



BSc in Psychology

Musical Effect and Personality: The Impacts of Video Game Music on Task Performance of Different Personality Dimensions

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Foreword

Submitted in partial fulfilment of the requirements of the BSc psychology degree, Reykjavík University, this thesis is presented in the style of an article for submission to a peer-reviewed journal.

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Abstract

This study was conducted to examine the effects of video game music on cognitive task performance for individuals scoring high and low on the various personality dimensions as measured with NEO-FFI. The participants of the study consisted of 70 undergraduate psychology students from the age 19 to 37, 18 men (25,7%) and 52 women (74,3%) all students at Reykjavik University. There were two experimental conditions to collect data about the impact of music, silence vs. low volume video-game music. Participants were randomly assigned to either silent condition or musical condition, where they all solved four levels of Stroop test. To gather information about the personality type, participants answered the revised NEO personality inventory that consists of 60 questions. The results showed significant main effect for the Extroversion, and significant interactions for Neuroticism and Agreeableness personality dimensions. Where Neuroticism showed the most significant effects, i.e. Individuals who scored high on neuroticism performed well on all levels of the Stroop test in the silence condition. However, when they were exposed to music, scores were significantly worse compared to those who scored low on neuroticism. There was also a particular trend in the difficulty levels of the Stroop test and the increasing importance of silence for all of the personality dimensions.

Keywords: musical effect, personality types, the five-factor inventory, Stroop effect, task performance, focus, attention

Útdráttur

Rannsóknin var framkvæmd til að kanna áhrif tölvuleikjatonlistar á hugræna færni mismunandi persónuleika við úrlausn taugasálfræðilegs verkefnis. Úrtakið innihélt 70 þátttakendur, allt nemendur við Háskólann í Reykjavík. Alls voru 18 karlkyns þátttakendur og 52 kvennkyns þátttakendur. Það voru tvöskónar rannsóknaraðstæður til þess að safna gögnum um áhrif tónlistar, þ.e. þögn vs. lágt stillt tölvuleikjatonlist. Þátttakendum var handahófskennt skipt í aðstæður, þar sem þeir leystu fjórar gerðir af Stroop prófi. Gagnasöfnun fyrir persónuleikagerð var safnað með NEO persónuleikaprófi, sem inniheldur 60 spurningar. Niðurstöður rannsóknarinnar sýndu marktæk meginhrif meðal úthverfu (e. *extraversion*) og Stroop. Ásamt marktækum samvirknihrifum meðal taugaveiklunar (e. *neuroticism*), Stroop og rannsóknaraðstæðna; og samvinnuþýði (e. *agreeableness*) og Stroop. Persónuleikavíddin taugaveiklun var hvað mest markverðust, þar sem einstaklingar sem skoruðu hátt á þeirri vídd stóðu sig betur á öllum gerðum af Stroop í þögn á miðað við þá sem skoruðu lágt. Hinsvegar, þegar kom að tónlistaraðstæðum, þá stóðu þeir sem skoruðu hátt í taugaveiklun sig töluvert verr heldur en þeir sem skoruðu lágt í taugaveiklun.

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Musical Effect: The impacts of Video Game Music on the Task Performance of Introverts and Extroverts

Personal stereos and speaker systems bring music into every part of our lives, from the street to the store and even the hospital. Where music can now be seen as a resource rather than a commodity. Music permeates our everyday lives, suggesting it must have significant influence on human behavior and cognitive activity (Furnham and Allass, 1999). Therefore, investigating the exact nature of the effects of music on performance is more relevant than ever.

Studies of music's effects on the brain have been conducted by specialists in several diverse fields. Industrial psychologists and ergonomists have been particularly interested in whether background music can enhance productivity (Furnham and Strbac, 2002). Smith (1961) proposed that depending on the cognitive complexity of the task, music may have a positive or negative influence on performance. Smith hypothesized that music has a positive effect on routine tasks, since it serves to reduce boredom and tension associated with those activities. Given the well-known effects of sound on physiological activity, especially those of noise and of music on the stress hormone cortisol in particular, Hébert et al. (2005) hypothesized that music may be a major source of stress during video game playing. In the study they examined the effects of built-in music on cortisol secretion as a consequence of video game playing, where players were randomly assigned to either music or silence condition. His findings suggested that the presence of action game music was an important stressor to enhance excitement or draw the players' attention to the game, therefore the auditory input contributed significantly to the stress response during video game playing. The type of music found in violent action games usually consist of techno or rock music, where studies have reported self-ratings of tension, anxiety and discomfort (McCraty et al., 1998; Burns et al., 1999, 2002; Labbé, Schmidt, Babin and Pharr, 2007). Other video games consist of classical music where studies have found that classical music induces relaxing effects,

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compared to silence (Knight and Rickhard, 2001; Khalifa et al., 2003). Therefore, the type of music is an important factor when it comes to create a certain atmosphere in a situation.

When the tasks required more mental effort, music seems to work as a distractor (Dalton and Behm, 2007; Furnham and Bradley, 1997; Hsu, Eastwood and Toplak, 2017; Milliman, 1986). Fox and Embrey's (1972) research contributed greatly to our understanding of music's ability to increase arousal levels and alertness and indicated that the music's complexity was an important factor. Subsequent experiments have further investigated the relationship between background music and performance efficiency. These experiments have taken into account the complexity of the music or sound by testing the effects of simple sounds, office noise, vocal music and instrumental music. For example, Furnham and Bradley (1997) investigated the differential distraction of background music on the cognitive test performance of introverts and extraverts, where participants were either exposed to pop music or silence while solving two different memory tests. Their focus was to examine the individual differences, but results suggested that there was non-significant difference. Although, the test performance for all individuals marginally lowered in the presence of music, where introverts performed slightly worse. Another study by Oldham, Cummings, Mischel, Schmidhe and Zhan (1995) found that those who prefer to work with music performed better with the presence of music compared to those who did not prefer to work with music. However, this study was flawed whereas individuals were able to select the duration and type of music themselves. Therefore, findings on the matter have been inconsistent since these studies differ in cognitive tasks, music choice and questionnaires. Further studies are necessary that include similar set of tasks, music and questionnaires with a reasonable sample size to gather significant and practical results.

Individual differences must be accounted for when investigating the effects of music while solving a task. Uhrbrock (1961) acknowledged that music had different kind of arousing effect on divergent individuals. According to Eysenck's (1967) theory of personality

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the concept of differential internal arousal levels between introverts and extroverts is fundamental. Where Introverts experience greater level of arousal to lower-intensity, because of low neurological threshold of arousal, compared to Extraverts. Therefore, a common believe is that introverts work better in silence opposed to extroverts who are able to perform better in a chaotic environment (Dobbs, Furnham and McClelland, 2011).

Cassidy and MacDonald (2007) studied the effects of background music and background noise on the task performance of introverts and extraverts. Their study included five different cognitive tasks: immediate recall, free recall, numerical and delayed recall, and Stroop, where music with high arousal potential (HA), low arousal potential (LA) and silence were the possible examination conditions. Their results suggested that test performance was lessened across all cognitive tasks in the presence of background sound (music and noise in HA and LA) compared to silence. Although they reported that introverts were more detrimentally affected by the presence of high arousal music compared to extraverts. Another study by Furnham, Trew and Sneade (1998) where they examined the distracting effects of music on the cognitive test performance of introverts and extroverts. They hypothesized that introverts would be impaired by the presentation of vocal and instrumental music whereas extroverts could benefit from the auditory stimulation, especially the vocal music. No significant interactions were found. Although there was an interesting condition effect in the logical task, where extroverts seemed to perform better with the presence of music compared to silence. Also, there was a trend in their study where introverts were somewhat impaired by the introduction to music while solving the tests whereas extroverts seemed to be enhanced by it. They also mentioned that other personality or individual differences should be examined in the future, whereas they might have a possible effect on performance which may interact with background sound.

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The Five-Factor Model of Personality

Extroversion and Introversion are only one dimension of the five personality traits according to the Big Five or the Five-Factor Model (McCrae & John, 1992). Thus, to gather greater understanding of individual characteristics and abilities, the five broad personality traits will be described according to the theory. Factor 1, the neuroticism dimension refers to the tendency to be anxious, fearful, depressed and moody. Individuals that score high on this factor are often described as emotionally unstable, apprehensive and prone to worry. Feelings of frustration, irritation and sadness are therefore common. However, those who score low on this factor are the exact opposite, e.g. emotional adjustment, which is the principal trait that leads to life satisfaction (McCrae & Costa, 1991). Factor 2, extraversion represents the tendency to be outgoing, active and excitement seeking. Individuals who score high on this personality factor are characterized as social, excited, assertive and emotionally expressive. These individuals tend to gain energy from social situations since they have a higher tolerance for stimuli. Those who score low in this factor are referred to as introverts, who prefer solitude and dislike being the center of attention (Watson & Clark, 1997). Factor 3, openness to experience represents the tendency to be creative, imaginative, perceptive and thoughtful. Individuals who score high on this factor contain characteristics such as imagination, insight and creativity. They tend to have a broad range of interest since they are open to try new things, therefore openness to experience is the only big five trait to appreciable correlations with intelligence. Those who score low on this factor are more conservative (Judge & Bono, 2000). Factor 4, agreeableness is a personality dimension that includes attributes such as kindness, altruism, trust, cooperation and other prosocial behavior. While those who score low on this factor tend to be more manipulative and competitive (McCrae & Costa, 1991). Factor 5, conscientiousness is the trait from the five-factor model that best correlates with job performance (Barrick & Mount, 1991). Those who score high on this personality factor are reasonably efficient, sensible and rational. They tend to be organized

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and mindful of detail, with good impulse control and goal-oriented behaviors. Individuals who score low in this trait procrastinate important tasks, fail to complete tasks at hand and dislike structure (McCrae & Costa, 1991).

An interesting study performed by Chamorro-Premuzic and Furnham (2007) on the relationship between individual differences and specific use of music, referred to why and how people use music in everyday life. The aim of their study was to investigate whether personality correlates with different uses of music. There were three possible ways of music use, rational/cognitive appreciation, emotional regulation or as background music to other activities (e.g. studying, working). They collected their data with The Big Five factor inventory (NEO-FFI), The Wonderlic Personnel Test (WPT), TIE and a self-report questionnaire specifically designed for this study. One of their hypothesis stated that extroversion would be positively related to the use of background music while working. However, the results showed that extroversion was not positively correlated with the use of background music while working. Thus, extroverts were not more likely to use background music while working. Even though extroverts might be more capable of handling the audio-stimuli in the environment does not mean that they prefer it. On the other hand, their findings provided empirical evidence for individual difference variable involved with everyday use of music e.g. emotional purposes and/or rational ways. Where emotional uses of music were characterized by mood regulation, focusing on the content rather than structure. Notably, individuals who scored high on the neuroticism were more likely to use music in emotional ways, which fits the nature of neurotic individuals, who are typically unstable and show higher intensity of emotional affectivity (Costa & McCrae, 1992).

The principles to understand the distractibility of music while working are tied up interaction with other factors such as type of tasks, type of music and individual differences. Therefore, the purpose of this study is to examine whether video game music (mild techno music) has a significant effect on task performance. Also, too see whether there is a distinct

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difference in task performance depending on different personality dimensions and whether the two variables interact in their impact on performance. Based on the above literature it was hypothesized that video-game music has a distracting effect on task performance; 1) Given the nature of the extraversion dimension that those who score high might be less effected by the presence of music than those who score low but show similar performance in silence to those who score low; 2) It was expected given the nature of the neuroticism dimension, that those who score high might be more effected by the presence of music than those who score low but show similar performance in silence to those who score low.

Method

Participants

Participants were Icelandic students at Reykjavík University ($N=70$). Most of them were female ($N=52$; 74,3%) and a few males ($N=18$; 25,7%). Participants ranged in age from 19 to 37 (mean age=23,6; $SD=3,5$). Students signed an informed consent form (Appendix A) prior to their participation.

Materials and Equipment

NEO FFI-R. Personality was assessed by using The *NEO five-factor inventory (NEO FFI-R)* that measures the Big Five personality factors i.e. Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness (Costa & McCrae, 1992). The inventory is divided into 5 x 12 questions for each personality factor and therefore contains 60 questions in total. Questions are answered on a five-point Likert scale (ranging from ‘strongly disagree’=1, ‘disagree’=2, ‘neutral’=3, ‘agree’=4 and ‘strongly agree’=5). Examples of questions for each personality factor: Neuroticism – ‘1. I am not a worried individual by nature’, Extraversion – ‘2. I enjoy being surrounded by a group of people’, Openness – ‘3. I enjoy focusing on my imaginations or daydreams and explore all their possibilities, nurture them and take care of’, Agreeableness – ‘4. I try to be polite to everybody I meet’, Conscientiousness – ‘5. I keep my belongings clean and proper’. The NEO-FFI is reliable

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and valid tool to assess the personality of individuals (Anisi et al., 2011). The NEO FFI-R inventory that was used in this experiment was translated into Icelandic (Appendix B).

Results from standardization testing on the Icelandic version of NEO-FFI-R showed good reliability on the main components (Jónsson and Bergþórsson, 2004).

Stroop Color-Word Test. To examine the participants' selective attention capacity and skills, as well as their processing speed ability a colored *Stroop task* was used. Stroop Color-Word test measures selective attention and cognitive flexibility, or the individual's ability to shift cognitive set (Homack, 2004). In this test, participants sometimes see a color name written in different font color e.g. the written word says green but the color of the font is red, this creates a conceptual confusion where this kind of matching is called incongruent. In other cases, the written word and the color of the font match, that type of matching is referred to as congruent. This test interferes with the different information that the brain receives (what the word says and what the actual color of the word is). The Stroop effect theory suggest that the interference occurs because words are read faster than colors are named (Stroop, 1935). The Stroop test used in the present study consisted of four different levels, 100% congruency, 70% congruency, 30% congruency and 0% congruency. The more complex levels of the Stroop Test were when some words were congruent while others were incongruent i.e. 30% congruency and 70% congruency. The Stroop test was presented on a 4-slide Powerpoint slideshow, where each slide contained 32 words (Appendix C). The order of the 4 Stroop tests were randomized by using a Latin square generator between subjects for reliability purposes. All of the participants concluded these four levels of the Stroop test. A stopwatch was used to measure the time for each set of Stroop test level.

The Music and Equipment. An audio-technica ATH-M50x professional Studio Monitor Headphones was used to display the low-volume background music to every other participant. Therefore, only half of the sample was exposed to the audio-stimuli. The video game music that was played during the musical condition was the Stickerbush Symphony

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(Bramble Blast) from the Donkey Kong Country 2 which is a slow beat techno/ambient music (90bpm).

Research Design

This was a mixed research design that was mainly investigating the effects of music on response time for every level/set of the Stroop Test (4 sets). All data analysis was conducted in SPSS version 24.0. The data was analyzed in mixed ANOVA 2x2x4 with experimental condition (silence vs. music), personality types (high vs. low) and Stroop level (0-100% congruency) as the factors for each of the five personality dimensions, Neuroticism, Extroversion, Openness, Agreeableness and Conscientiousness. Where directional hypotheses were tested, the p value was divided by 2.

Procedure

Data was collected over the period of one and a half week, 27th of February until 10th of March. Participants signed up to a particular time on each day and showed up accordingly. The experiment was performed in a small research facility located in Reykjavik University, where only one participant was measured at a time. Participants started by signing an informed consent form before continuing with the experiment (Appendix A). There were two experimental conditions, silence vs. music. Every other participant was exposed to the music condition whereas the other half resumed the tests in silence. In each condition the participant solved all four different sets of the Stroop tests, where each set was timed specifically. After the Stroop test was finished, each participant was given the NEO FFI-R inventory (Appendix B) to answer in silence. When the inventory was fully completed the experiment was finished. The whole experiment took around 20-30 minutes depending on each participant.

Results

The purpose of this study was to examine the difference in task performance between personality dimensions on Stroop tests in two experimental conditions, silence vs. video-

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game music. A separate 2 x 2 x 4 mixed ANOVAs were conducted to examine the data.

Level of significance was set at .05.

Stroop Performance, Music and Extraversion

Table 1 below illustrates the number of participants, mean difference values (ms) and standard deviation of the total scores from the four levels of Stroop tests in both the silent condition and the musical condition for the extraversion personality dimension.

Table 1

Descriptive Statistics for the Extraversion Personality Dimension in both experimental conditions for all levels of the Stroop Test

		Low Extraversion		High Extraversion	
		Silence	Music	Silence	Music
Stroop100	<i>M</i>	21,05	21,38	20,38	20,51
	<i>SD</i>	4,63	5,41	3,92	6,5
	<i>N</i>	16	17	19	18
Stroop70	<i>M</i>	25,97	27,37	25,26	25,74
	<i>SD</i>	5,44	4,58	4,40	5,62
	<i>N</i>	16	17	19	18
Stroop30	<i>M</i>	29,59	30,74	29,11	29,51
	<i>SD</i>	6,69	7,24	5,93	5,44
	<i>N</i>	16	17	19	18
Stroop0	<i>M</i>	30,67	30,76	31,89	32,01
	<i>SD</i>	7,37	7,11	7,27	5,93
	<i>N</i>	16	17	19	18

A 2 extraversion (low, high) x 2 condition (music vs. silence) x 4 types of Stroop (0-100% congruency) mixed ANOVA revealed a non-significant difference between conditions, $F(1,$

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66) = .178, $p = .674$. Performance did not vary between music and no music. However, the main effect of type of Stroop was significant $F(1, 178) = 117,679$, $p < .001$. Participants' performance varied depending on the type of Stroop task, demonstrating the Stroop effect. Furthermore, the Polynomial contrasts showed a significant quadratic trend for the interaction between the type of Stroop and Extraversion $F(1,66) = 2,788$, $p = 0,05$. As can be seen in Figure 1 those higher on the extraversion dimension scored better in three of the four levels of the Stroop tests (100% congruent, 70% congruent and 30% congruent).

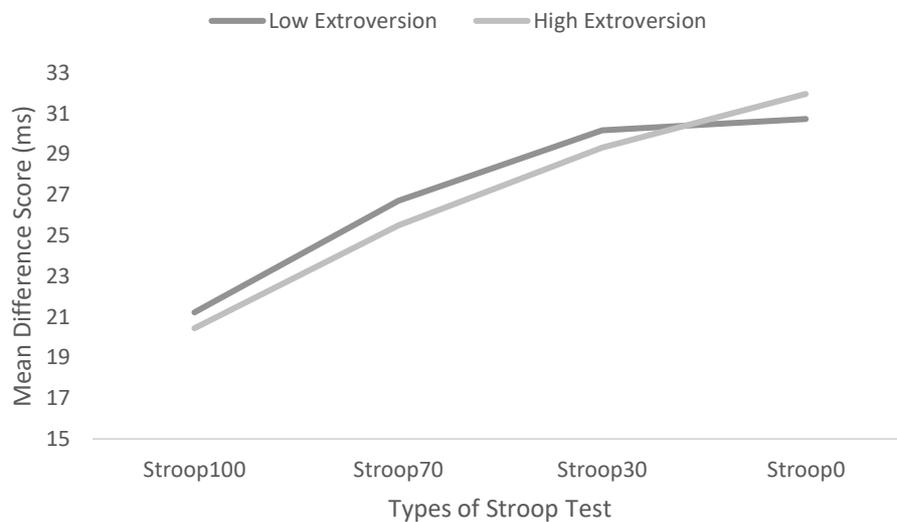


Figure 1. Mean difference values (ms) representing the different times scores in seconds on each Stroop level between high extroversion and low extroversion personality traits.

There were no other significant interactions found for the extraversion personality dimension.

Stroop Performance, Music and Neuroticism

Table 2 below illustrates the number of participants, mean difference values (ms) and standard deviation of the total scores from the four levels of Stroop tests in both the silent condition and the musical condition for the neuroticism personality dimension.

Table 2

Descriptive Statistics for the Neuroticism Personality Dimension in both experimental conditions for all levels of the Stroop Test

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		Low Neuroticism		High Neuroticism	
		Silence	Music	Silence	Music
Stroop100	<i>M</i>	21,27	20,33	19,81	21,29
	<i>SD</i>	4,67	2,85	3,39	7,26
	<i>N</i>	21	13	14	22
Stroop70	<i>M</i>	26,71	25,60	23,87	27,08
	<i>SD</i>	4,74	4,80	4,62	5,35
	<i>N</i>	21	13	14	22
Stroop30	<i>M</i>	30,71	27,39	27,27	31,71
	<i>SD</i>	6,51	4,02	5,25	6,93
	<i>N</i>	21	13	14	22
Stroop0	<i>M</i>	33,23	29,56	28,49	32,49
	<i>SD</i>	7,64	5,76	5,72	6,73
	<i>N</i>	21	13	14	22

A 2 x 2 x 4 mixed ANOVA showed a significant three-way interaction between the type of Stroop, experimental condition and neuroticism, $F(1, 66) = 5,39, p = .023$. Figure 3 and 4 below shows that participants who scored high on neuroticism performed better on all levels of the Stroop test in the silence condition compared to those who scored low on neuroticism (Figure 3). However, in the music condition, those who scored high on neuroticism performed worse on all levels of the Stroop test compared to those who scored low on neuroticism (Figure 4).

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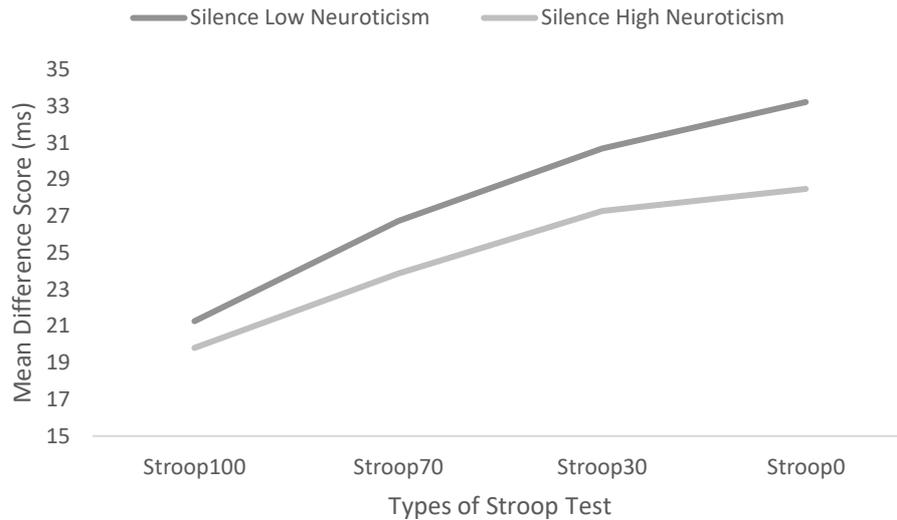


Figure 3. The Mean Difference time score (ms) in seconds for Neuroticism on each level of Stroop in Silence condition.

An interesting alteration in mean difference scores occurred for the participants who scored high on neuroticism when they were exposed to music. In contrast of the silence condition, the high neuroticism scored worse on every Stroop test in the music condition (see Figure 4). Indicating that the participants that scored highly on the neuroticism were affected by the presentation of music.

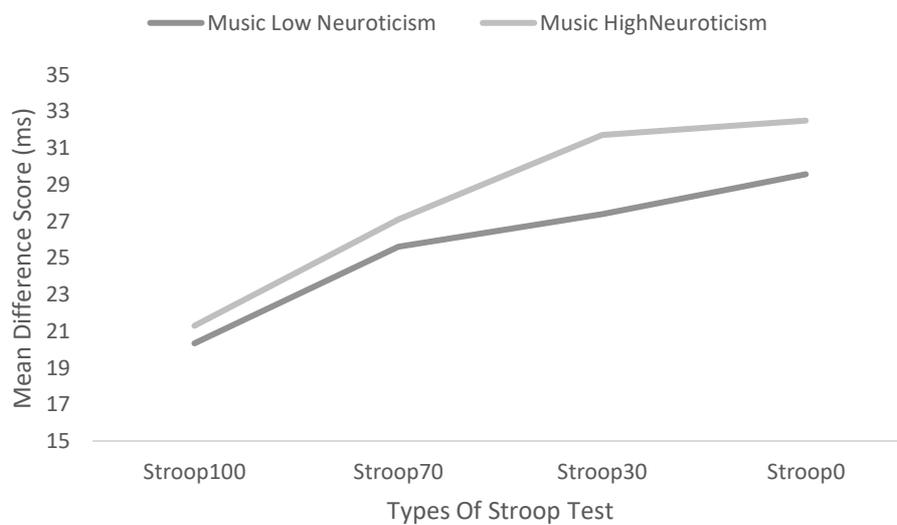


Figure 4. The Mean Difference time score (ms) in seconds for neuroticism on each level of

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Stroop in Music condition.

No other interactions nor main effects were significant.

Stroop Performance, Music and Agreeableness

Table 3 below illustrates the number of participants, mean difference values (ms) and standard deviation of the total scores from the four levels of Stroop tests in both the silent condition and the musical condition for the agreeableness personality dimension.

Table 3

Descriptive Statistics for the Agreeableness Personality Dimension in both experimental conditions for all levels of the Stroop Test

		Low Agreeableness		High Agreeableness	
		Silence	Music	Silence	Music
Stroop100	<i>M</i>	22,43	23,05	19,37	19,15
	<i>SD</i>	4,64	6,56	3,41	4,90
	<i>N</i>	15	16	20	19
Stroop70	<i>M</i>	27,54	27,31	24,11	25,88
	<i>SD</i>	4,64	4,73	4,55	5,49
	<i>N</i>	15	16	20	19
Stroop30	<i>M</i>	31,73	30,85	27,53	29,48
	<i>SD</i>	6,94	7,00	5,03	5,79
	<i>N</i>	15	16	20	19
Stroop0	<i>M</i>	31,59	30,62	31,14	32,06
	<i>SD</i>	6,38	6,34	7,97	6,67
	<i>N</i>	15	16	20	19

A 2 agreeableness (low, high) x 2 condition (music vs. silence) x 4 types of Stroop (0-100% congruency) mixed ANOVA showed that the linear interaction between the type of

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Stroop test and Agreeableness was significant $F(1, 66) = 5,98, p = .017$. Although the performance did not vary between music and no music. As can be seen in Figure 5 those higher on the agreeableness dimension scored better in three of the four levels of the Stroop tests (100% congruent, 70% congruent and 30% congruent). Figure 5 below displays the significant interaction between the Stroop levels and the personality trait.

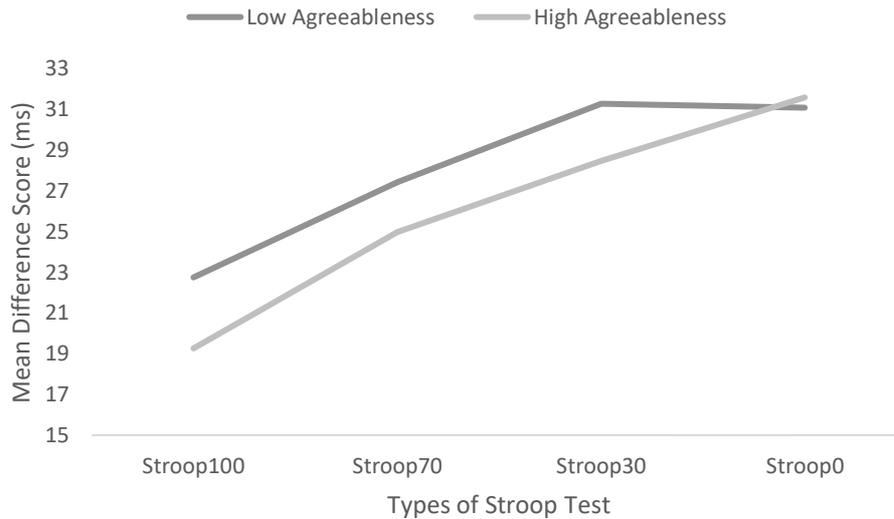


Figure 5. The Mean Difference time score (ms) in seconds between High Agreeableness and Low Agreeableness and every Stroop level.

No other main effects or interactions were significant.

Stroop Performance, Music, Openness and Conscientiousness

Table 4 below illustrates the number of participants, mean difference values (ms) and standard deviation values of the total scores from the four levels of Stroop tests in both the silent condition and the musical condition for the openness personality dimension

Table 4

Descriptive Statistics for the Openness Personality Dimension in both experimental conditions for all levels of the Stroop Test

Low Openness		High Openness	
Silence	Music	Silence	Music

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Stroop100	<i>M</i>	21,48	21,01	20,01	20,88
	<i>SD</i>	5,05	5,89	3,34	6,18
	<i>N</i>	16	15	19	20
Stroop70	<i>M</i>	25,96	27,43	25,26	25,86
	<i>SD</i>	5,12	4,89	4,70	5,33
	<i>N</i>	16	15	19	20
Stroop30	<i>M</i>	28,86	30,88	29,73	29,52
	<i>SD</i>	6,61	7,43	5,99	5,46
	<i>N</i>	16	15	19	20
Stroop0	<i>M</i>	31,11	31,60	31,52	31,25
	<i>SD</i>	8,03	7,17	6,71	6,07
	<i>N</i>	16	15	19	20

Table 5 below illustrates the number of participants, mean difference values (ms) and standard deviation values of the total scores from the four levels of Stroop tests in both the silent condition and the musical condition for the openness personality dimension

Table 5

Descriptive Statistics for the Conscientiousness Personality Dimension in both experimental conditions for all levels of the Stroop Test

		Low		High	
		Conscientiousness		Conscientiousness	
		Silence	Music	Silence	Music
Stroop100	<i>M</i>	21,05	21,83	20,38	20,09
	<i>SD</i>	4,63	5,17	3,92	6,67
	<i>N</i>	16	17	19	18

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Stroop70	<i>M</i>	25,97	27,78	25,26	25,35
	<i>SD</i>	5,44	5,12	4,40	5,00
	<i>N</i>	16	17	19	18
Stroop30	<i>M</i>	29,59	30,83	29,11	29,42
	<i>SD</i>	6,69	7,21	5,93	5,45
	<i>N</i>	16	17	19	18
Stroop0	<i>M</i>	30,67	32,05	31,89	30,79
	<i>SD</i>	7,37	7,55	7,27	5,39
	<i>N</i>	16	17	19	18

Results from the 2 x 2 x 4 mixed ANOVA for both the Openness and Conscientiousness personality dimensions, showed no significant main effects nor interactions. Neither in connection to the Stroop tests or the experimental conditions.

Discussion

This experiment investigated the cognitive task performance of different personality dimensions under the conditions of video-game music and silence. Subjects' cognitive task performance was tested with four different levels of Stroop test and their personality type was assessed with NEO-FFI-R, where it was found that in all tests there were two significant interactions and one significant main effect for three of the five dimensions that were assessed. The results of the current study indicated that participants who scored high on extraversion did not perform better in a musical condition. Similar to previous experiments (Furnham, Trew and Sneade, 1998) that showed non-significant difference between condition and personality, whereas task performance did not vary between musical or silent condition. Therefore, the primary hypothesis was not supported, since there was no significant difference between condition and personality. However, there was a significant main effect for type of Stroop and extraversion, whereas those who scored high on extraversion were

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performing better in three of four levels of the Stroop test. Which correlates with the findings from Cassidy and MacDonald (2007) where extroverts performed better than introverts on the Stroop test. There is a possibility that this may be due to their natural and internal excitement/arousal levels (Watson & Clark, 1997).

The experiment revealed a significant three-way interaction between the type of Stroop, experimental condition and neuroticism. Participants who scored high on neuroticism performed significantly worse in the musical condition compared to those who scored low on neuroticism. Therefore, the second hypothesis was supported concerning participants that scored high on neuroticism would be more effected by the presence of music compared to those who scored low on neuroticism. These findings add to Chamorro-Premuzic and Furnham (2007) study, where individuals who scored high on neuroticism tended to use music in emotional purposes rather than rational. Combined with the characteristics that high scoring neurotics possess, the type of music may have been the main reason for the lack of performance, since the type of music that was applied in this experiment, mild-techno music, had formerly been reported as anxious, discomforting and created a stressful atmosphere (McCraty et al., 1998; Lanné, Schmidt, Babin and Pharr, 2007). However, those who scored high on neuroticism performed significantly better in the silence condition compared to those who scored low on neuroticism. These findings can be supported by the anxious nature of neuroticism, and perhaps those who score high on neuroticism have a more active internal stress response so when it comes to any kind of stimuli the stress response can quickly alter from positive to negative.

In addition to the hypothesizes that were investigated, there was an interesting finding for the agreeableness personality dimension. Where the results from mixed ANOVA showed a significant linear interaction between the type of Stroop and Agreeableness. Revealing that participants who scored high on the agreeableness dimension performed significantly better in three of four levels of the Stroop test. The feature of surprise is that individuals who score

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low on agreeableness are perceived to be more competitive (McCrae & Costa, 1991).

However, personality traits such as cooperation and trust are highly correlated with high scores of agreeableness, which may contribute to the given results.

There were no other significant findings, i.e. concerning participants who scored high on conscientiousness and openness personality dimensions. According to Barrick and Mount (1991) Conscientiousness was the trait from the five-factor model that best correlates with job performance since they are perceived to have a good impulse control and mindful to details. However, in this particular experiment there were no significant interactions or main effects between the Stroop tests nor condition.

The current study had some limitations. First, the sample size was not sufficient enough and it was conveniently comprised of students drawn from the participants pool of undergraduate psychology students. Therefore, the results cannot be considered representative for students or any larger population. Second, the gender distribution was not equal. Third, participants were either assigned to silent condition or musical condition, therefore a fully equipped comparison was not performed, e.g. participants were not compared to themselves, although that would have had a more serious error to the Stroop scores. The study also had its strengths, the most important of which was the structured research conditions and no participant fallout.

In conclusion, this study found that there is a difference in task performance between different personality dimensions and how they deal with background noise and music. Future studies on this matter may be necessary to develop an informed and personalized basis for individuals to enhance their task performance and work efficiency. Perhaps a meta-analysis to gather experiments that have been conducted on the field. Moreover, a separate study on the nature of neuroticism and their psychological distress, cognitive process, cardiovascular reaction and cortisol blood levels.

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Appendix A

Eyðublað fyrir upplýst samþykki

Rannsókn: Athyglisspönn útfra persónuleika

Ábyrgðarmaður rannsóknar: Dr. Kamilla Rún Jóhannsdóttir, Sálfræðideild
Háskólinn í Reykjavík, sími: 599-6459

Tilgangur þessa eyðublaðs er að tryggja að þátttakandi skilji bæði tilgang rannsóknarinnar og hvert hans hlutverk er í rannsókninni. Eyðublað þetta verður að veita nægar upplýsingar svo þátttakandi geti tekið upplýsta ákvörðun um þátttöku sína í rannsókninni. Vinsamlegast leitið til rannsakandans ef einhverjar spurningar vakna eftir lestur þessa eyðublaðs.

Starfsfólk rannsóknarinnar:

Auk ábyrgðarmanns rannsóknarinnar, sem nefndur var hér að ofan, eru eftirfarandi aðilar einnig starfandi vegna rannsóknarinnar og má hafa samband við þær hvenær sem er ef þörf er á frekari upplýsingum varðandi þessa rannsókn: Anný Tinna Aubertsdóttir [anny15@ru.is].

Tilgangur:

Tilgangur rannsóknarinnar er að skoða athyglisspönn hjá fólki og athuga hvort munur sé á milli persónuleika.

Verkefni:

Þátttakandi greinir og les upp liti af þeim orðum sem koma fram ásamt því að svara stuttu persónuleikaprófi í lokin sem byggir á kenningunni „The Big Five“.

Tími og staðsetning:

Rannsóknin fer fram í rannsóknarherbergi sálfræðisviðs sem er staðsett í Háskóla Reykjavíkur. Rannsóknin í heild sinni tekur allt að 20-30 mínútur.

Möguleg áhætta eða óþægindi:

Almennt fylgir þessari rannsókn engin áhætta – en ef þú finnur fyrir eitthverskonar óþægindum þá lætur þú rannsakanda vita og getur þar með hætt þátttöku hvenær sem er.

Nafnleynd/trúnaður:

Algerrar nafnleyndar og trúnaðar er gætt varðandi hlut þátttakenda í þessari rannsókn. Þær upplýsingar sem fengnar eru í þessari rannsókn verður farið með sem trúnaðarmál og aðeins notað af rannsakendum sem tengjast þessari rannsókn. Öll gögn eru merkt með þátttakandanúmeri og því ópersónugreinanleg.

Réttur til að hætta þátttöku:

Þú hefur fullan rétt á að hætta þátttöku í þessari rannsókn hvenær sem er.

Ég hef lesið ofantalda lýsingu á rannsókninni; líffræðileg viðbrögð við streitu; áhrifaþættir. Ég geri mér grein fyrir skilyrðum þátttöku minnar.

Nafn: _____ Dagsetn.: _____

Undirskrift: _____ Vottur: _____

Persónuleikapróf

NEO FFI-R

Leiðbeiningar:

Vinsamlegast lesið eftirfarandi leiðbeiningar áður en þið svarið spurningalistanum. Þetta persónuleikapróf inniheldur 60 staðhæfingar. Þeim þarf að svara með því að merkja við viðeigandi valkost. Ef þið teljið að staðhæfingin eigi vel við ykkur þá merkið þið við mjög sammála [MS], ef þið teljið að staðhæfingin eigi að einhverju leiti við ykkur þá merkið þið við sammála [S]. En ef þið teljið að staðhæfingin eigi ekki við ykkur þá merkið þið við ósammála [Ó], en ef þið teljið að hún eigi alls ekki við ykkur þá merkið þið við mjög ósammála [MÓ]. Ef þið eruð óviss eða eigið erfitt með að svara einhverri staðhæfingu þá getið þið merkt við hlutlaus [H].

Mikilvægt er að **öllum** staðhæfingum sé svarað og að hver og einn svari fyrir sjálfan sig. Það eru engin rétt eða röng svör og eingöngu er óskað eftir því að svarað sé eftir bestu samvisku og af hreinskilni. Með öll svör verður farið sem fyllsta trúnaðarmál og ómögulegt er að rekja spurningalista til svarenda.

Við þökkum ykkur kærlega fyrir þátttökuna

Aldur: _____

Kyn: _____

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Mjög Ósam- Hlut- Sam- Mjög
 ósammála mála laus málasammála

1. Ég er ekki áhyggjufull(ur) að eðlisfari.....[MÓ] [Ó] [H] [S] [MS]
2. Mér finnst gaman að hafa fullt af fólki í kringum mig.[MÓ] [Ó] [H] [S] [MS]
3. Ég nýt þess að einbeita mér að ímyndunum eða dagdraumum og.....[MÓ] [Ó] [H] [S] [MS]
 kanna alla þeirra möguleika, hlúa að þeim og þróa
4. Ég reyni að vera kurteis við alla sem ég hitti.[MÓ] [Ó] [H] [S] [MS]
5. Ég held eigum mínum hreinum og fínum.[MÓ] [Ó] [H] [S] [MS]
6. Stundum hef ég verið bitur og full(ur) af gremju.[MÓ] [Ó] [H] [S] [MS]
7. Það er stutt í hláturinn hjá mér.[MÓ] [Ó] [H] [S] [MS]
8. Mér finnst áhugavert að læra og koma mér upp nýjum áhugamálum[MÓ] [Ó] [H] [S] [MS]
9. Stundum ráðskast ég með fólk eða hrósa því til að fá það það sem ég vil. [MÓ] [Ó] [H] [S] [MS]
10. Ég er nokkuð góð(ur) í að skipuleggja tíma minn[MÓ] [Ó] [H] [S] [MS]
11. Þegar ég er undir miklu álagi, finnst mér sem ég muni kikna.[MÓ] [Ó] [H] [S] [MS]
12. Ég vel heldur störf þar sem ég get unnið ein(n) án þess að.[MÓ] [Ó] [H] [S] [MS]
 trufluð/truflaður af öðru fólki.
13. Þau mynstur sem ég finn í list og náttúru vekja áhuga minn[MÓ] [Ó] [H] [S] [MS]
14. Sumt fólk telur mig vera sjálfelska(n) og eigingjarna(n).[MÓ] [Ó] [H] [S] [MS]
15. Ég lendi oft í aðstæðum sem ég er ekki fyllilega undirbúin(n) fyrir..[MÓ] [Ó] [H] [S] [MS]
16. Ég er sjaldan einmana eða niðurdregin(n).[MÓ] [Ó] [H] [S] [MS]
17. Ég nýt þess virkilega að tala við fólk.....[MÓ] [Ó] [H] [S] [MS]
18. Ég tel að það rugli og afvegaleiði nemendur að hlusta á[MÓ] [Ó] [H] [S] [MS]
 umdeilda fyrirlesara.
19. Ef einhver byrjar rifrildi er ég alltaf til í að rífast á móti.[MÓ] [Ó] [H] [S] [MS]
20. Ég reyni að inna samviskusamlega af hendi þau verkefni sem mér[MÓ] [Ó] [H] [S] [MS]
 eru fengin.
21. Ég er oft spenn(ur) og taugaóstyrk(ur).[MÓ] [Ó] [H] [S] [MS]
22. Mér líkar að vera þar sem eitthvað er að gerast.[MÓ] [Ó] [H] [S] [MS]
23. Ljóð hafa lítil eða engin áhrif á mig.....[MÓ] [Ó] [H] [S] [MS]
24. Ég geri mér grein fyrir því að ég er betri en flest fólk.[MÓ] [Ó] [H] [S] [MS]
25. Ég á mér skýr markmið og vinn að því að ná þeim á skipulagðan hátt[MÓ] [Ó] [H] [S] [MS]
26. Mér finnst ég stundum einskis virði.....[MÓ] [Ó] [H] [S] [MS]
27. Ég forðast fjölmenni[MÓ] [Ó] [H] [S] [MS]
28. Ég ætti erfitt með að láta hugann reika án stjórna eða leiðbeininga[MÓ] [Ó] [H] [S] [MS]
29. Þegar ég hef verið móðguð/móðgaður reyni ég að fyrirgefa og gleyma því.[MÓ][Ó] [H] [S] [MS]
30. Ég eyði miklum tíma til einskis áður en ég sest niður við vinnu mína[MÓ] [Ó] [H] [S] [MS]
31. Ég er sjaldan óttaslegin(n) eða kvíðin(n).[MÓ] [Ó] [H] [S] [MS]
32. Mér líður oft eins og ég sé að springa úr orku.[MÓ] [Ó] [H] [S] [MS]
33. Ég tek sjaldan eftir þeim tilfinningum eða hugarástandi sem[MÓ] [Ó] [H] [S] [MS]
 mismunandi aðstæður leiða af sér.
34. Ég hef tilhneigingu til að trúa því besta um fólk.[MÓ] [Ó] [H] [S] [MS]

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- | | Mjög
ósammála | Ósam-
mála | Hlut-
laus | Sam-
málasammála | Mjög |
|--|------------------|---------------|---------------|---------------------|------|
| 35. Ég legg hart að mér til að ná settum markmiðum..... | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 36. Ég verð oft reið(ur) yfir því hvernig fólk kemur fram við mig..... | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 37. Ég er glaðvær og fjörmikil(l). | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 38. Ég missi stundum áhugann þegar fólk talar um mjög óhlutbundna,.....
fræðilega hluti. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 39. Sumir telja mig vera kalda(n) og útsmogna/útsmoginn. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 40. Þegar ég skuldbind mig til að gera eitthvað má treysta því að ég geri það.. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 41. Of oft þegar hlutirnir fara úrskeiðis, missi ég kjarkinn og langar
að gefast upp. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 42. Ég fæ ekki mikla ánægju út úr því að spjalla við fólk. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 43. Stundum þegar ég les ljóð eða virði fyrir mér listaverk setur
að mér hroll eða ég fyllist ánægju. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 44. Ég er þver og ákveðin(n) í skoðunum..... | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 45. Stundum er ég ekki eins áreiðanleg(ur) og traust(ur) eins og ég
ætti að vera. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 46. Ég er sjaldan döpur/dapur eða þunglynd(ur). | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 47. Ég lifi hratt. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 48. Ég hef lítinn áhuga á að velta fyrir mér uppruna alheimsins
eða mannlegu eðli. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 49. Ég reyni yfirleitt að vera hugulsöm/samur og tillitsöm/samur. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 50. Ég er afkastamikil manneskja sem kem hlutunum alltaf í verk. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 51. Mér finnst ég oft hjálparvana og vill láta einhverja aðra leysa úr
vanda mínum. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 52. Ég er mjög virk(ur). | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 53. Ég bý yfir mikilli fróðleiksfýsn..... | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 54. Ef mér líkar ekki við fólk, þá læt ég það vita af því. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 55. Ég virðist aldrei ná því að vera skipulögð/skipulagður. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 56. Stundum hef ég skammast mín svo mikið að mig hefur langað
til að jörðin gleypri mig. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 57. Ég myndi frekar fara mínar eigin leiðir en að vera leiðtogi annarra..... | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 58. Ég nýt þess oft að leika mér að kenningum og óhlutbundnum hugmyndum | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 59. Ef nauðsyn krefur þá er ég tilbúin(n) til að ráðskast með fólk til
að fá það sem ég vil. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| 60. Ég reyni alltaf að ná framúrskarandi árangri í öllu sem.....
ég tek mér fyrir hendur. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| A. Ég tel mig hafa svarað spurningunum á eins nákvæman og
hreinskilinn hátt og mér var unnt. | [MÓ] | [Ó] | [H] | [S] | [MS] |
| B. Hefur þú lokið við að svara <u>öllum</u> staðhæfingunum? | [Já] | [Nei] | | | |

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Appendix C

100% congruent

Rauður	blár	grænn	gulur
Gulur	blár	svartur	grænn
Grænn	rauður	bleikur	blár
Rauður	Blár	grænn	gulur
Bleikur	grænn	gulur	svartur
Gulur	blár	bleikur	grænn
Bleikur	grænn	gulur	rauður
Svartur	rauður	blár	grænn

MUSICAL EFFECT AND PERSONALITY

70% congruent

Rauður	gulur	grænn	gulur
Gulur	blár	blár	grænn
Bleikur	rauður	bleikur	blár
Gulur	Blár	rauður	gulur
Svartur	grænn	gulur	svartur
Gulur	blár	blár	grænn
Rauður	grænn	gulur	rauður
Svartur	rauður	grænn	grænn

MUSICAL EFFECT AND PERSONALITY

30% congruent

gulur	blár	blár	grænn
Svartur	gulur	svartur	gulur
Bleikur	gulur	bleikur	rauður
Blár	bleikur	grænn	rauður
Blár	svartur	gulur	blár
grænn	blár	grænn	blár
Rauður	grænn	gulur	bleikur
Blár	rauður	blár	svartur

MUSICAL EFFECT AND PERSONALITY

0% congruent

Gulur	grænn	blár	rauður
Grænn	svartur	blár	gulur
blár	bleikur	rauður	grænn
Gulur	grænn	blár	rauður
Svartur	gulur	grænn	bleikur
Grænn	bleikur	blár	gulur
Rauður	gulur	grænn	bleikur
Grænn	blár	rauður	svartur