How do facets of personality as measured by the NEO PI-R correlate with level of distraction on a reading comprehension test taken while listening to popular music?

Kaitlyn Bloom

Allegheny College

04/01/2013

Pledge _____

Approved:

_____

Joshua Searle-White

_____

Juvia Heuchert

ACKNOWLEDGEMENTS

While this project may have only one author, it was anything but a solo effort. At this time, I would like to thank all of the individuals who have supported me, guided me, and provided me with advice throughout the duration of this project, ensuring that it would be something of which I could be proud.

I would like to thank my *mother* for offering her best ideas and for making herself available at all hours of the day and night. Without her ongoing support, wisdom, frankness, and motherly love certain aspects of this project would have been much more difficult.

I would like to thank *Denise*, *Alyssa*, *Erin*, *Karly*, *Briana*, *Amanda*, *Hannah*, and *Sarah* for pushing me to succeed, for listening to my daily frustrations, and for helping with perfecting the method for this study. My best friend Denise deserves special mention as she was the one who continually wished for my success. It was during many late nights in the Quigley computer lab with her that this project came together. Her intelligence, unceasing motivation, and constant support encouraged me to do my best.

I would like to thank my *comp groups* who were always there to listen to my ideas and provide helpful feedback- thank you all for making a stressful process as fun as possible. I would like to thank *Dr. Joshua Searle-White* especially for encouraging us to swim with the dolphins and for allowing us our creative freedoms, as well as for providing excellent feedback. *Dr. Juvia Heuchert* deserves thanks as well for critiquing my original comp proposal, and helping me to solidify my topic.

I would like to thank all of my *co-workers* who frequently asked about my project and encouraged me to do my best. Their faith in me was unwavering and their support cannot go

without thanks. Special thanks go to my bosses *Stephanie* and *Nicole* for understanding that this project came first and for allowing me the leeway to ensure that I could devote enough attention to it.

Lastly, I would like to thank everyone else who has supported me throughout my educational journey- *teachers*, *professors*, *co-workers*, *community members*, *family*, and *friends*. You all know who you are… The following product is the culmination of my Allegheny career, and I could not have completed it alone. Thank you all so very much; we did it!

TABLE OF CONTENTS

List of Figures…….……6

Abstract…….……...7

Introduction…...……..8

Background Music……..……..10

Genre……..……10

Lyrics...……..……..…..11

Familiarity and Musical Preferences……...…..11

Background Music and Cognitive Abilities...……12

Reading Comprehension…….....13

Music and Personality Characteristics……...14

Introversion and Extraversion……14

Other Aspects of Personality…….15

Hypothesis…….……17

Method…..……..18

Participants……18

Musical Stimuli..…..……..…….18

Measures……19

Procedure……...19

Results……...……20

Discussion…….……...……..25

Limitations of This Study……..……29

Future Research…….30

References……..32

Appendixes…….....35

Appendix A Informed Consent Form……...…….35

Appendix B Debriefing Form……...…….37

Appendix C Reading Comprehension Test…….....39

Appendix D Permission to Utilize Reading Comprehension Test…….44

Appendix E Post-Test Questionnaire…….45

Appendix F Informational Hand-out…….47

List of Figures

Figure 1. Relationship between self-reported level of distraction and Anxiety (facet N1)…… 21

Figure 2. Relationship between level of distraction and Vulnerability (facet N6)……..... 22

Figure 3. Relationship between self-reported level of distraction and Assertiveness (facet E3)…… 23

Figure 4. Relationship between self-reported level of distraction and Feelings (facet O3)…….. 24

Figure 5. Relationship between self-reported level of distraction and Modesty (facet A5)…….. 25

Abstract

Past research has shown that one's level of extraversion may affect their performance on a test of cognitive abilities taken while in the presence of an auditory distractor. The goal of the current experiment is to investigate if, why, and to what extent, different elements of one's personality are correlated with level of distraction reported after completing a reading comprehension task in the presence of music. Adopting and modifying the methods of previous experiments, the current research study required participants to complete a reading comprehension task while listening to four popular music selections taken from the Billboard Top 100. Participants then completed a post-test questionnaire that asked them to report their level of distraction, and the NEO PI-R to measure their personality across five personality dimensions and 30 personality facets. Results showed that five facets of personality were significantly correlated with self-reported level of distraction; these facets are: Anxiety, Vulnerability, Assertiveness, Feelings, and Modesty. Limitations of this study are discussed and suggestions are made for conducting future research.

How do facets of personality as measured by the NEO PI-R correlate with level of distraction on a reading comprehension test taken while listening to popular music?

Music is all around us. Whether we consciously acknowledge it or not, we hear music on a daily basis. We watch television advertisements, tune-in to car radios, shop in our favorite department stores while popular music plays, and are sometimes even subjected to music when our telephone call is put on hold. While we are bombarded by music in many different environments, it is quite true that we are not always passive listeners. There are specific instances in which we choose to listen to music- whether at work or at play. Examples of these music listening behaviors occur in both educational settings (college students completing class assignments or studying for exams) and work settings (office workers utilizing music to aid in productivity or factory workers utilizing music to maintain a specific pace of production). Due to the increasing popularity of portable music devices and online music databases such as Spotify, 8tracks, and Pandora it is very likely that individuals sometimes listen to music in environments in which any resulting distraction may lead to performance detriments.

The effects of listening to background music while completing different tasks has been of interest to psychologists who study many different areas of psychology. Most interestingly, psychologists have been researching ways in which music can be used by both students, inside and outside of the classroom to facilitate learning and improve academic performance, and by workers, in order to aid in production and to blur the line between work and leisure, a popular goal of large businesses such as Google and Microsoft (Haake, 2011).

At this point in time, the conclusions of studies that have researched the potential benefits of listening to music while completing tasks have not been in total agreement (Furnham & Bradley, 1997). This has left certain researchers, such as Behne (1999), to conclude that

"background music has a negligible impact on everyday behavior" (cited in Kampfe et al., 2010, p.425). However, due to the great variation in the composition and nature of music and the different tasks that have been examined, it is difficult to say definitively that music, in general, has no effect on certain individuals in specific situations. A meta-analysis completed by Kampfe, Sedlmeier, and Renkewitz (2010) confirmed that, while "there is no uniform effect of background music [on cognitive tasks]," there is research that displays noticeable positive effects and noticeable negative effects(p. 440). Kampfe et al. point to researchers' use of many different theories and methodologies as the source of these varied findings, and suggest that researchers should closely examine all of the variables involved in these experiments so that precise theories can be developed and a unified methodology created (2010).

While music of varying complexities has been studied, it is now necessary for researchers to continue focusing their attention on individual differences, namely personality differences, in order to work towards a more comprehensive theory of the impact background music has on cognitive performance. It is true that much research in the area of psychology and music has focused on the personality aspects of introversion and extraversion, an area studied in great detail by Hans Eysenck. It was through such research that a relationship between level of introversion and extraversion and level of musical distraction while completing a task has been established.

The current study placed participants in an environment with musical stimuli in which they completed a complex mental task, a test of reading comprehension, and then completed the NEO PI-R. This was done in order to examine the nature and the extent of the relationship between specific facets of personality and self-reported level of musical distraction while completing a task in the presence of background music.

Literature Review

Background Music

Kallinen (2002), inspired by Radocy & Doyle (1988), defines background music as "any music that is played while the listener's primary attention is focused on another task or activity" (p. 539). Past research utilizing background music has manipulated and reported on many different elements of music including: musical genre, tempo, complexity (Furnham & Strbac, 2002; Furnham & Bradley, 1997; Kiger, 1989), loudness (Thompson et al., 2011), and information-load. Due to the vast array of studies that all focus on different elements of music, it has been hard for researchers to determine definitively how listening to background music affects cognitive performance.

Genre. Early studies examined the effect of classical music on cognitive abilities; more recent studies have been focusing on popular music. North and Hargreaves (2003) assert that "of all the musical styles in Western society it seems that we should regard pop music as especially important" (p.407). In a study done by North and Hargreaves, it was determined that participants listened to pop music in 67.1% of all music listening episodes (2003). Following the research of Furnham and Strbac (2002), the current study will utilize popular music, music that most students would likely be familiar with, in order to aid with ecological validity.

While previous studies that utilized pop music showed that it hindered performance on a reading comprehension task (Fogelson, 1973), other research has shown that listening to music that one likes heightens arousal and consequently performance (Perham & Vizard, 2011). However, Furnham and Bradley report that, overall, listening to background music while completing a cognitive task is more likely to lower performance when compared to completing the same cognitive task in silence (1997).

Lyrics. Whether or not a particular song selection contains lyrics has also been shown to influence the effect listening to background music has on a reading comprehension task. Avila, Furnham, and McClelland (2011) reported that when lyrics are present in a piece of music, the information load is increased. Kiger (1989) found that on a test of reading comprehension participants scored higher in a low information-load condition than in a silent or high information-load condition. This may be because attempting to concentrate on a complex mental task, such as reading comprehension, while also listening to music lyrics results in the two inputs "contradicting each other" making it "impossible to concentrate properly and listen to music" at the same time (Haake, 2011, p. 120).

Familiarity and Musical Preferences. Along with studying the elements of music itself, researchers have taken into consideration participants' own musical preferences as well as their familiarity with the music selections. These two factors have been thought to influence how listening to background music while completing a task affects cognitive performance. Perham and Vizard (2011) had participants complete a serial recall task in which they were asked to recall a list of eight letters in the exact order they were presented under five different sound conditions: quiet, steady-state speech, changing-state speech, liked music, and disliked music. Researchers found that although participants liked their self-selected music more than the other sound conditions, and found it to be more pleasant, their performance on the serial recall task was just as poor in the liked music condition as it was in the disliked music condition. Participants in the same research study did not view their self-selected liked songs any less distracting than the disliked songs (Perham & Vizard, 2011). This study highlights the possibility that preference for a particular song does not moderate the affect listening to background music has on cognitive task performance. For this reason, the current study will not

address musical preferences, although it may be true that the participants may have a preference for the selections chosen.

Along with having a preference for a particular genre of music or particular music selections, participants may also be familiar with the music selections chosen by researchers. Familiarity with the selected background music may result in one of at least two different scenarios. Firstly, music that is familiar to participants may be more easily tuned out. Secondly, music that is familiar to participants may encourage them to want to sing along with the lyrics which may affect the level of attention that can be given to completing the cognitive task at hand. Etaugh and Michals (1975) found that music that is unfamiliar to participants is more distracting than music that is familiar to them. Mehrabian (1976), when examining high information-load music, noted that when listening to unfamiliar, high information-load music, individuals may experience tension and anxiety that interferes with their ability to concentrate on complex tasks (cited in Kiger, 1989). The current experiment utilized popular music that participants were most likely to be familiar with and hear on a daily basis.

Background Music and Cognitive Abilities

Previous studies that have examined the relationship between listening to background music and its impact on one's cognitive abilities have focused on a variety of cognitive tasks including word recall (Perham & Vizard, 2011), mental arithmetic (Furnham & Stephenson, 2007), the Stroop test (Cassidy & MacDonald, 2007), and reading comprehension (Etaugh & Michals, 1975; Furnham & Bradley, 1997; Furnham & Strbac, 2002). Due to the variance in the type of task and the different musicalr selections being used, past research has been quite inconsistent with regards to reporting the effects of background music on cognitive performance (Daoussis & McKelvie, 1986).

Reading Comprehension. In order to control the scope of the current study, the cognitive task focused on is reading comprehension. This cognitive task was chosen for numerous reasons. Firstly, the participants in the current research study were college students who most likely engaged in reading tasks inside the classroom, and outside of the classroom, such as when studying (Thompson et al., 2011). Secondly, reading comprehension was chosen because it is a complex mental task, a task on which music is more likely to have an effect. As defined by Smith (1961), a complex mental task is one in which "the mental activity required in [a] situation is more than just routine and genuinely deserves the term complex in a problem-solving sense" (p.159). Henderson, Crews, and Barlow (1944) also attest that the complexity of a task influences participants' level of distraction. Furnham and Strbac (2002) add that reading comprehension is one complex mental task in particular that is more greatly impacted by listening to background music.

Thompson, Schellenberg, and Letnic (2011) report that both reading and listening to music "place demands on temporal processing skills…" which affect one's ability to process both types of information concurrently (p.2). Referencing Kahneman's capacity model, Thompson and colleagues state the Cognitive-Capacity hypothesis which says, "a limited pool of resources must be distributed over cognitive processes at any given moment" (Thompson et al., 2011, p.2). Evidence of these attentional limitations supports the notion that if one is attempting to give their undivided attention to one task, then that attention can be broken if one is presented with another task (Kampfe et al., 2010; Thompson et al., 2011). Because comprehending a reading passage involves gathering information, understanding information, and interpreting information, and then recalling it for later use, one can understand how listening to music with

lyrics could complicate the completion of a reading comprehension task (Furnham & Strbac, 2002).

In order to test reading comprehension, most past studies have utilized the reading comprehension components from college-level standardized tests including the Graduate Management Admission Test (GMAT) and the Law School Admissions Test (LSAT) preparation booklet (Thompson et al., 2011; Etaugh & Michals, 1975; Furnham & Bradley, 1997). The current study utilized a reading comprehension question modeled after reading comprehension questions presented on the Graduate Record Examination (GRE), and acquired with permission from majortests.com. A question modeled after the GRE was chosen to ensure that the reading comprehension task would not be too difficult or too easy for the participants, which could result in participants not taking the task seriously or a reduction in score variance.

Music and Personality Characteristics

While the components of music have been examined in great detail in past research on background music and cognitive abilities, research on individual differences is not as prevalent, with the exception of introversion and extraversion.

Introversion and Extraversion. Along with the particular elements of music being studied, and the cognitive task being tested, individual differences have been shown to moderate the affects background music has on cognitive abilities. Introversion and extraversion are two elements of personality that have been examined most extensively. Hans Eysenck (1967) stated that introverted and extraverted individuals have different levels of optimum cortical arousal. Optimum cortical arousal refers to the level at which an individual can perform at their best without any type of distraction. Eysenck hypothesized that the level of optimum cortical arousal was much lower for introverts than it was for extraverts. This implies that introverted

individuals need less external stimuli to reach their optimum level of arousal, while extraverted individuals need much more stimulation to perform at their best. In an environment in which introverted and extraverted individuals would be working together in the presence of an environmental stimuli, such as background music, introverted individuals would be more likely to surpass their optimum level of arousal, viewing the stimuli as a distraction, while the extraverted individuals would perform better in the presence of the stimuli (cited by Avila et al., 2011).

Numerous studies have examined the relationship between introversion and extraversion, and level of distraction while completing a cognitive task in the presence of background music. Furnham and Strbac (2002) found that the performance of introverts was significantly worse than the performance of extraverts on a test of reading comprehension taken in the presence of background music. Additionally, Furnham and Strbac (2002) found that participants were less likely to report finding the music distracting as their level of extraversion increased. Another study by Furnham & Bradley (1997) found that introverts had more difficulty completing a reading comprehension task in the presence of music than extraverts.

In many studies, while the presence of background music had a greater effect on introverts, the performance of extraverted students was negatively impacted as well. These findings left Furnham and Bradley (1997) to state that there is very little evidence that the presence of background music is beneficial to anyone, even extraverts, although "[the presence of background music] nearly always impairs the performance of introverts" (p.454)

Other Aspects of Personality. Even prior to the most recent studies regarding personality, background music, and cognitive performance, Daoussis and McKelvie (1986) recognized that the effects background music has on cognitive performance are, in the very least,

"partly mediated," by personality differences (p. 288). Seeing as a wealth of research already exists on introversion and extraversion, it is now of importance to research possible correlations between other aspects of personality and the effects of background music on cognitive abilities.

Ylias and Heaven (2003) moved beyond the use of the Eysenck Personality Inventory (Eysenck, 1963) conducting an analysis of the Big Five. The Big Five, devised by Costa and McCrae, is comprised of five personality domains. Following are the five personality domains as summarized by Dunn, de Ruyter, and Bouwhuis (2011, p.413):

- Neuroticism: "An individual's propensity to feel fear, sadness, embarrassment, anger, guilt, and other emotions of negative affect."
- Extraversion: "An individual's propensity to be talkative, assertive, active, and indicates their preference toward stimulating and exciting environments."
- Openness to experience: "An individual's propensity toward intellectual curiosity, imagination, aesthetic and emotional sensitivity, and originality."
- Agreeableness: "An individual's propensity toward being altruistic, helpful, sympathetic, and empathetic toward others."
- Conscientiousness: "An individual's propensity toward cleanliness, orderliness, having self-determination, and self-control."

Participants in Ylias and Heaven's research study read two passages, one in the presence of a distractor, and one in silence, and then completed the NEO Five-Factor Inventory (NEO-FFI) and a post-test questionnaire meant to assess level of distraction. The results of Ylias and Heaven's research indicated that, while distracted, individuals who were more extraverted performed better on the reading comprehension test than individuals who were less extraverted. However, Ylias and Heaven failed to find any significant performance differences due to

distraction between high-scorers and low-scorers on the dimensions of neuroticism, conscientiousness, agreeableness, or openness to experience, although some trends were found in the expected directions. Despite their findings, the researchers discussed flaws in their experiment that may have affected the results such as the complexity of the reading comprehension passages, the content of the television show being used as a distractor, and small cell sizes (2003).

Inspired by Ylias and Heaven's research, the current study dove further into the relationship between personality, background music, and level of distraction by utilizing the NEO PI-R, a 240 question personality inventory, also created by Costa and McCrae, in which personality is reported according to five domains, and includes six facets under each domain. The NEO PI-R allows for a more detailed analysis of personality. In fact, Dunn et al. (2011) observed improved correlations when using the facets compared to just the Big Five dimensions. While Ylias and Heaven (2003) did not find significant results in any domain other than extraversion, the goal of the current research was to determine what specific facets of personality are related to one's ability to perform on a reading comprehension task while concurrently listening to background music. The purpose of this goal was to better understand the relationship between personality and distraction due to background music while completing a reading comprehension task.

Hypotheses

Much of the research that studies the effects of background music on tests of cognitive ability focuses on elements of the music, personal musical preferences, and the personality dimension of extraversion/introversion. Following the suggestion of Chamorro-Premuzic, Swami, Terrado, and Furnham (2009), the aim of the current research study was to examine the

relationship between other aspects of the Big Five and level of distraction while completing a cognitive task performance in the presence of auditory distracters.

Based upon previous research findings, it was hypothesized that at least one or more facets of Extraversion would be correlated with self-reported level of distraction reported after completing a reading comprehension task while listening to popular music. It was also hypothesized that there would be a positive correlation between level of Extraversion and how often participants study with music playing in the background, such that participants who scored higher in the Extraversion personality dimension would report studying with music more often. Lastly, it was hypothesized that the reading comprehension scores of both high-scorers and low-scorers on the Extraversion domain would be impacted by the background music, while low-scorers may be more negatively impacted than high-scorers, such that participants who scored higher in Extraversion would score marginally higher on the reading comprehension test.

Method

Participants

Twenty-four volunteers for the study were recruited from psychology classes offered at Allegheny College during the Spring 2013 semester. The sample consisted of five men (20.83%) and 19 women (79.17%). All volunteers were college-aged students between the ages of 18-22.

Musical Stimuli

The songs played during the experiment were selected from the Billboard Top 100. The songs selected were “Thrift Shop” by Macklemore & Ryan Lewis, “Locked Out of Heaven” by Bruno Mars, “Hey Ho” by The Lumineers, and “Suit & Tie” by Justin Timberlake featuring Jay-Z. All songs played were the “clean” version. The music was played from a computer located in the testing room. The volume was set moderately loud.

Measures

A test of reading comprehension modeled after the reading comprehension section on the GRE (Graduate Record Examination) was obtained with permission from Major Tests, an online company who provides practice materials for standardized tests. The test consisted of two passages for the participants to read and eight questions to answer about the passages. The test was used to gauge participants reading comprehension levels while listening to music. A 10 question post-test questionnaire created by the experimenter was administered. The questionnaire asked participants to report demographic information, as well as information pertaining to how much they were distracted by the music while completing the reading comprehension task. The question used in data analysis read, "How much did the music distract you from completing the reading comprehension task?" and allowed participants to respond "not at all", "somewhat", "very much", or "completely". Lastly, the NEO PI-R was administered to participants to determine their personality scores across five domains, and six facets of each domain.

Procedure

Volunteers first gave their consent to participate and were then asked to enter a classroom and instructed to sit wherever they liked. Once all members of one group of participants arrived, the experimenter entered the classroom and passed a reading comprehension test to each participant. Participants were instructed to follow the instructions printed on their testing sheet and to begin the test as soon as the experimenter exited the room. The experimenter turned to the computer podium and began playing the selection of music from a CD that had previously been set up in the testing room. Participants were allowed 14 minutes to complete the reading comprehension task. After these 14 minutes had elapsed, the researcher entered the classroom,

collected the reading comprehension task, and passed out a post-test questionnaire to each participant.

Participants received numbered testing materials throughout the duration of the experiment, with the exception of the consent and debriefing forms, to ensure that materials for each participant could be kept together for analysis. Participants were told to make sure that the number on the bottom of their post-test questionnaire matched the number that was on the bottom of their reading comprehension task. Participants were instructed to complete the post-test questionnaire and then to return it to the experimenter who was stationed outside the testing room. As each participant submitted their post-test questionnaire, they were instructed on how to complete the NEO PI-R. Participants returned to the testing room to complete the NEO PI-R. Upon completion of the personality inventory, participants returned the test to the experimenter and were then given a debriefing form as well as an informational sheet explaining the purpose of the personality inventory and also listing websites that they could access for more information pertaining to similar personality inventories. Participants in this correlational study were awarded either two research participation credits or two extra credit points in one of their psychology classes at the discretion of their professor.

Results

A Pearson correlation was computed to assess the relationship between each facet and domain of personality measured by the NEO PI-R and self-reported level of distraction after completing a reading comprehension task while listening to popular music. Significant correlations were not found in any of the five personality domains; however, five of the 30 facets measured by the NEO PI-R were shown to be significantly correlated with level of distraction. Two facets of Neuroticism were found to be significantly, positively correlated with level of

distraction- Anxiety (N1) and Vulnerability (N6). One facet of Extraversion was found to be significantly, negatively correlated with level of distraction- Assertiveness (E3). One facet of Openness to Experience, Feelings (O3), and one facet of Agreeableness, Modesty (A5), were also found to be significantly, positively correlated with level of distraction. The following figures summarize the significant correlations.

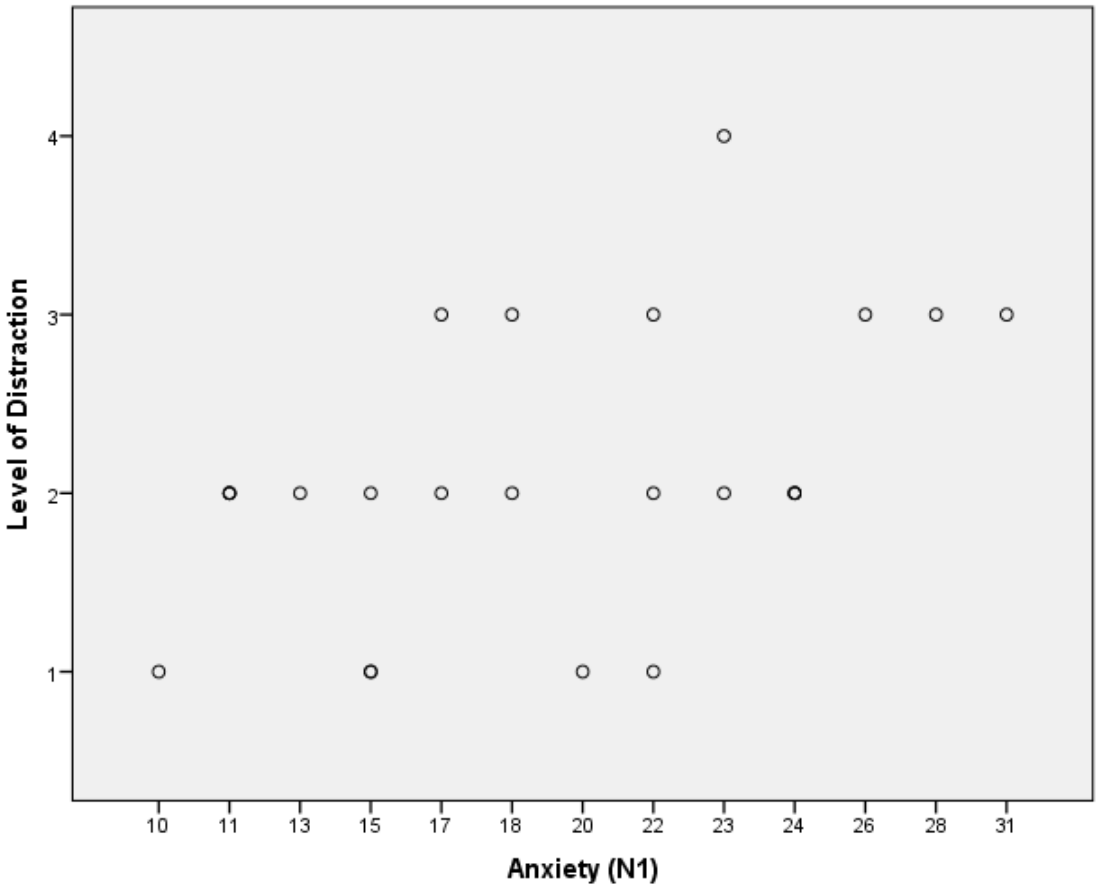


Figure 1. Relationship between self-reported level of distraction and Anxiety, r=.445, n=24, p=.025.

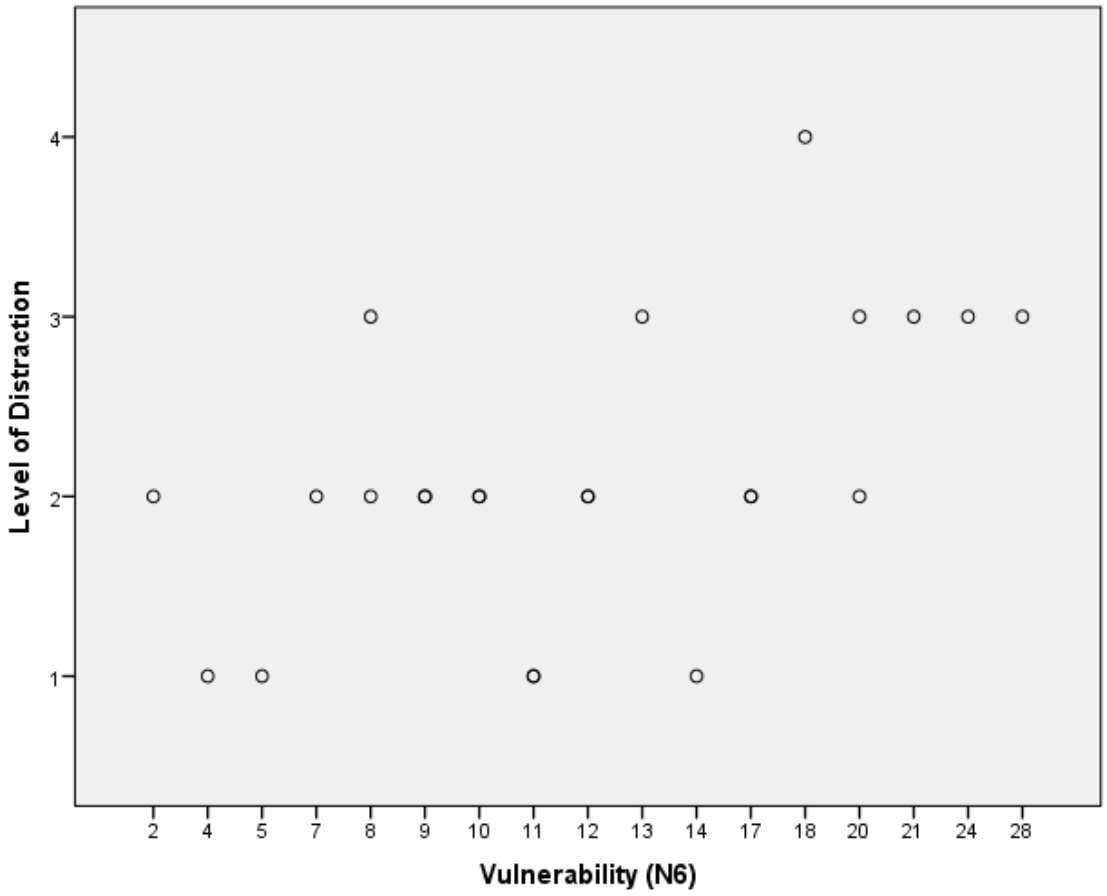


Figure 2. Relationship between self-reported level of distraction and Vulnerability, r=.554, n=24, p=.005.

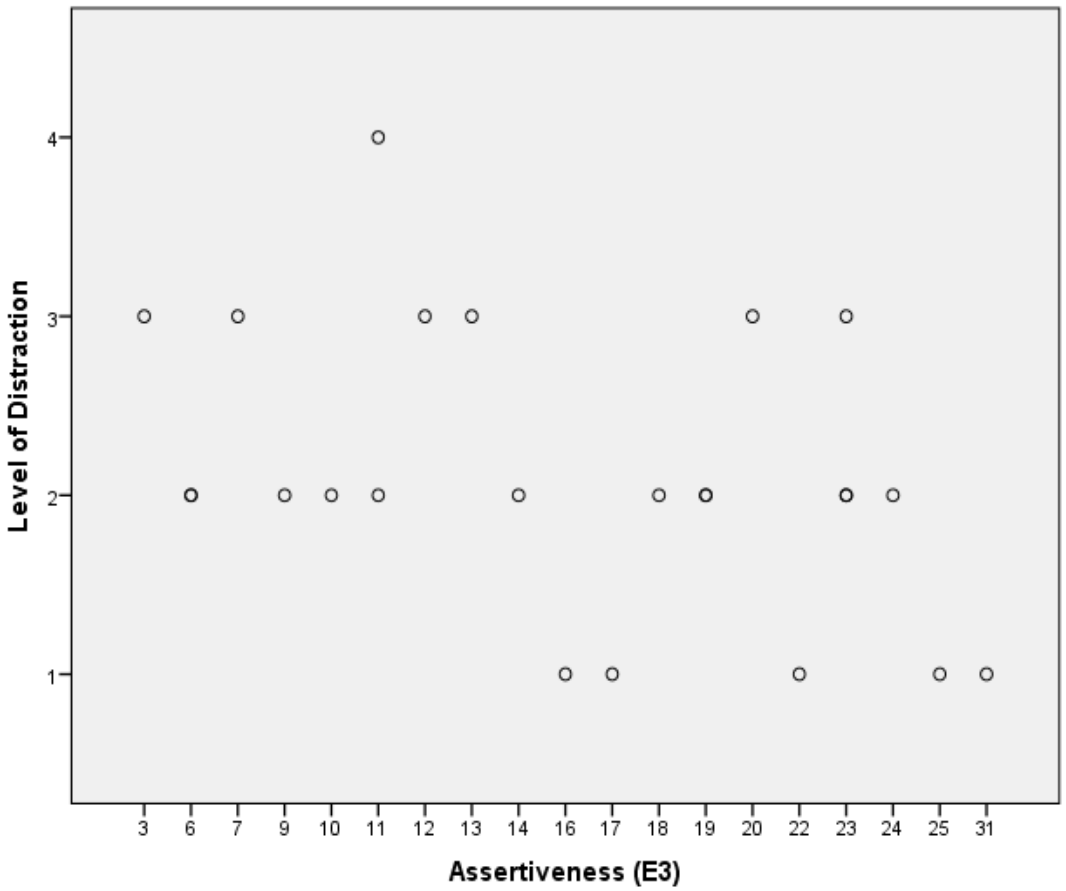


Figure 3. Relationship between self-reported level of distraction and Assertiveness, r= -.442, n=24, p=.030.

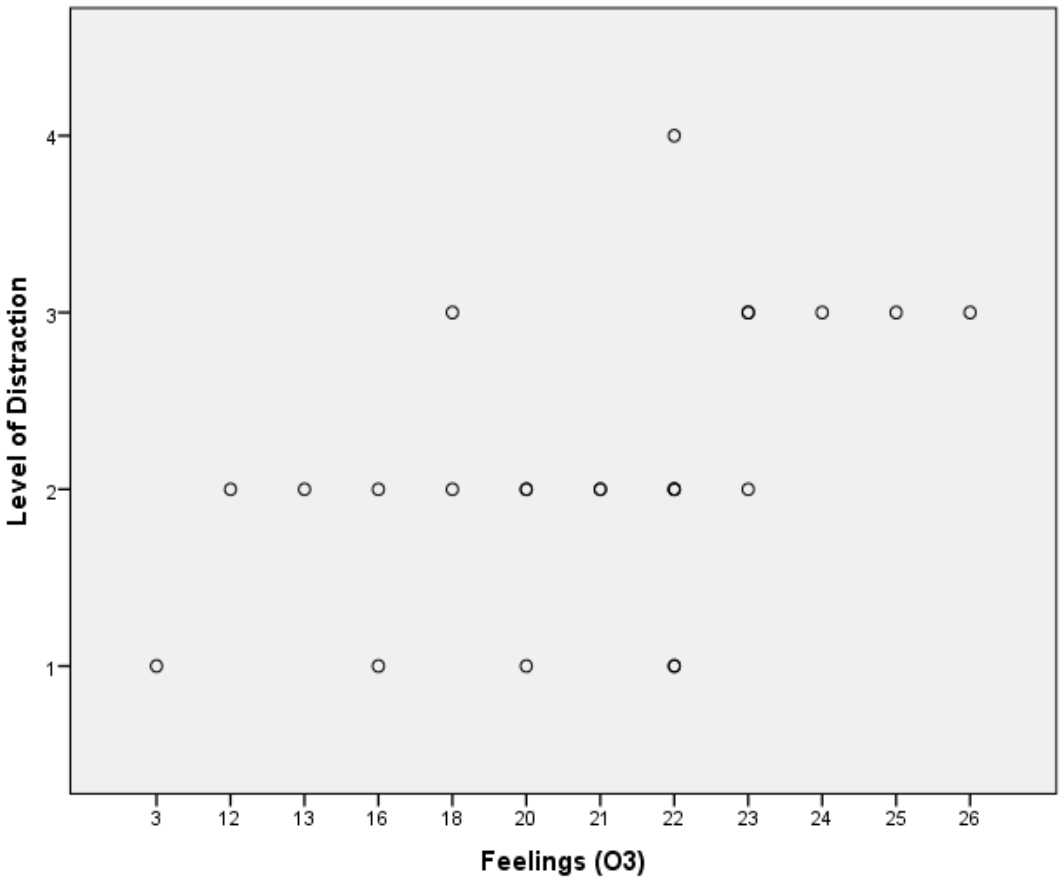


Figure 4. Relationship between self-reported level of distraction and Feelings, r=.446, n=24, p=.029.

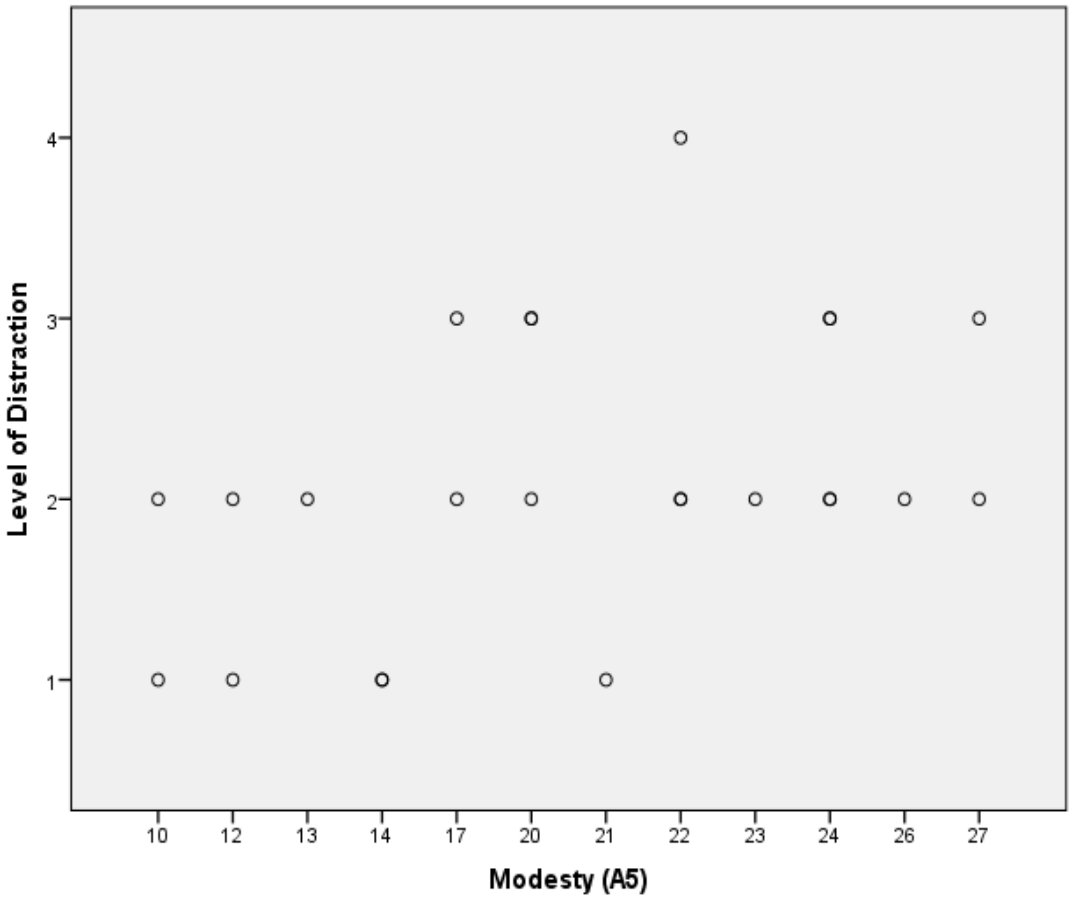


Figure 5. Relationship between self-reported level of distraction and Modesty, r=.471, n=24, p=.020.

No significant relationship was found between level of Extraversion and how often a participant studied with music playing in the background. There was also no significant correlation between score on the Extraversion domain and score on the reading comprehension test.

Discussion

Out of the five domains measured by the NEO PI-R, none was found to be significantly correlated with level of distraction reported after completing a reading comprehension test in the presence of popular music. However, five of the 30 facets measured by the NEO PI-R were

significantly correlated with level of distraction. These facets are: Anxiety (N1), Vulnerability (N6), Assertiveness (E3), Feelings (O3), and Modesty (A5).

Supporting the experimental hypothesis, one facet of Extraversion, Assertiveness, was found to be significantly, negatively correlated with level of distraction. High-scorers on the facet of Assertiveness are "dominant, forceful, and socially ascendant," while low-scorers "prefer to keep in the background and let others do the talking" (Costa & McCrae, 2010, p.22). This suggests that there may be a relationship between Assertiveness and level of distraction such that participants who are normally less assertive may be more distracted by background music. This finding is supported by past research that has shown a relationship between level of extraversion and distraction while completing complex mental tasks.

Two facets of the Neuroticism domain, Anxiety and Vulnerability, were significantly, positively correlated with level of distraction. Considering the potentially stressful nature of completing the reading comprehension task while listening to background music, it is logical that a relationship could exist between these domains and level of distraction. Costa and McCrae (2010) state that "anxious individuals are apprehensive, fearful, prone to worry, nervous, tense, and jittery" while individuals who score lower on the Anxiety domain "are calm and relaxed" (p.21). Vulnerability as measured by the NEO PI-R refers to vulnerability to stress. High-scorers on the Vulnerability facet are likely to feel "unable to cope with stress," while low-scorers feel more capable of being able to remain in control during stressful situations (Costa & McCrae, 2010, p.22). These findings indicate that participants who reported that they were more distracted may be more prone to worry and may feel more unable to cope with the stress of completing a reading comprehension task while simultaneously being distracted by background music. While other studies have found that individuals sometimes use musical distractors to

cope with stress, the participants in this experiment who scored higher in the Anxiety and Vulnerability domains may have felt extra stress while attempting to complete the reading comprehension task. Anxious individuals may have also been worrying about completing the task to the best of their ability, while also attempting to complete the reading comprehension task and listening to the background music. This may have resulted in these participants reporting being more distracted by the music. Individuals who scored high on the Vulnerability facet may have felt unable to cope with the stress resulting from attempting to complete a complex task in the presence of a distractor.

One facet of the Openness domain, Feelings, was significantly, positively correlated with level of distraction. High-scorers on this domain "experience deeper and more differentiated emotional states and feel both happiness and unhappiness more keenly than others do" (Costa & McCrae, 2010, p.23). Low-scorers do not experience feelings as intensely and do not value the experience of differing emotional states as highly as high-scorers. Therefore, a relationship was found between higher levels of self-reported distraction and the experience of deeper emotional states. Existing research has focused on the ways in which music may moderate one's mood. For example, Fiske (1996) concluded that the feelings and moods experienced during and after music listening are unique to each individual because each individual's past experiences mediate how they respond to the music (as cited in Lesiuk, 2005). It could be that individuals whose emotions were influenced more readily by the music found it to be more distracting than individuals who do not experience feelings as intensely because the feelings the music produced for them caused them to think of other things while they were attempting to concentrate on the reading comprehension task.

Lastly, the Modesty facet of Agreeableness was significantly, positively correlated with level of distraction. High-scorers on the Modesty facet are humble, quiet, and shy, while low-scorers "believe they are superior people" and are sometimes viewed as conceited or arrogant (Costa & McCrae, 2010, p.23). This means that participants who are more likely to be quiet and shy reported higher levels of distraction overall. This may be due, in part, to the lyrics of the songs that acted as background music. While the songs played throughout the duration of the study were all the "clean" versions, many of the songs included sexual innuendos and mild curse words. In fact, one participant mentioned that the most distracting element of the background music was the song lyrics which they found to be "offensive" in nature. It is also possible that individuals who are quiet and shy were more distracted by the music because they do not normally place themselves in noisy environments, especially while attempting to focus on a reading comprehension task.

It is important to note here that scores on the Extraversion domain were not correlated with scores on the reading comprehension test, just as participants' level of distraction was not correlated with reading comprehension test scores. With the exception of four participants, all other participants found the background music to be at least "somewhat" distracting. Reasons participants listed as for why the background music was distracting included: unfamiliarity with the music, the genre of the music, personal music preference, difficulty of the reading, fighting the desire to sing along, loudness of the music, and the fact that the music had lyrics. The most popular responses being the genre of the music, the loudness of the music, and the difficulty of the reading comprehension test. It is possible that the loudness of the music resulted in an additional level of distraction, even for high-scorers on the Extraversion domain, while the difficulty of the test did not allow for a variety in scores.

Limitations of This Study

There are several limitations of the current study that must be discussed. The small sample size, n=24, is a definite limitation. Having so few participants may have greatly impacted the significance of the resulting correlations. As has happened in past research, several other personality facets were very close to reaching significance, but did not possibly due to the small sample size.

The post-test questionnaire also included several questions that may have been poorly designed. Question 3 asked participants "How did the music playing while you were completing the reading comprehension task affect your test performance?", and allowed them to answer "negatively", "positively", "no effect", or "unsure". The next question, question 4, then asked participants to rank this effect on a Likert scale of one to five, a rating of one indicating "no effect" while a rating of five indicated a "very strong" effect. While it was intended for these two questions to measure the same variable, they were not correlated with one another. It was hypothesized that participants who felt the music negatively affected their performance would report that they were more affected by the music; while individuals who were positively affected by the music or felt the music had no effect would report that the music had a smaller effect on their performance. However, this is problematic because a participant could have been very strongly positively affected by the music or very strongly negatively impacted by the music, and the wording of question four did not make this clear to participants. Question four could have been made much clearer by splitting it into two questions that would ask participants to rate how much the music negatively affected their performance, and then how much the music positively affected their performance. Neither of these questions was included in the final data analysis, however, because the intent of the questions was to provide supplemental data.

While the intent of the experimenter was for participants to be subjected to music that was meant to act as a potential source of distraction, it may be true that participants were also distracted because testing was done in groups of seven to eight participants in an academic building that was open to the public during testing times. All relevant questions on the post-test questionnaire did specifically refer to distraction and effect on test performance related to background music; however, because no questions were asked about other environmental distractors, it cannot be stated without doubt that the background music was the only distraction in the testing environment. It is possible that participants were distracted by the presence of other participants. Several participants mentioned that the music made them want to sing or hum along; while none of the participants explicitly stated that they did sing or hum along with the music, it is possible that they may have. Throughout the duration of the experiment, the building was occupied by other members of the campus community. The classroom where the testing was conducted was situated next to a main entrance to the building meaning the door opened and closed numerous times throughout the duration of the experiment. Also, on the second day of testing a class was held in a computer lab one door down from the testing room. The class utilized the computer lab's projector to play videos which were quite loud.

Future Research

The results of this correlational study show that further research into the personality correlates of level of distraction on a reading comprehension task taken in the presence of background music may be of interest to psychologists who study the effects of music in our everyday lives. While the current study unearthed some interesting correlations, future studies could benefit by utilizing much larger sample sizes and creating post-test questionnaires that contain questions that exhibit higher levels of validity. Correlational findings are also not a basis

for causation, so future studies could incorporate the use of an experimental design. As much of the past research on background music, level of distraction on tests of cognitive abilities, and personality suggests, music may be both helpful and detrimental to the same individual dependent upon a number of factors. Future research can examine how background music affects individuals who exhibit certain personality characteristics in different everyday situations such as the work environment, during the creative process, and while learning. A plethora of research exists in this area, but due to the great number of variables that have been considered (such as the type of music, the loudness of the music, the situation in which the music is being listened to, personality characteristics, etc.), and the different methods used in each research study, it is difficult to come to a definitive conclusion about the effects of background music. Another way to approach the issue may be to study individuals in settings where they typically utilize music while they listen to their own musical selections. While the current study attempted to utilize popular music, a familiar task, and a setting that participants would be quite used to, it is very likely that participants utilize different types of music according to their own personal tastes and in environments that they can control. After reviewing existing research, it is clear that listening to background music while completing cognitive tasks is not beneficial to everyone, and that is why it is very important for researchers to study individual differences.

References

Avila, C., Furnham, A., & McClelland, A. (2011). The influence of distracting familiar vocal music on cognitive performance of introverts and extraverts. *Psychology of Music*, *40*(1), 84-93.

Cassidy, G., & MacDonald, R. A. (2007). The effect of background music and background noise on the task performance of introverts and extraverts. *Psychology of Music, 35*(3), 517-537.

Chamorro-Premuzic, T., Swami, V., Terrado, A., & Furnham, A. (2009). The effects of background auditory interference and extraversion on creative and cognitive task performance. *International Journal of Psychological Studies*, *1*(2), 2-9.

Daoussis, L., & McKelvie, S. J. (1986). Musical preferences and effects of music on a reading comprehension test for extraverts and introverts. *Perceptual and Motor Skills*, *62*, 283-289.

Dunn, P. G., De Ruyter, B., & Bouwhuis, D. G. (2011). Toward a better understanding of the relation between music preference, listening behavior, and personality. *Psychology of Music*, *40*(4), 411-428. doi:10.1177/0305735610388897

Etaugh, C., & Michals, D. (1975). Effects on reading comprehension of preferred music and frequency of studying to music. *Perceptual and Motor Skills*, *41*, 553-554.

Fogelson, S. (1973). Music as a distractor on reading-test performance of eighth grade students. *Perceptual and Motor Skills*, *36*, 1265-1266.

Furnham, A., & Bradley, A. (1997). Music while you work: the differential distraction of background music on the cognitive test performance of introverts and extraverts. *Applied Cognitive Psychology*, *11*, 445-455.

Furnham, A., & Stephenson, R. (2007). Musical distracters, personality type and cognitive performance in school children. *Psychology of Music, 35*(3), 403-420.

Furnham, A., & Strbac, L. (2002). Music is as distracting as noise: the differential distraction of background music and noise on the cognitive test performance of introverts and extraverts. *Ergonomics*, *45*(3), 203-217.

Haake, A. B. (2011). Individual music listening in workplace settings: An exploratory survey of offices in the UK. *Musicae Scientiae*, *15*(1), 107-129.

Henderson, M. T., Crews, A., & Barlow, J. (1943). A study of the effect of music distraction on reading efficiency. *Journal of Applied Psychology*, *29*(1), 313-317.

Kallinen, K. (2002). Reading news from a pocket computer in a distracting environment: effects of the temp of background music. *Computers in Human Behavior*, *18*, 537-551.

Kampfe, J., Sedlmeier, P., & Renkewitz, F. (2010). The impact of background music on adult listeners: A meta-analysis. *Psychology of Music*, *39*(4), 424-448.

Kiger, D. (1989). Effects of music information load on a reading comprehension task. *Perceptual and Motor Skills*, *69*, 531-534.

Lesiuk, T. (2005). The effect of music listening on work performance. *Psychology of Music*, *33*(2), 173-191.

McCrae, R.R., & Costa, P.T. (2010). *NEO Inventories for the NEO Personality Inventory-3 (NEO-PI-3), NEO Five-Factor Inventory-3 (NEO-FFI-3), and NEO Personality Inventory-Revised (NEO PI-R). Professional manual.* Lutz, FL: Psychological Assessment Resources.

North, A. C., & Hargreaves, D. J. (2003, August). Is music important? *The Psychologist*, *16*(8), 406-410.

Perham, N., & Vizard, J. (2011). Can preference for background music mediate the irrelevant sound effect? *Applied Cognitive Psychology*, *25*, 625-631.

Smith, W. A. (1961). Effects of industrial music in a work situation requiring complex mental activity. *Psychological Reports*, *8*, 159-162.

Thompson, W. F., Schellenberg, E. G., & Letnic, A. K. (2011). Fast and loud background music disrupts reading comprehension. *Psychology of Music*, 1-9.

Ylias, G., & Heaven, C. L. (2003). The influence of distraction on reading comprehension: a Big five analysis. *Personality and Individual Differences*, *34*, 1069-1079.

Appendix A

RESEARCH PARTICIPANT CONSENT FORM

Level of Distraction and Personality
Kaitlyn Bloom
Allegheny College
Department of Psychology

Principal Investigators: Dr. Joshua Searle-White and Kaitlyn Bloom

Purpose of Research: The purpose of this research is to determine if, and to what extent, level of distraction during examinations and aspects of personality are correlated.

Description of Experimental Procedure: As a voluntary participant in this research, I understand that I will be asked to complete a timed examination. I understand that after the examination, I will be asked to complete a 240 question personality inventory, as well as a brief questionnaire. I understand that this study will take 40-60 minutes.

Risks: This research involves minimal risk; no risks of participation are foreseen.

Benefits: I understand that the main benefit of participating in this study is to help explore if, and to what extent, level of distraction is correlated with aspects of personality.

Compensation: I understand that as compensation for my participation in this study, I may earn 2 extra credit points or 2 credits toward research participation as approved by my professor.

Anonymity: I understand that all information I provide throughout this experiment is completely anonymous and that my name will not be associated with the data I provide. I understand that the researcher is not interested in any single person's data and will combine the data I provide with all other participants' data to look for general patterns. Any reports made based on this study's data will focus only on general patterns.

Confidentiality: I understand that my participation in this experiment, as proven by my signature on this form, will remain confidential. I understand that my data and consent form will be stored separately in the Department of Psychology at Allegheny College. I understand that the data I provide today will be destroyed when they are no longer needed.

Right to Refuse or End Participation: I understand that at any point throughout the experiment I may choose to withdraw my participation. I also understand that I will incur no penalty for doing so. If I choose to withdraw from this study, I will verbally inform the researcher so that she may discontinue my participation in the study.

If I have questions or concerns, I may contact Kaitlyn Bloom at bloomk@allegheny.edu, or Dr. Searle-White at jsearle@allegheny.edu. Also, if I have any questions, comments, or concerns about the treatment of research participants in regards to this study I can contact Dr. Richard Bowden, Chair of the IRB, at rbowden@allegheny.edu.

I am at least 18 years of age. I understand the description of the experiment and the procedures, and I have been provided a copy of this informed consent form. My questions have been answered, and I agree to participate in the study.

Name (printed): _____

Signature: _____ Date: _____

Appendix B

RESEARCH PARTICIPANT DEBRIEFING FORM

Musical Distraction and Personality
Kaitlyn Bloom
Allegheny College
Department of Psychology

Thank you for taking the time to participate in this study!
Your participation is both very helpful and greatly appreciated.

Purpose of Research: The purpose of this research was to determine if, and to what extent, level of distraction while listening to music and completing a reading comprehension task correlates with different facets of personality as measured by the NEO PI-R. It has been previously determined that extraversion is correlated with level of distraction, so this study's goal is to examine if other elements of personality are correlated with level of distraction.

Compensation: As compensation for participating in this research study you may earn 2 extra credit points or 2 credits toward research participation as approved by your professor.

Anonymity: The data that you have provided is completely anonymous and your name will not be associated with any of the data that you have provided in any way. All data collected during this study will be destroyed when it is no longer needed.

Additional Sources of Information: If you would like to learn more about musical distraction and personality, please access the resources listed below:

Cassidy, Gianna and MacDonald, Raymond A.R. (2007). *The effect of background music and background noise on the task performance of introverts and extraverts.* Psychology of Music 2007 (35). pp. 517-537.

Chamorro-Premuzic, Tomas and Swami, Viren and Terrado, Avegayle and Furnham, Adrian (2009) *The effects of background auditory interference and extraversion on creative and cognitive task performance.* International Journal of Psychological Studies, 1 (2). pp. 18-24.

Etaugh, Claire and Michals, David (1975). *Effects on reading comprehension of preferred music and frequency of studying to music.* Perceptual and Motor Skills 41 (2), pp. 553-554.

Contact Information:

- For any questions or concerns about this research project, please email Kaitlyn Bloom at bloomk@allegheny.edu. You also may call **Dr. Searle-White** at **814-332-2706** or email him at jsearle@allegheny.edu.
- For any psychological concerns, please visit or call the Allegheny College Counseling Center at **814-332-4368.**

- For any questions or concerns about the treatment of research participants, please call **Dr. Richard Bowden**, Chair of the Allegheny College Institutional Review Board (IRB), at **(814) 332-2869** or email him at rbowden@allegheny.edu.

If you would like to receive a copy of the results of this experiment, please complete the information below, tear at the line, and return the information to the experimenter.

THANK YOU AGAIN FOR YOUR PARTICIPATION!

Name: _____

Email: _____

Box Number: _____

Appendix C

Instructions: You will have 14 minutes to complete the following reading task. Please read the passages carefully and select the answer to the following questions that is most appropriate by circling it. If you should complete the reading task before the 14 minutes are up, please turn over your testing sheet and sit quietly. After 14 minutes have elapsed, the experimenter will return to the room to instruct you on what to do next.

Passage 1:

In regard to propaganda the early advocates of universal literacy and a free press envisaged only two possibilities: the propaganda might be true, or it might be false. They did not foresee what in fact has happened, above all in our Western capitalist democracies - the development of a vast mass communications industry, concerned in the main neither with the true nor the false, but with the unreal, the more or less totally irrelevant. In a word, they failed to take into account man's almost infinite appetite for distractions.

In the past most people never got a chance of fully satisfying this appetite. They might long for distractions, but the distractions were not provided. Christmas came but once a year, feasts were "solemn and rare," there were few readers and very little to read, and the nearest approach to a neighborhood movie theater was the parish church, where the performances, though infrequent, were somewhat monotonous. For conditions even remotely comparable to those now prevailing we must return to imperial Rome, where the populace was kept in good humor by frequent, gratuitous doses of many kinds of entertainment - from poetical dramas to gladiatorial fights,

from recitations of Virgil to all-out boxing, from concerts to military reviews and public executions. But even in Rome there was nothing like the non-stop distraction now provided by newspapers and magazines, by radio, television and the cinema. In Brave New World non-stop distractions of the most fascinating nature (the feelies, orgy-porgy, centrifugal bumblepuppy) are deliberately used as instruments of policy, for the purpose of preventing people from paying too much attention to the realities of the social and political situation. The other world of religion is different from the other world of entertainment; but they resemble one another in being most decidedly "not of this world." Both are distractions and, if lived in too continuously, both can become, in Marx's phrase, "the opium of the people" and so a threat to freedom. Only the vigilant can maintain their liberties, and only those who are constantly and intelligently on the spot can hope to govern themselves effectively by democratic procedures. A society, most of whose members spend a great part of their time, not on the spot, not here and now and in the calculable future, but somewhere else, in the irrelevant other worlds of sport and soap opera, of mythology and metaphysical fantasy, will find it hard to resist the encroachments of those who would manipulate and control it.

In their propaganda today's dictators rely for the most part on repetition, suppression and rationalization - the repetition of catchwords which they wish to be accepted as true, the suppression of facts which they wish to be ignored,

the arousal and rationalization of passions which may be used in the interests of the Party or the State. As the art and science of manipulation come to be better understood, the dictators of the future will doubtless learn to combine these techniques with the non-stop distractions which, in the West, are now threatening to drown in a sea of irrelevance the rational propaganda essential to the maintenance of individual liberty and the survival of democratic institutions.

1. The author would be most likely to agree that propaganda
- A. can serve a vital function in democracy
- B. is concerned mainly with the irrelevant
- C. is now combined with entertainment
- D. is universally recognized as a danger
- E. needs constant vigilance to avoid

2. The "early advocates of universal literacy" (line 1) are mentioned as
- A. advocates of propaganda
- B. opponents of an idea that the author thinks is correct
- C. proponents of an idea that the author wishes to counter
- D. people who made wrong predictions about freedom of the press
- E. social commentators unaware of man's appetite for distractions

3. The author refers to "Brave New World" as a fictional example of a society in which
- A. non-stop distractions are the main instrument of government policy
- B. people are totally unaware of political realities
- C. entertainment is used to keep people from full awareness of social realities
- D. entertainment resembles religion in its effects on the masses
- E. non-stop entertainment is provided as it was in Rome

4. By "intelligently on the spot" (line 37) the author apparently means
- A. alert to the dangers of propaganda
- B. in a particular society at a particular time
- C. in a specific time and place
- D. conscious of political and social realities
- E. deeply aware of current trends

Passage 2:

The principle of selection solved the riddle as to how what was purposive could conceivably be brought about without the intervention of a directing power, the riddle which animate nature presents to our intelligence at every turn, and in face of which the mind of a Kant could find no way out, for he regarded a solution of it as not to be hoped for. For, even if we were to assume an evolutionary force that is continually transforming the most primitive and the simplest forms of life into ever higher forms, and the homogeneity of primitive times into the infinite variety of the present, we should still be unable to infer from this alone how each of the numberless forms adapted to particular conditions of life should have appeared precisely at the right moment in the history of the earth to which their adaptations were appropriate, and precisely at the proper place in which all the conditions of life to which they were adapted occurred: the humming-birds at the same time as the flowers; the trichina at the same time as the pig; the bark-coloured moth at the same time as the oak, and the wasp-like moth at the same time as the wasp which protects it. Without processes of selection we should be obliged to assume a "pre-established harmony" after the famous Leibnitzian model, by means of which the clock of the evolution of organisms is so regulated as to strike in exact synchronism with that of the history of the earth!

All forms of life are strictly adapted to the conditions of their life, and can persist under these conditions alone. There must therefore be an intrinsic connection between the conditions and the structural adaptations of the organism, and, since the conditions of life cannot be determined by the animal itself, the adaptations must be called forth by the conditions. The selection theory teaches us how this is conceivable, since it enables us to understand that there is a continual production of what is non-purposive as well as of what is purposive, but the purposive alone survives, while the non-purposive perishes in the very act of arising. This is the old wisdom taught long ago by Empedocles.

5. It can be inferred that the author believes that the "Leibnitzian model" (line 22) is

A. ingenious and worthy of serious consideration
B. untenable by all rational people
C. an acceptable solution to Kant's dilemma
D. unworthy of further consideration
E. an alternative that might still be valid

6. The author's primary purpose in this extract is to

A. suggest that a particular theory explains otherwise puzzling phenomena
B. describe the details of the selection theory for a lay audience
C. justify a particularly controversial model of the origins of life
D. persuade the reader that Empedocles was right
E. prove that selection is the only possible way of looking at evolutionary biology

7. The examples in lines 17 - 19 are intended to

A. reinforce the author's point that is difficult to explain adaptation
B. show that adaptations must take place only at specific times and in specific places
C. give specific illustration of organisms that are particularly well-adapted to their conditions
D. show organisms that have evolved synchronously in a predestined manner
E. demonstrate that intelligent design is needed for purposive evolution

8. Answer this question based on the information in the paragraph below.

The committee on sexual discrimination in the workplace has highlighted Supremo Company as a chief offender. Of the twenty senior executives in the firm, only one is a woman. And of the forty junior executives, only five are female.

Supremo could best defend itself against the charges by showing that

A. male and female executives at the same level have the same qualifications
B. they pay the same salary to senior men and senior women
C. ten times more men than women apply for jobs with the company
D. the work pressures and long hours make jobs with the company unattractive to married women
E. all job applicants who were rejected had fewer qualifications than those accepted

Appendix D

Hi Kaitlyn,

Yes, it's fine if you use one of our GRE prep questions for your project. Thank you for asking.

Blaine

On Sun, Oct 14, 2012 at 5:54 PM, <contact-form@majortests.com> wrote:
name : Kaitlyn Bloom
mail : bloomk@allegheny.edu
date : 15 Oct 2012
time : 12:54 AM
message :
As a senior at Allegheny College I am required to complete an original research project\. For my research project I am examining if introverted and extroverted students score differently on a test of reading comprehension while listening to self-selected music\. Much of the existing research uses reading comprehension sections from standardized tests\. I am inquiring about using one of the GRE Prep questions available on your site for my research project\. The project is being done only to fulfill my graduation requirements and will not be published outside of my college\. Please let me know if I may use one\(or more\) of your practice examples\. Thank you\.

Appendix E

Please circle the answer that is most appropriate. Complete all open-ended questions truthfully and as detailed as possible.

1) How many hours each day do you listen to self-selected music?

   0 hours Less than 1 hour 1-2 hours 3 or more hours

2) Do you listen to music when you study?

   Never Some of the time Often Every time I study

3) How did the music playing while you were completing the reading comprehension task affect your test performance?
   Negatively Positively No effect Unsure

4) On a scale of 1 to 5, how much did the music playing while you were completing the reading comprehension task affect your test performance (1= no effect, 5= very strong effect)?
   1 2 3 4 5

5) How much did the music distract you from completing the reading comprehension task?

   Not at all Somewhat Very much Completely

6) Did you find it difficult to concentrate on the reading comprehension task due to the music playing in the background?

   Not at all Somewhat Very much Unable to concentrate at all

7) What element of the music was **most** distracting for you?

I was not distracted at all by the music
The song lyrics
The genre of the music
The loudness of the music
Just having the music playing

Other: _____

B. Please elaborate on why this element was most distracting for you:

8) Do you participate in any musical ensembles (including choir) either at Allegheny or in the community?

None One Two or more Have in the past, but not currently

9) Did you recognize any of the songs played during the reading comprehension task?

None of them At least one of them All of them

B. Please list the names of all songs that you recognized:

10) Is there anything else you would like to mention about your experience listening to music while taking the reading comprehension test?

Sex: _____ Age: _____

Appendix F

The NEO PI-R is a personality inventory which measures the Big 5 personality traits. These traits are: Neuroticism, Extraversion, Openness to experience, Agreeableness, and Conscientiousness. Your responses to the items presented on this inventory are taken together to comprise an overview of your personality. If you are interested in learning more about the domains and facets of the NEO PI-R, you may visit the following link:

http://www.unifr.ch/ztd/HTS/inftest/WEB-Informationssystem/en/4en001/d590668ef5a34f17908121d3edf2d1dc/hb.htm

If you are interested in completing similar personality inventories online, please visit:
http://www.personalitytest.net/ipip/ipipneo1.htm

http://www.123test.com/big-five-personality-theory/