and requires a lot of concentration. For individuals high on conscientiousness, they may benefit most from meditation when first learning the practice because they may not necessarily have a specific goal for meditation aside from learning how to do it properly. Otherwise, individuals scoring high on openness may choose to use music to improve their mood, and those scoring high on agreeableness may choose to listen to music to decrease stress, in keeping with our results.

Of course, limitations to our study may be directly related to the results we found opposing our hypotheses. First, it is unknown whether our results are short-term or long-lasting because our experimental manipulations only included brief, 5-minute relaxation tasks. Future research may benefit from a longitudinal study conducted to see if meditating on a regular basis or listening to certain music on a regular basis have similar or different effects on mood and stress compared with the results we found. Second, the present study failed to measure individuals' levels of relaxation directly. Rather than studying relaxation indirectly in terms of stress, a relaxation score may provide further insight into the possible benefits of listening to music or meditating on overall well being. Future research may benefit from studying relaxation as an added dependent variable. Finally, future research may also incorporate self-selected music

for music listeners, rather than using only classical music, because self-selected music has been effective in reducing anxiety and promoting relaxation.

Ultimately, the benefits of listening to music and meditating on mood and stress across personality traits are unclear and require further research to make more concrete conclusions. Although significant effects on negative affect and stress were not found in this study, meditating was not beneficial for positive affect, and listening to music was not more beneficial for positive affect than listening to nothing. However, the meditation task presented may not have provided enough exposure to meditation to obtain benefits. In addition, the music presented was not self-selected, and allowing participants to select their own music may have been more beneficial. In both relaxation manipulations, participants were not given clear objectives for participating in the relaxation task, so individuals did not have a clear goal or self-determined reason for completing the tasks, possibly affecting the results. This may have especially affected individuals scoring high on conscientiousness who are achievement-oriented and need a specific goal to focus on in order to experience benefits to well-being. In all, our findings raise new questions about when music and meditation will be most beneficial and for whom they will benefit most. Future research can no doubt further our understanding on the benefits of music and meditation for well-being.

References

- Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion regulation as a scientific construct: Methodological challenges and directions for child development research. *Child Development, 75*, 317-333. <http://dx.doi.org/10.1111/j.1467-8624.2004.00673.x>
- Fein, E. C., & Klein, H. J. (2011). Personality predictors of behavioural self-regulation: Linking behavioural self-regulation to five-factor model factors, facets, and a compound trait. *International Journal of Selection and Assessment, 19*, 132-144. <http://dx.doi.org.proxy1.lib.uwo.ca/10.1111/j.1468-2389.2011.00541.x>
- Hosemans, D. (2014). Meditation: A process of cultivating enhanced well-being. *Mindfulness*, <http://dx.doi.org/10.1007/s12671-013-0266-y>
- Hoyle, R. H. (2006). Personality and self-regulation: Trait and information-processing perspectives. *Journal of Personality, 74*, 1507-1525. <http://dx.doi.org/10.1111/j.1467-6494.2006.00418.x>
- John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (Vol. 2, pp. 102–138). New York: Guilford Press.
- Keune, P. M., & Forintos, D. (2010). Mindfulness meditation: A preliminary study on meditation practice during everyday life activities and its association with well-being. *Psihologijske Teme, 19*, 373-386. Retrieved from <http://search.proquest.com/docview/906331401?accountid=15115>
- Komaraju, M., Karau, S. J., Schmeck, R. R., & Avdic, A. (2011). The big five personality traits, learning styles, and academic achievement. *Personality and Individual Differences, 51*, 472-477. <http://dx.doi.org/10.1016/j.paid.2011.04.019>

- Krygier, J. R., Heathers, J. A. J., Shahrestani, S., Abbott, M., Gross, J. J., & Kemp, A. H. (2013). Mindfulness meditation, well-being, and heart rate variability: A preliminary investigation into the impact of intensive vipassana meditation. *International Journal of Psychophysiology*, *89*, 305-313. <http://dx.doi.org/10.1016/j.ijpsycho.2013.06.017>
- Labbé, E., Schmidt, N., Babin, J., & Pharr, M. (2007). Coping with stress: The effectiveness of different types of music. *Applied Psychophysiology and Biofeedback*, *32*, 163-168. <http://dx.doi.org/10.1007/s10484-007-9043-9>
- Levenstein, S., Prantera, C., Varvo, V., Scribano, M. L., Berto, E., Luzi, C., & Andreoli, A. (1993). Development of the perceived stress questionnaire: A new tool for psychosomatic research. *Journal of Psychosomatic Research*, *37*, 19-32. Retrieved from <http://search.proquest.com/docview/618300042?accountid=15115>
- Liljeström, S., Juslin, P. N., & Västfjäll, D. (2013). Experimental evidence of the roles of music choice, social context, and listener personality in emotional reactions to music. *Psychology of Music*, *41*, 579-599. <http://dx.doi.org/10.1177/0305735612440615>
- Lykins, E. L. B., & Baer, R. A. (2009). Psychological functioning in a sample of long-term practitioners of mindfulness meditation. *Journal of Cognitive Psychotherapy*, *23*, 226-241. Retrieved from <http://search.proquest.com/docview/89163116?accountid=15115>
- Marqués, M. J., Ibáñez, M. I., Ruipérez, M. A., Moya, J., & Ortet, G. (2005). The self-regulation inventory (SRI): Psychometric properties of a health related coping measure. *Personality and Individual Differences*, *39*, 1043-1054. <http://dx.doi.org/10.1016/j.paid.2005.02.030>

- Miranda, D., & Gaudreau, P. (2011). Music listening and emotional well-being in adolescence: A person-and variable-oriented study. *European Review of Applied Psychology/Revue Européenne De Psychologie Appliquée*, *61*, 1-11.
<http://dx.doi.org/10.1016/j.erap.2010.10.002>
- Morinville, A., Miranda, D., & Gaudreau, P. (2013). Music listening motivation is associated with global happiness in Canadian late adolescents. *Psychology of Aesthetics, Creativity, and the Arts*, *7*, 384-390. Retrieved from
http://journals1.scholarsportal.info/details/19313896/v07i0004/384_mlmiawghicla.xml&sub=all#C19
- Morossanova, V. I. (2003). Extraversion and neuroticism: The typical profiles of self-regulation. *European Psychologist*, *8*, 279-288. <http://dx.doi.org/10.1027/1016-9040.8.4.279>
- Pavot, W., & Diener, E. (1993). Review of the satisfaction with life scale. *Psychological Assessment*, *5*, 164-172. <http://dx.doi.org/10.1037/1040-3590.5.2.164>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*, 68-78.
<http://dx.doi.org/10.1037/0003-066X.55.1.68>
- Saarikallio, S. (2011). Music as emotional self-regulation throughout adulthood. *Psychology of Music*, *39*, 307-327. <http://dx.doi.org/10.1177/0305735610374894>
- Thoma, M. V., la Marca, R., Brönnimann, R., Finkel, L., Ehlert, U., & Nater, U. M. (2013). The effect of music on the human stress response. *PLoS ONE*, *8*, Retrieved from
<http://search.proquest.com/docview/1449311236?accountid=15115>

Thompson, W. F., Schellenberg, E. G., & Husain, G. (2001). Arousal, mood, and the mozart effect. *Psychological Science, 12*, 248-251. <http://dx.doi.org/10.1111/1467-9280.00345>

Van den Hurk, P., Wingers, T., Giommi, F., Barendregt, H. P., Speckens, A. E. M., & Van Schie, H. T. (2011). On the relationship between the practice of mindfulness meditation and personality—an exploratory analysis of the mediating role of mindfulness skills. *Mindfulness, 2*, 194-200. <http://dx.doi.org/10.1007/s12671-011-0060-7>

Van Gordon, W., Shonin, E., Sumich, A., Sundin, E. C., & Griffiths, M. D. (2014). Meditation awareness training (MAT) for psychological well-being in a sub-clinical sample of university students: A controlled pilot study. *Mindfulness, 5*, 381-391. <http://dx.doi.org/10.1007/s12671-012-0191-5>

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063-1070. <http://dx.doi.org/10.1037/0022-3514.54.6.1063>

Appendix A

Modified Perceived Stress Questionnaire

For each sentence, indicate your agreement with each item by placing the appropriate number on the line beside that item. Please be open and honest in your responding. The 4-point scale is as follows:

1 = strongly disagree

2 = slightly disagree

3 = slightly agree

4 = strongly agree

1. You feel rested. _____
2. You feel that too many demands are being made on you. _____
3. You are irritable or grouchy. _____
4. You have too many things to do. _____
5. You feel lonely or isolated. _____
6. You find yourself in a situation of conflict. _____
7. You feel you're doing things you really like. _____
8. You feel tired. _____
9. You fear you may not manage to attain your goals. _____
10. You feel calm. _____
11. You have too many decisions to make. _____
12. You feel frustrated. _____
13. You are full of energy. _____
14. You feel tense. _____
15. Your problems seem to be piling up. _____
16. You feel you're in a hurry. _____
17. You feel safe and protected. _____
18. You have many worries. _____
19. You are under pressure from other people. _____
20. You feel discouraged. _____
21. You enjoy yourself. _____
22. You are afraid for the future. _____
23. You feel you're doing things because you have to,
not because you want to. _____
24. You feel criticized or judged. _____
25. You are lighthearted. _____
26. You feel mentally exhausted. _____
27. You have trouble relaxing. _____
28. You feel loaded down with responsibility. _____
29. You have enough time for yourself. _____
30. You feel under pressure from deadlines. _____

Appendix B

Introspective Thought

Please take the next one to two minutes to describe the thoughts going through your mind at this moment. Be as descriptive as possible.

