Global Tides

Volume 7 Article 10

2013

The Effect of Music Preference on Complex Task Performance

Jordan Mcdonald
Pepperdine University, Jordan.Mcdonald@pepperdine.edu

The Effect of Music Preference on Complex Task Performance

Jordan McDonald

Abstract

This study examined the relationship between music preference and extraversion on complex task performance in a sample of 34 college students from a small, Christian, liberal arts university. Separated into two groups of high and low extraversion, these 34 participants were invited to participate in the experimental phase of the study. For the experimental phase, each participant experienced three different music conditions (Preferred, Preset, and Silence) while performing a complex reading comprehension task. The results revealed a significant interaction effect between level of extraversion and music condition. Individuals with higher levels of extraversion performed marginally significantly better listening to preferred music during the complex task compared to silence and a preset music selection; all other sound conditions were not significant.

The Effect of Music Preference on Complex Task Performance

Music, like all other art forms, is unique to human beings. It expresses emotion shared by all cultures, closes the gap between eras of time, and reflects attitudes and progression. The power of music holds a strong influence over many human functions and recent technological advances of the 20th and 21st centuries have made music highly accessible. In addition, the ubiquitous nature of music accessibility in modern society raises important questions about the pervasive presence of music in work and educational settings.

Studies searching for the distracting or facilitating effect of music on task performance have generally been inconsistent. Despite inconclusive results, public acceptance of claims that support the facilitative function of music in task performance is common. The highly publicized study by Rauscher, Shaw, and Ky conducted in 1994 for example, found significant results “proving” Mozart music increased spatial reasoning performance in college students. McKelvie & Low (2002) conducted a replication study and found that listening to Mozart music, in fact, showed no significant improvements in task performance. Although McKelvie and Low's (2002) study failed to replicate the findings, the public continues to be influenced by the original findings. Many more studies follow a similar progression, illustrating the deficiency of stable findings in this area of research.

To provide further understanding about the effects of music on task performance, the current study adds to the literature base by improving upon the limitations and utilizing ideas for future research given by past research. It is essential to examine the results of past studies to gain a perspective on the progress and pitfalls within this area of research.

The Effect of Music on Task Performance

Psychological research on the effect of music on task performance was introduced in the middle of the 20th century. After nearly 60 years of research, there are only a few stable findings from past research consistent with today's research findings. An extensive literature review by Uhrbrock in 1961 (cited in Furnham & Bradley, 1997) summarized findings pertaining to the effect of music on productivity and motivation in an industrial setting. These include:

1. Claims that background music increased productivity were unsupported by research.
2. A small proportion of workers, 1-10%, disliked listening to music.
3. Music affected the overall quality of work negatively.
4. Several researchers found that background music increased output of "young, inexperienced employees, engaged in doing simple, repetitive… tasks" (1997).

Inconsistent findings from this early research led to an abrupt shift in direction from examining the effect of music on simple tasks to activities requiring more complex cognitive functioning. The Limited Capacity Model proposed by Broadbent in 1958 introduced relevant concepts that theorized why complex cognitive functioning is impaired by external stimuli, such as background music (Anderson & Fuller, 2010). The theory "argue[s] that attempting to carry out two tasks that draw on inherently limited cognitive resources will work to the detriment of one or both" (Anderson & Fuller, 2010, p. 179). Kirkpatrick conducted a study in 1943 (cited in Dobbs, Furnham & McClelland, 2011) supporting the Limited Capacity Model by finding that background music negatively impacted mental concentration. However, Smith (1961) conducted a similar study only to find no significant difference in performance with background music. These studies, along with numerous others, continue to find equivocal findings, partially based on differing methodologies used by researchers.

Variables that Mediate Task Performance

Several distinct variables exist that have significantly moderated task performance in prior research: personality, the nature of the auditory distraction, and the types of tasks performed (Dobbs et al, 2011).

Personality

Level of extraversion is a critical variable in predicting task performance with background auditory conditions. A study conducted by Daoussis (1986) surveyed the study habits and music preferences between introverts and extraverts. The results of this study found extraverts generally listened to music more often than introverts. However, a compelling percentage of introverts in the sample listened to music while studying. According to Eysenck's personality theory, the cortical arousal threshold of introverts (individuals scoring low on extraversion) and extraverts (individuals scoring high on extraversion) is vastly different (Furnham & Bradley, 1997). Classified introverts "have been shown to have a lower optimum arousal threshold," requiring minimum amounts of stimulation (Furnham & Bradley, 1997). Persistent or intense forms of stimulation overwhelm this arousal threshold, inhibiting excitation (Furnham, Strew, & Sneade, 1999). Therefore, Eysenck's theory predicts detrimental effects of music on task performance. In contrast, highly extraverted individuals seek out stimulation because their optimum arousal threshold is higher. Why, then, do a large number of introverted individuals report studying with music? It is currently unknown, but a vast number of experiments examine performance differences while accounting for extraversion levels.

Furnham and Bradley (1997) conducted an experiment examining whether level of extraversion moderates cognitive task performance under background auditory stimuli, and found significant results. In this study, 10 extraverts and 10 introverts completed three cognitive tasks: reading comprehension, memory, and delayed memory. Introverts performed significantly worse than extraverts with background music in the delayed recall task. While not statistically significant, introverts also generally performed worse in the other two tasks. The facilitative nature of music is not supported by these findings, suggesting that specific personality types predispose individuals to perform differently under certain music conditions.

Despite a small sample size and an insufficient amount of wait time used for the delayed memory task, this study inspired future experiments to control for the effects of personality. In a later study, Cassidy and MacDonald (2007) discovered that introverts performed significantly worse under any noise condition compared to extraverts. Though a relatively stable finding in this area of research, studies continue to find inconsistencies. Chamorro-Premuzic, Swami, Terrado, and Furnham in 2009 found no significant differences between extraverts and introverts on the performance on any cognitive tasks. Therefore, more studies recognizing the effect of personality are required to further understand its importance in the research literature.

Auditory Stimuli

The type of background auditory stimuli differs in the degree to which it affects task performance. A range of noises has been studied to discover their effect on task performance. Ylias and Heaven (2003) found that extraverts performed better on a reading comprehension task than introverts when a television was turned on. Typical office noise proved to be considerably detrimental to scores on a math and recall test for a mixed sample of young adults in a study conducted by Banbury and Berry in 1998.

Several research studies compared noise stimuli and music in an effort to uncover differences in cognitive task performance. Furnham and Strbac (2002) found no significant difference between the effect of noise and music on task performance. However, both background music and noise effects significantly decreased task performance compared to silence. In contrast, Dobbs et al. (2011) conducted an experiment examining performance differences under background noise, music, and silence conditions. All participants performed better in silence on a task measuring abstract thinking with no significant interaction effect between auditory condition and degree of extraversion. However, performance was better during the music condition compared to the noise condition on the same task.

Several studies analyzed the background music factor differently by examining performance differences in relation to diverse music genres (Chamorro-Premuzic et al., 2009; Furnham & Bradley, 1997). However, analyzing music by genre has garnered criticism. Furnham and Allass (1999) point out that musical genres have a wide spectrum of unique attributes that differentiate in each music selection including tempo, style, tonal, and rhythmic changes. These musical characteristics establish a song's "information-load" (Kiger, 1989, p. 531). Kiger (1989) conducted a study measuring the differential effects of low information-load and high information-load on a reading comprehension task. Low information-load music was characterized as slow, soft and repetitive, whereas high information-load music boasted dynamic changes in rhythm with fast tempos (Kiger, 1989). The findings of this study found improvement of reading comprehension scores under the low information-load music compared to silence. High information-load music, however, significantly decreased reading comprehension performance. Despite being conducted before the recognition of personality effects, this early study offers rare support for the ability of music to facilitate task performance.

Studies examining the effect of lyrical and instrumental music on task performance have yielded ambiguous results. According to Kiger's information-load model, vocal music would have a higher amount of information-load than instrumental music, and thus affect task performance negatively. Furnham et al. (1999) found no significant results to support that vocal music decreased performance more than instrumental music.

A relatively recent variable researchers have begun to examine is the characteristic ability music possesses to instill a wide range of different moods. Furnham and Stephenson (2007) tried and failed at finding significant differences among music selections of varying affective value. Cassidy and MacDonald (2007), however, examined the same affect factor and found profound results. In this study, background auditory stimuli varied across four groups: silence, general noise, and two background music groups expressing different emotional attributes. One of the music groups consisted of musical pieces rated to be “low arousal potential and positive affect (LA)” (p. 517). The second group of musical selections was rated as “high arousal potential and negative affect (HA)” (p. 517). The mental tasks included a Stroop Test (participants had to vocalize a list of color names printed in different colors), immediate recall, free recall, and delayed recall. Results indicated a pervasive decrease in task performance between the music and noise conditions compared to the silence condition for all tasks. However, the HA music and noise conditions proved to be considerably more detrimental to task performance compared to the LA music group. Though this study was not exhaustive in its testing conditions (high arousal and positive affect and low arousal and negative affect were not tested), the affect, or mood, of music did indeed affect task performance

Familiarity with the music stimulus has also been a variable of interest. Hilliard & Tolin (1979) conducted an early study examining whether familiarity with background music stimulation had any effect on task performance. Though the researchers did not control for personality differences, they found “performance in the presence of familiar background music [was] higher than that in the presence of unfamiliar music” (p. 714). A possible explanation for this is given by Etaugh and Michals (cited in Hilliard & Tolin, 1979) who proposed that "the more frequently undergraduates reportedly studied in the presence of music, the less background music impaired their performance" (1979, p. 713). Jäncke and Sandmann (2010) identified music familiarity as an important area of future research after their exhaustive and highly controlled study yielded no significant results. Composing their own musical pieces, Jäncke and Sandmann controlled for the emotional, complexity, tempo, and semantic associations found in music. Despite controlling for all of these confounding variables, they found no significant difference of positive background music on verbal learning tasks. They suggested abandoning the generic, unfamiliar music selections for more familiar music pieces. More familiar musical stimulation may evoke stronger emotion and meaning that may, in turn, affect task performance.

Cognitive Tasks

All past studies relevant to the current study conducted experiments examining the effect that background sound conditions had on complex task performance. Complex cognition is associated with many different processes, and therefore many tasks exist to measure them. Abstract thinking, general IQ, verbal reasoning abilities, reading comprehension, spatial and verbal memories, and logical reasoning are all functions of various complex processes (Cassidy & MacDonald, 2007; Chamorro-Premuzic, Swami, Terrado, & Furnhman, 2009; Dobbs, Furnham, & McClelland, 2011; Furnham & Allass, 1999; Furnham & Bradley, 1997; Iwanaga & Ito, 2002; Jäncke & Sandmann, 2010; Furnham, Trew & Sneade, 1999; Avila, Furnham & McClelland, 2011). By examining music's effect on these various processes of complex functioning, differences may exist.

Purpose of the Present Study

The purpose of the present study was to examine the interaction between level of extraversion and preferred music on a complex reading comprehension task. The findings and directions of future research provided by Jäncke and Sandmann (2010) suggested that familiarity may have a stronger effect on task performance than is currently known. Therefore, this study aimed to expand and test the effect preferred musical selection has on task performance. A theory proposed by Berlyne (cited in Furnham & Allass, 1999) asserts, “optimum preference occurs at a moderate stimulus complexity at which the general population would be neither under- nor over-aroused” (1999, p. 30). By adjusting the musical stimulation to their preferences, participants may be able to experience optimum arousal. The current study tested four different hypotheses examining whether: 1) the effect of background music conditions on reading comprehension performance was moderated by a participant’s level of extraversion, 2) no differential effect on task performance existed between the preferred music and silence conditions for individuals with low extraversion levels, 3) participants with lower extraversion levels performed significantly worse under a preset music condition, and 4) extraverts performed better in both music conditions compared to silence.

Method

Participants

Participants included 144 students attending a small, Christian, liberal arts university in Southern California. This convenience sample was recruited via the Sona system, a human participant management software created for universities and available online. All participants were enrolled in introductory psychology courses and received course credit for participation in the study. However, they had the option to complete alternative assignments to fulfill course requirements. A subsample of 34 individuals was divided into groups of low (*n*=14) and high (*n*=20) extraversion using a median split to distinguish extraversion scores. The average age of the students in the low extraversion group was 18.7 years (*SD*=.99) and 18.8 years (*SD*=1.1) in the high extraversion group. Both groups were predominantly White/Caucasian and had relatively equal sex ratios. Refer to Table 1 for additional demographic information.

Measures

Demographic Form: A demographic survey was administered to assess age, sex, race, and family income. The survey included questions regarding individual study habits as well as free response areas asking participants to specify up to five songs participants would prefer to listen to while studying.

International Personality Inventory Pool (IPIP): Participants completed the IPIP, which was created by Goldberg as a public domain measure. With 60 items, the IPIP survey assesses the six facets of extraversion: friendliness (e.g., “make friends easily”), gregariousness (e.g., “enjoy being part of a group”), assertiveness (e.g., “try to lead others”), activity level (e.g., “am always on the go”), excitement seeking (e.g., “seek adventure”), and cheerfulness (e.g., “have a lot of fun”). Participants responded to each item on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Extraversion scores were determined by reverse coding and summing up all items. Each facet of the scale exhibits strong reliability, with coefficients ranging from .71 to .87 according to Goldberg. Internal consistency reliability of this measure for the current study was adequate with a Cronbach’s alpha of .75.

GRE Practice Test: Participants completed three different GRE practice reading comprehension tests with a total of eight questions each. GRE practice tests were randomly matched with a sound condition. Each item on the GRE practice test was worth two points, with two points awarded only for completely correct responses. All the GRE tests were found online at http://majortests.com/gre/reading_comprehension.php. and used with permission of the site administration.

Procedure

Phase I

The first phase of the study was administered online using the Sona System. Before beginning, all participants signed an informed consent form. Participants then completed both the demographic form and the IPIP. Participants were awarded one research credit for completing the first phase of the study.

Phase II

During the second phase of the study, each participant wore headphones and experienced three different music conditions while completing a GRE reading comprehension test. All music selections were retrieved from a large music database found on grooveshark.com and then manually placed into playlists. In the Preferred condition, participants completed the reading comprehension test while listening to music previously listed by the participant during the online phase. Participants were given the option to adjust the volume settings to his/her preference and had a maximum of 14 minutes to complete the task. During the Preset condition, participants listened to a playlist derived from the top nine songs listed on the iTunes Store and repeated the same procedure as described in the Preferred condition. However, the volume level was fixed and the instructions discouraged participants from adjusting it. The third condition, Silence, involved completing the task in silence. Playlists of all music selections were created using the online music database, grooveshark.com. In between each condition, a 2-3 minute break was given to participants. This experiment controlled for order effects by counterbalancing the music conditions every experimental session. Furthermore, the order of the GRE tests was randomized for every participant.

Results

Preliminary Analyses

To examine group differences in demographic information, chi-square tests were conducted on all demographic variables except age personality groups. Results are shown in Table 1 and indicate no significant differences exist for any of the demographic variables including sex ($t(1)=.083$, $p=.77$), race ($t(4)=3.1$, $p=.54$), income ($t(5)=10.98$, $p=.052$), academic year ($t(3)=3.67$, $p=.30$), and whether or not participants usually listened to music while studying ($t(1)=1.3$, $p=.26$) between high and low extraversion groups. A t-test was conducted to compare age between the two groups, resulting in no significant group differences ($t(32)=-.232$, $p=.82$).

ANOVA Results

A 2 X 3 mixed repeated measures ANOVA was conducted to examine interaction and main effects for extraversion level and music condition. The assumption of sphericity was met within the sample using Mauchly's Test ($t(2)=.682$, $p=.71$). The results of the mixed repeated-measures ANOVA indicated a significant interaction effect between level of extraversion and music condition ($F(2, 64)=3.79$, $p=.028$). With marginal significance, the simple effects are shown in Table 2, indicating that the scores in the Preferred music condition were higher than scores in the Silence condition for the High Extraversion group (p=.088). No other simple effects indicated any significant differences. Mean trends across all conditions and groups are shown in Figure 1. Though not statistically significant, low-extraversion individuals generally performed better in the silence condition compared to the two conditions with music.

Discussion

The purpose of the current study was to examine whether music preference had a differential effect on complex task performance for individuals with high and low extraversion levels. Three out of the four hypotheses were supported or partially supported by this research. Though rife with inconsistencies, prior studies have shown personality characteristics to moderate performance of individuals under certain sound conditions. One of the hypotheses for the current study was based on the prior interactions found in previous research between personality and music conditions. The study by Furnham and Bradley (1997), for example, found that introverted individuals significantly performed worse in all sound conditions when compared to silence. The first hypothesis for the current study predicted extraversion level would moderate performance in the music conditions. The current study demonstrated a significant interaction between level of extraversion and music conditions, in that the means in the high and low extraversion groups proved to be statistically different. This interaction effect is consistent with the majority of past research (Furnham & Bradley, 1997).

The second hypothesis, which predicted that there would be no differential effect on task performance between the preferred music and silence condition for the low extraversion group, was supported. Based on Berlyne's parabolic curve model, it was predicted that participants would be able to adjust their music preference to match the theorized optimal conditions. Possessing lower arousal thresholds, low-extraverted participants consistently performed better in silence because of the distracting nature of superfluous stimuli in past research (Furnham & Bradley, 1997; Cassidy & MacDonald, 2007). The Preferred music variable allowed these individuals to listen to music according to their preference, suggesting it helped in preventing the music from being significantly distracting. Though not significant, the low extraversion group performed better in the silence condition than the other music conditions. Although the mean trends for each condition suggest participants with low extraversion levels perform better in silence, it is important to note that 78.6% of the participants in the group indicated that they listen to music while studying. This trend is consistent with past research showing a large percentage of classified introverts listened to music (Daoussis, 1986).

The third hypothesis of this study predicted that individuals in the low extraversion group would perform the worst under the pre-set condition, but was not supported. The Preset music condition was predicted to exceed the low threshold introverts theoretically possess, resulting in the music being too distracting to effectively focus on the reading comprehension task (Furnham & Bradley, 1997; Furnham & Strbac, 2002). There were no differences in task performance large enough to be significant across the music conditions. When comparing the means of the two music conditions, they are similar, suggesting that preferred music is as distracting as a preset playlist of music.

The final hypothesis of the current study that individuals in the high extraversion group would perform significantly better while listening to both music conditions compared to silence was partially supported. Though participants in the high extraversion group did not perform significantly better in both of the music conditions, there was a marginally significant increase in scores in the preferred music condition when compared to the silence condition. This finding is consistent with theories that suggest extraverts tend to seek out higher stimulation because their optimum arousal threshold is higher (Furnhman, Strew & Sneade, 1999).

Similar to other research studying music and its effect on cognitive tasks, this study is not without its limitations. First, while participants were devoting their attention to the reading comprehension test, the computers in front of them playing the music selections displayed flashy advertisements that may have been an added distractor during the testing conditions. Another limitation was the available technology. All the lab computers used for the experimental condition were very old models. Due to the age of the machines, the Internet connection capabilities sometimes failed and several participants reported that the music stopped working several times throughout the test. Thirdly, recruiting participants for the conditions proved more difficult than previously planned, which resulted in uneven and small sample sizes. Originally, participants whose scores fell above the 75^{th} percentile and below the 25^{th} percentile were invited back to participate in the experimental phase. However, there was a small turnout, which would not have severely decreased the power of this study. Therefore, the median split separating individuals into high and low extraversion groups was a correction done to account for the lack of participants, which decreased the robust differences in extraversion for the two groups.

Despite these limitations, the current study presents conditions that have not yet been used in this area of research. Comparing the Preferred and Preset conditions, volume levels across the two music conditions was not equal. With uneven volume levels, this suggests that it would be unknown whether music preference or volume preference caused differences to be significant. However, the purpose of the Preset condition was to replicate the methodology of previous research, whereas the Preferred condition introduces a new methodology that more accurately represents conditions individuals would face in everyday life. From the results, there is a trend showing that music may actually enhance performance, but only if the participants adjust the music to fit their preferences. Future research would benefit by adopting the Preferred music methodology while studying the different elements of the music such as information load, affect, volume, and lyrical vs. instrumental (Kiger, 1989; Furnham & Allass, 1999; Furnham & Stephenson, 2007). Including different cognitive tasks in future studies would also provide a basis of comparison for the effect of music on different complex processes. Although confounding variables prevent full confidence in stating music preference facilitates performance in extraverts, findings from the current study encourage the inclusion of music preference in future research.

References

Anderson, S. A., & Fuller, G. B. (2010). Effect of music on reading comprehension of junior high school students. *School Psychology Quarterly*, *25*(3), 178-187. doi:10.1037/a0021213.

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. doi: 10.1177/0305735611422672

Banbury, S., & Berry, D. (1998). Disruption of office-related tasks by speech and office noise. *British Journal of Psychology, 89*(3). 499-517. Doi: 10.111/j.2044-8295.1998.tb02699.x

Cassidy, G., & MacDonald, R. R. (2007). The effect of background music and background noise on the task performance of introverts and extraverts. *Psychology Of Music*, *35*(3), 517-537. Retrieved from http://pom.sagepub.com.lib.pepperdine.edu/content/35/3/517.full.pdf+html

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. (1986). Musical preferences and effects of music on a reading comprehension test for extraverts and introverts. *Perceptual and Motor Skills, 62*(1). 283-289. Doi: 10.2466/pms.1986.62.1.283.

Dobbs, S., Furnham, A., & McClelland, A. (2011). The effect of background music and noise on the cognitive test performance of introverts and extraverts. *Applied Cognitive Psychology*, *25*(2), 307-313. Doi:10.1002/acp.1692.

Furnham, A., & Allass, K. (1999). The influence of musical distraction of varying complexity on the cognitive performance of extroverts and introverts. *European Journal Of Personality*, *13*(1), 27-38. Retrieved from http://content.ebscohost.com.lib.pepperdine.edu/pdf25_26/pdf/1999/58P/01Jan99/11819770.pdf?T=P&P=AN&K=11819770&S=R&D=a9h&EbscoContent=dGJyMNHX8kSeqLM4xNvgOLCmr0qep7VSs6i4TK6WxWXS&ContentCustomer=dGJyMPGuslCuqLFQuePfgeyx44Dt6fIA

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*(5), 445-455. Retrieved from http://content.ebscohost.com.lib.pepperdine.edu/pdf25_26/pdf/1997/BU8/01Oct97/11818107.pdf?T=P&P=AN&K=11818107&S=R&D=a9h&EbscoContent=dGJyMNHX8kSeqLM4xNvgOLCmr0qep7VSs6i4SbOWxWXS&ContentCustomer=dGJyMPGuslCuqLFQuePfgeyx44Dt6fIA

Furnham, A., & Stephenson, R. (2007). Musical distractors, personality type and cognitive performance in school children. *Psychology of Music, 35*(1), 403-420. doi: 10.1177/0305735607072653

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. Doi: 10.1080/00140130210121932

Furnham, A., Trew, S., Sneade, I. (1999). The distracting effects of vocal and instrumental music on the cognitive test performance of introverts and extraverts.

Personality and Individual Differences, 27(1), 381-392. doi: 10.1016/S0191-8869(98)00249-9

Hilliard, M., Tolin, P. (1979). Effect of familiarity with background music on performance of simple and difficult reading comprehension tasks. *Perceptual and Motor Skills, 49*(3), 713-714. Retrieved from http://www.amsciepub.com/doi/pdf/10.2466/pms.1979.49.3.713

Iwanaga, M., Ito, T. (2002). Disturbance effect of music on processing of verbal and spatial memories. *Perceptual and Motor Skills, 94*(3), 1251-1258. doi: 10.2466/PMS.94.3.1251.

Jäncke, L., & Sandmann, P. (2010). Music listening while you learn: No influence of background music on verbal learning. *Behavioral & Brain Functions*, *6,* 1-14. Retrieved from http://web.ebscohost.com.lib.pepperdine.edu/ehost/pdfviewer/pdfviewer?sid=c3658b41-817e-462a-ba94-fcde786d24c8%40sessionmgr112&vid=78&hid=123

Kiger, D. (1989). Effects of music information load on a reading comprehension task. *Perceptual and Motor Skills, 69*(2), 531-534. Retrieved from http://www.amsciepub.com/doi/pdf/10.2466/pms.1989.69.2.531

Mathur, H. (2010). Majortests.com. Retrieved from http://majortests.com/gre/reading_comprehension.php

McKelvie, P., & Low, J. (2002). Listening to Mozart does not improve children's spatial ability: Final curtains for the Mozart effect. *British Journal of Developmental Psychology, 20*(1), 241. Retrieved from http://content.ebscohost.com.lib.pepperdine.edu/pdf13_15/pdf/2002/99E/01Jun0

2/6990260.pdf?T=P&P=AN&K=6990260&S=R&D=a9h&EbscoContent=dGJyMNHX8kSeqLM4xNvgOLCmr0qep7dSsK24SbGWxWXS&ContentCustomer=dGJyMPGuslCuqLFQuePfgeyx44Dt6fIA

Rauscher, F., Shaw, G., Ky, K. (1994). Listening to Mozart enhances spatial-temporal reasoning: Towards a neurophysiological basis. *Neuroscience Letters, 185*(1). 44-47. Doi: 10.1016/0304-3940(94)11221-4

Smith, W. (1961). Effects of industrial music in a work situation requiring complex mental activity. *Psychological Reports, 8,* 159-162. Doi: 10.2466/pr0.1961.8.1.159

Ylias, G., Heaven, P. (2003). The influence of distraction on reading comprehension: A Big Five analysis. *Personality and Individual Differences, 34*(6), 1069-1079. doi: 10.1016/S0191-8869(02)00096-X

Table 1:

Demographic Information of Participants (n=34)

	Low Extraversion (n=14)	High Extraversion (n=20)
Demographic Information	Percentage	Percentage
Gender		
Male	50%	45%
Female	50%	55%
Race		
Asian/Pacific Islander	7%	25%
Hispanic	7%	15%
African American	14%	5%
Caucasian	57%	45%
Other	14%	10%
Income		
$0-40,000	15.4%	29.4%
$41,000-$60,000	0%	29.4%
$61,000-$80,000	15.4%	17.6%
$81,000-$100,000	7.7%	5.9%
$101,000-$120,000	7.7%	11.8%
$121,000+	53.8%	5.9%
Academic Year		
Freshman	57.1%	60%
Sophomore	28.6%	15%
Junior	7.1%	20%
Senior	7.1%	0%
Music Listening*		
Yes	78.6%	60%
No	21.4%	40%

*Do you listen to music while studying?

Table 2:

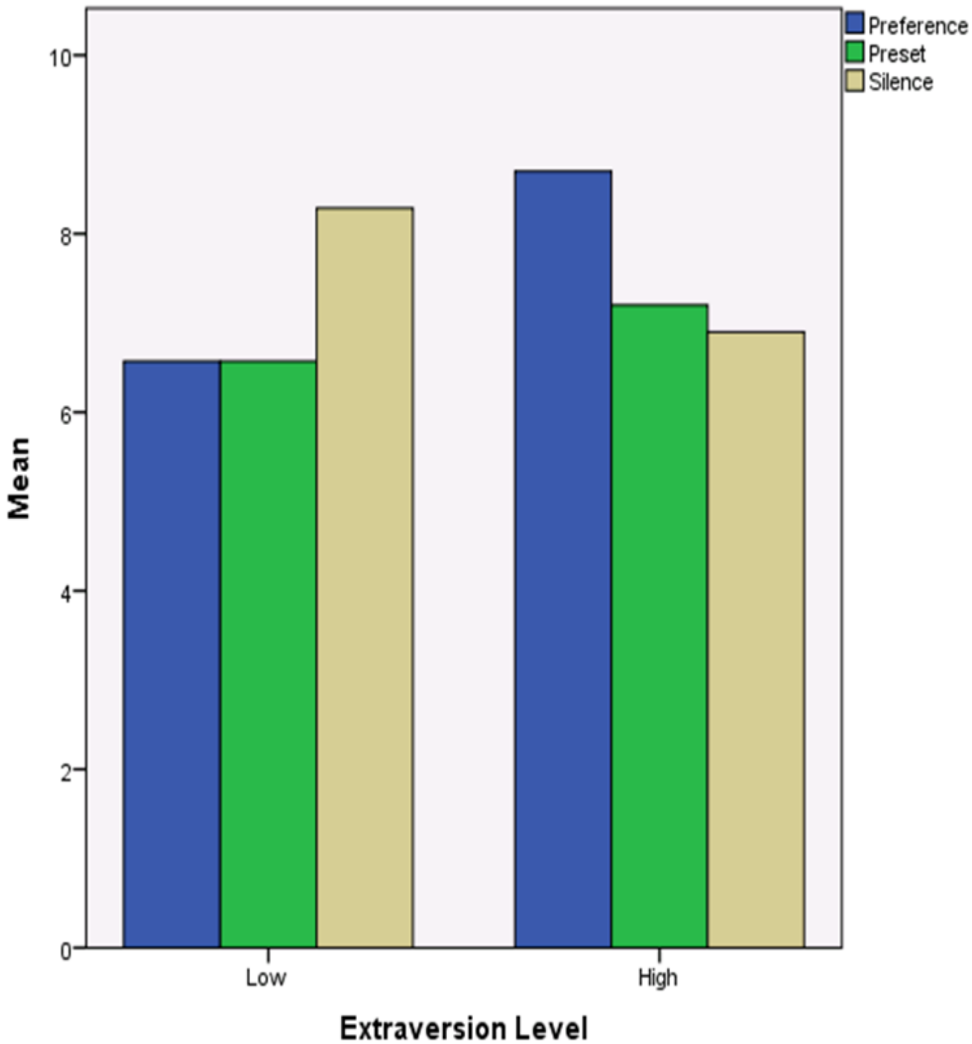
ANOVA Table of Main Findings

Simple Effects		*F*-Value	
Low Extraversion	Preferred	Preset	Silence
Preferred	-	0	-1.71
Preset	0	-	-1.71
Silence	-1.71	-1.71	-
High Extraversion			
Preferred	-	1.50	1.80*
Preset	-1.50	-	.30
Silence	-1.80*	-.30	-

* Significant to p<.1.

Figure 1

Mean Differences by Music Condition and Extraversion Level



Acknowledgements

I wish to thank Dr. Miller-Perrin and Dr. Harriger for their continual guidance and support throughout this research project.