

The Effect of Piped-in Music and Preferred Music on Focus in Adolescents with Type A and Type B Personalities

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In the wake of the COVID-19 pandemic, adolescents have reported increased difficulties with focus. These challenges coincide with heightened screen time and irregular sleep patterns. Prior research has explored the relationships between music, personality, and focus separately. However, no study has examined how personality type may moderate the impact of background music on attention. This is an issue worth examining because understanding the relationship between personality, music, and focus could help students or working adults improve task efficiency with a simple fix. This study investigates whether a correlation exists between music type (preferred or piped-in) and focus in high school students with Type A and Type B personalities. A quasi-experimental design was used to measure focus using the Digit Vigilance Test (DVT). Twenty-nine students aged 14–18 from a private high school were classified as either Type A or Type B through a modified MBTI survey. A modified version was used as a result of a lack of funds for the study. The survey derived similar questions to ensure they prompted participants to reveal certain traits that classify them as Type A or Type B. The modified survey was compared to the official MBTI test and tested on a few sample participants and yielded exact matches. The 16 personalities were able to fit into the A,B,C, D system: Type A (ENTJ, ESTJ, ENTP, ESTP) and Type B (ENFP, ESFP, ENFJ, ESFJ). Participants were divided into six groups based on personality type and music condition (no music, piped-in, or preferred). Focus was evaluated based on completion time and omission errors, and results were analyzed using t-tests and Chi-Square Tests of Independence. There was no statistically significant relationship between average DVT completion time and music type across personality groups. However, a significant positive correlation was found between omission errors and personality type when piped-in music was introduced, with Type B individuals showing improved focus and reduced errors. Type A participants exhibited greater variability and sensitivity to music stimuli. This study suggests that background music impacts focus differently based on personality. Type B individuals benefit from piped-in music, while Type A individuals may be more distractible. These findings support personalized auditory strategies for improving focus in educational settings.

Keywords: focus, adolescents, background music, personality types, Digit Vigilance Test, Type A, Type B, attention

Introduction

Personality shapes how individuals approach situations. According to the International Journal of Progressive Sciences and Technologie, it “refers to a person’s characteristic patterns of thought, emotion, and behavior, together with the psychological mechanisms—hidden or not—behind these patterns”¹. While characteristics vary widely, people draw on certain cognitive behaviors and strategies in daily life². These sets of behaviors are called personality types.

Personality Types

Type A

A University of California, Berkley, and University of

Madison, Wisconsin study utilized a taxometric approach derived from Meehl and Golden to conclude that “most people tend to have either Type A or Type B personality, with relatively few people in between”³. Although most people tend to fall into one of those two personality types, the categories behave quite differently from one another. Type A individuals are described as “[...] intense striving for achievement, competitiveness, aggressiveness, pressures for vocational activity, excessive sense of time urgency, impatience and restlessness”. While Type A personalities are more driven towards accomplishment, they are prone to coronary heart disease as a result of a default higher level of stress². Another study’s conclusions agree with the load of stress in Type A individuals. It proves that most medical students are individuals with Type A personality⁴. Additionally, the stigma that medical students tend to be workaholics directly aligns with the fact

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that in Sharma and Jain's study, workaholic was found to be a leading behavioral trait in individuals classified as Type A personality⁵.

Type B

Type B personality is very polar to Type A. A study done by the American College of Greece Athens studied the characteristics of individuals with Type B personality. They found that "Type B individuals are characterized by a stress-free way of operating. They are patient, relaxed, easy going, and usually do not have conflict with co-workers. They maintain a stable personality and are almost always even tempered. Finally, they are able to adjust easily to new environments"⁶. With the findings of these several studies, it can be concluded that Type A and Type B behave very differently from one another and utilize different approaches to situations. However, all teens of all personality types experienced a shift in focus when the COVID-19 pandemic shut down many social interactions and activities in 2020, leading to excess boredom and screen time. This raises the central research question: Is there a correlation between preferred music and piped-in music with focus in high schoolers with Type A and Type B personalities? This is a crucial topic to explore, as focus impacts nearly every aspect of people's lives. For high school students, focus is essential for learning effectively and earning strong grades for college applications. For adults, it is key to maximizing productivity, advancing careers, and providing for themselves and their families. In both cases, sustained focus is critical to success.

Importance of Focus

Impact of Technology and Sleep

A correlational study from the Journal of Coastal Life Medicine indicates that "due to the e-learning method, most students are simultaneously greatly addicted to social media like WhatsApp, Facebook, etc."⁷. These social media addictions are difficult to break as teenagers are addicted to the dopamine high that comes with doom scrolling on social media platforms such as Instagram or TikTok. The pandemic ultimately aided teenagers in building detrimental addictions. Furthermore, the online learning method seriously affected their concentration. Post-pandemic, there were significant changes in children in terms of their attention span and writing skills, which have both taken a toll.

Music and Focus

Effects of Music Intensity and Tempo

Scientists have recognized the widely prevalent issue and began researching ways to combat the problem. A 2010 quasi-experimental study tested college students' performance on

tasks with different types of music playing. Types of music referring to difference in genre, tempo, and lyrics. It was concluded that "... music with a higher intensity is more distracting and has a greater effect on task performance and concentration"⁸.

Music Preferences and Personality

Knowing that music can significantly affect one's focus is extremely important in educating teens, as well as adults, on how to combat their struggle with focus. The current generation of teenagers places a strong emphasis on music dependency. On average, teenagers spend 2.45 hours each day listening to music⁹. Some of this time, in fact most of this time, including when they sit to do schoolwork. Teens would rather listen to music they like instead of music that may help them focus better when doing homework¹⁰. Knowles introduces a new aspect of music, the fact that one's personality guides preference: "Research has determined that with certain music, there are collective traits the person is more disposed too. Therefore, there is a definite relationship between one's music preference and personality"¹⁰. As teens are more likely to play preferred music in the background while performing focus demanding tasks, it would be in their best interest that focus would increase as a result of listening to preferred music. Kiss and Linell's study corroborates with Knowles and states: "findings show for the first time that preferred background music can enhance task-focused attentional states on a low-demanding sustained-attention task and are compatible with arousal mediating the relationship between background music and task-performance"¹¹. While preferred music has been confirmed to positively affect focus, slower music tempos have not. Chou's results also found that "...reading rate and efficiency was significantly reduced in the slow tempo music group as compared to the fast music group"⁸. A 2009 pilot study conducted by researchers at Fu Jen Catholic University challenged these claims by showing that piped-in music—commonly used in hotel lobbies, elevators, and restaurants to create a calm, slow-tempo atmosphere—actually improved attention. Participants scored significantly higher on Chu's Attention Test when exposed to piped-in music¹².

Addressing the Gap

Knowing that personality directly affects an individual's preference in music solidifies the fact that people with different personality types will perform differently with different types of music playing in the background. A study from the Bulletin of the Council for Research in Music Education reinforces the ideas from the Kiss and Linell study that preferred music is proven to facilitate focus¹³. Additionally, Shih and colleagues' study proves that piped-in music also helps facilitate

focus, which strengthens the correlation between music and focus. Continuing, Knowles' study proves that an individual's personality influences their preference in music. Even with all these scholarly studies, it has not been researched whether there is a correlation between preferred music and piped-in music on focus in Type A and B personalities. The variable of personality has never been brought into the equation of focus. Raj and Vijayakumar's study illustrates how this issue of lack of focus has spiked since the COVID-19 pandemic and is difficult to counteract. A quasi-experimental study using analysis to find relationships between variables is most suitable for this topic as there are other factors that influence and facilitate focus. For example, whether the participant had caffeine before the study, mood, or how many hours of sleep they got the night before.

Measuring Focus: The Digit Vigilance Test

Evidently, focus has been a growing issue which will eventually lead to a regressing society if not combated soon. Ronald Lewis, PhD developed a test composed of cognitive, perceptual, and motor tasks designed to be sensitive to focus, the Digit Vigilance Test. Through his research he categorizes focus into three parts: alertness, selectivity, and processing capacity. In his development of the DVT, alertness was targeted as it involves vigilance during boring, repetitive tasks and the DVT is in fact a boring repetitive task. The DVT places minimal demands on the selectivity and capacity components of focus (PAR Inc. User's Guide, 1996). Through testing of the DVT Lewis found that the DVT was insensitive to repeated administrations accruing from multiple trials. They also found high test reliability when comparing the one-page version to the two page version ($p = .001$).

Methods

Study Goal and Justification

This study aimed to determine whether a correlation exists between focus, music genres, and personality types among adolescents aged 14-18. To make results as representative as possible, only Type A and Type B personality were examined as justified by Robins et al., 1998 in the literature review. Two types of music were tested: piped-in music and preferred music. Research by Adriano & DiPaola (2010) indicated that listening to music while completing school assignments is a common practice among adolescents. Additional studies (Knowles, Kiss & Linell, and Darrow) further support the prevalence of this behavior, with listening to music becoming a routine for most adolescents. The selection of piped-in music was based on findings from Shih et al., which demonstrated its effectiveness in improving performance on Chu's

Attention Test more than any other music genre. The focused demographic was justified by research from Raj & Vilkamar and Gillick & Magoulias, which highlighted increased difficulties in focus among students in this age range following the COVID-19 pandemic^{7,14}. The study was conducted at a private school as Mingle et al. found that private school students tend to experience higher levels of social media and screen time addiction, which can contribute to focus-related issues¹⁵.

Study Design

While prior studies have examined the relationship between personality and music choice¹⁰ and the effects of music on focus⁸, this study addressed the gap in research on the interaction between personality and music in influencing focus. Given the limited existing research, no existing datasets adequately addressed the research question, necessitating primary data collection, necessitating an experimental design. This approach allowed for the collection of primary data, which was analyzed using a Chi-Square to identify patterns without inferring causality, ultimately providing an aligned answer to the research question. Potential external factors such as rushing through tasks, preoccupied thoughts, lack of sleep, and caffeine consumption were acknowledged and therefore the study cannot prove causation, only correlation. The study employed descriptive and inferential statistics, including Chi-Square of Independence tests and t-tests, to interpret results.

Participant Selection

Because the study involved human participants IRB approval was required and obtained. Participants had to meet the following criteria: enrollment in high school, age between 14-18 years, classification as Type A or Type B personality, enrolled in the specific private school. Recruitment was conducted via email, ensuring broad accessibility since all students at the private school were assigned a school-affiliated email address. 520 students were contacted, 94 responded, and 29 remained through the study. Rather than sending individual emails, the recruitment message was distributed to the entire student body by utilizing the grade-specific email groups, which automatically included all students within each respective high school grade. Emails were sent out multiple times in an effort to gain as many participants as possible.

A Microsoft Forms survey, familiar to students due to the school's requirement for Microsoft Surface Pro devices, was used to collect demographic information, including age and grade level. First and last name were required to keep participants organized and facilitate follow-up communication if they were approved to proceed to the next step, which was taking the personality survey. The survey also obtained informed consent from both participants and their parent/guardian. Po-

tential participants were informed about the goal of this study, what they would be entailed to do, confidentiality of this study, as well as the right to withdraw at any time. Approved participants advanced to the personality assessment phase. See Appendix C for the Microsoft participation form which also includes the consent form. Per confidentiality guidelines all information regarding identifying details, including researcher names, school information, and personal contact information, has been redacted from the consent form.

Personality Assessment

A modified version of the Myers-Briggs Type Indicator (MBTI) was administered via Google Forms to classify participants into five personality types: A, B, C, D, and X; See Appendix D. The MBTI, widely used in professional settings, assesses personality based on responses to situational questions. The Myers-Briggs Type Indicator (MBTI) utilizes a series of self-report questions designed to uncover consistent behavioral tendencies and cognitive preferences. Although the MBTI categorizes individuals into sixteen personality types rather than the binary Type A/Type B framework, the underlying process is similar: responses are analyzed to reveal stable traits that shape how a person approaches tasks, stress, and decision-making. In this way, MBTI results can highlight characteristics—such as competitiveness, urgency, or calmness—that align with qualities traditionally associated with Type A or Type B personalities. The survey derived similar questions to ensure they prompted participants to reveal certain traits that classify them as Type A or Type B. The modified survey was compared to the official MBTI test and tested on a few sample participants and yielded exact matches. The 16 personalities were able to fit into the A,B,C, D system: Type A (ENTJ, ESTJ, ENTP, ESTP) and Type B (ENFP, ESFP, ENFJ, ESFJ). The test consisted of 20 multiple-choice questions. Participants were classified based on majority responses, with ties resulting in a Type X designation. Only Type A and Type B participants were approved for the study, as previous research³ and a pilot test at the study site confirmed that the majority of the population falls within these two categories.

Group Formation

Participants were divided into two primary groups based on personality type: Type A and Type B. Within each group, participants were randomly assigned to one of three subgroups to ensure validity: a control group (no music), a piped-in music group, and a preferred music group. The groups were labeled as follows:

- Type A: AC (control), AE1 (piped-in music), AE2 (preferred music)

- Type B: BC (control), BE1 (piped-in music), BE2 (preferred music)

The groups were assigned categorical variables because the independent variables were Type A and B as well as no music, preferential music, or piped in. Since these variables are not quantitative but categorical, a Chi Square Test for Independence was run to account for the multiple variables and the outcome of time in one instance and errors in another. A T test was also performed but only arrived at a significant difference between control compared to preferred music with the preferred music being quicker for the Type B group.

All participants completed the Digit Vigilance Test (DVT), with control groups taking the test in silence, AE1 and BE1 listening to piped-in music, and AE2 and BE2 listening to preferred music.

Administration of the DVT Test

The DVT test was bought from PAR Inc. and included copies of the test, a user's guide, and scoring keys- See Appendix E. The information in the literature review was derived from PAR Inc.'s user's guide.

Administration of the DVT can be accomplished by individuals who have no formal training or professional qualifications. However, to purchase the DVT from PAR Inc. one must be a certified member of one of the six psychological associations of America listed in Appendix A. The DVT was purchased for this study by an eligible school counselor.

In the DVT a sheet of hundreds of digits 1-9 are scrambled on two sheets of paper. Participants are given specific instructions, found in the user's guide, to complete the test. They are asked to cross out only the 9s on the sheets. Alternate administration of crossing out 6s is also valid but not used in this study as the administration instructions stated to select only one digit to cross out. See Appendix B for student samples. The DVT is scored with total time (measured in seconds) and errors. If one takes more than 400s to complete page 1 they are asked not to complete page 2. The DVT should take less than 10 minutes. Errors of omission (6s or 9s that are not crossed out) and commission (numbers other than 6 or 9 crossed out) are combined for total errors. The original form of admission (9s) was used for this study. Increased time indicates slow processing speed, but more important to this study, omission indicates a lapse in attention.

To maintain anonymity but stay organized, participants were assigned unique codes. Participants met in a designated classroom during a free period in the school day to complete the test simultaneously, ensuring consistency. Three periods were needed to conduct the DVT tests with all groups. One period for AC and BC, one period for AE1 and BE1, and one period for AE2 and BE2. A fourth period was conducted to give participants who did not show the first time an opportunity to

participate and collect as much data as possible. The DVT test was administered in paper format. This is because the participants' computers were attached to the school organization which prohibited the downloading of the software needed to take the C-DVT (computerized DVT). According to a study done by Newcastle University on cognitive tests, the DVT test yields results just as valid and reliable as results from the C-DVT¹⁶. The DVT was administered once per group; multiple trials were not needed as the DVT is "relatively insensitive to the effects of repeated administrations and practice" (PAR Inc.). The test was conducted in a quiet, distraction-free environment. Participants provided their own headphones, following Darrow et al.'s protocol, and for those in the preferred music group, a 20-minute playlist they brought with them. A Deci-meter was used to ensure the quality/volume of the music was standardized. Piped-in music was delivered via a standardized YouTube playlist accessed through a QR code created online via Online QR Code Generator.

Participants received standardized instructions and a practice trial before beginning. They were instructed to complete the test as quickly and accurately as possible, marking only the number 9. They were told to raise their hand once finished with page 1 and do the same when finished with page 2. Completion time was recorded as a stopwatch was running for the whole of the experiment, and participants exceeding the seven-minute threshold per page were instructed to stop (as per PAR guidelines). Time was recorded using a stop watch and an additional volunteer to stop the stopwatch accurately. The timer was blinded to the group.

Data Collection and Analysis

The DVT scoring process followed the PAR guidelines. Recorded metrics included:

- Time taken to complete each page and total time
- Number of correct markings on each page and combined on both pages
- Number of commissions (incorrect markings) on each page and combined on both pages
- Number of omissions (missed targets) on each page and combined on both pages

Results

Descriptive Statistics

Participant Outcomes

In this study a total of 94 participants responded to the initial survey, and 60 completed the personality survey. Of the 60 that completed the personality survey, 39 were classified as

Type A or B, and 23 as Type C, D, or X. After accounting for dropouts, 29 participants remained: three in grade 9, two in grade 10, 17 in grade 11, and seven in grade 12 (10 males, 19 females). Participants were distributed across the six groups as follows:

- AC ($n = 3$)
- AE1 ($n = 4$)
- AE2 ($n = 4$)
- BC ($n = 7$)
- BE1 ($n = 5$)
- BE2 ($n = 6$)

For each group, the average time and standard deviation (SD) to complete the DVT were recorded. The raw data from this study can be found in Appendix F. Both average and standard deviation are considered measures of descriptive statistics.

DVT Completion Time (avg)

As displayed in Table C, using each participant's time in their respective groups, an average time to complete the DVT test was calculated for each of the six groups. As displayed in Chart A, a standard t-test was also conducted to determine the statistical significance of these times.

On average, group AC took 325.33 seconds to complete the DVT. This measure had a standard deviation (SD) of 23.97. Group AE1 took 295.75 seconds (SD = 75.91), and group AE2 took 305.50 seconds (SD = 31.84).

Among the B groups, group BC had an average completion time of 338.57 seconds (SD = 52.29), group BE1 took 330.80 seconds (SD = 33.18), and group BE2 took 302.17 seconds (SD = 35.10).

Although the Type A groups showed less average time to complete the DVT on two out of three of the groups, all six groups still fell within the appropriate time range provided by PAR Inc. (340 seconds SD=70), which is a preliminary indicator pointing to appropriate conduction of the DVT tests.

DVT Omissions

Using the same process, an average number of omissions per group was calculated and a t-test was done. See Table D for the average number of omissions per group and Chart B for the t-test on those averages.

Omission errors also varied across groups. On average, group AC made 7.33 omissions (SD = 5.51), group AE1 made 23.00 omissions (SD = 18.02), and group AE2 made 20.25 omissions (SD = 12.33).

Among the B groups, group BC had 11.23 omissions (SD = 9.03), group BE1 had 10.20 omissions (SD = 6.10), and group BE2 had 7.67 omissions (SD = 4.97).

Time							
Type A		Type B					
Group	AC	AE1	AE2	BC	BE1	BE2	
	311	304	286	403		331	294
	312	400	278	263		316	274
	353	236	309	383		311	270
		243	349	406		388	314
				344		308	366
				325			295
				316			
average	325.33333333	295.75	305.5	348.5714286		330.8	302.1666667
stdev	23.96525262	75.91387664	31.83813227	52.29039792		33.17679912	35.10223165
ttest	0.253563482	0.412160603	0.195187254	0.244323566		0.099599971	0.042565889

Table C: Average DVT Completion Time

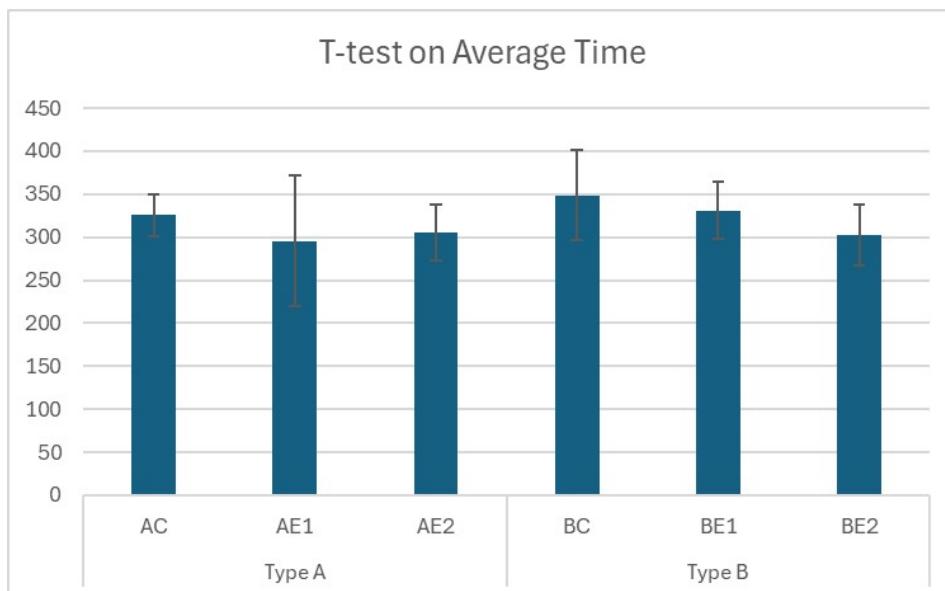


Chart A: T-test on Average DVT Completion Time

Omissions							
Type A		Type B					
AC	AE1	AE1	BC	BE1	BE2		
13	7	9	3		5		
7	9	24	15		6		
2	44	36	5		20		
	32	12	2		12		
			27		8		
			17				
			10				
7.3333333333	23	20.25	11.28571429		10.2		9
5.507570547	18.018509	12.33896268	9.031690239		6.091802273		4
0.090984367	0.405311447	0.06526792	0.404399783		0.239017825		0

Table D: Average Number of Omissions

Results indicate that the Type A groups had a significantly higher number of omissions than the Type B groups. However, this trend is contrasted with the previous data point where Type A groups had a lesser average time. Referring to the literature review, the data referencing the Type A groups' low

completion time indicates good proficiency, but the number of omissions contradicts this observation as a higher number of average omissions indicates a lapse in focus. Descriptive statistics suggest a pattern that requires further testing, a trend of the Type B groups having better focus is displayed.

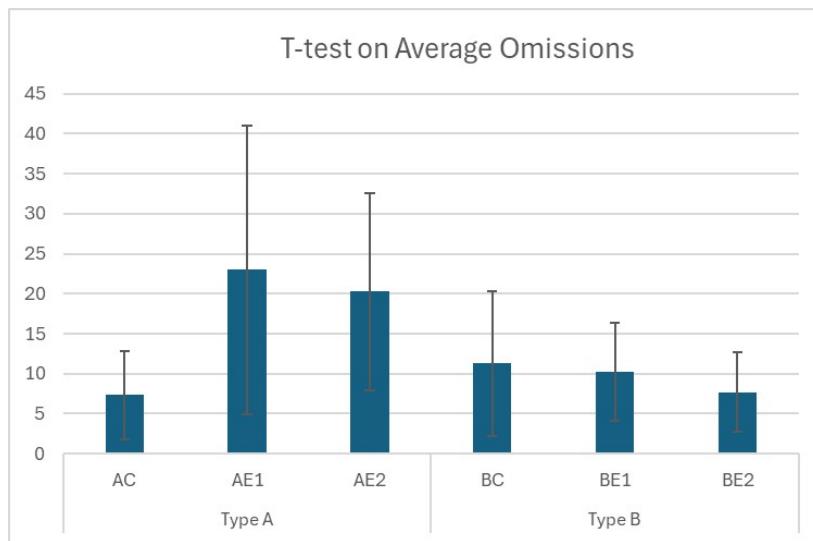


Chart B: T-test on Average Number of Omissions

Inferential Statistics

Using the averages of total omissions and time to complete the DVT for each of the 6 groups described above and displayed in Tables C and D, a Chi-Square of Independence test was conducted. This test was used to evaluate the relationship between the variables as Spearman's or Pearson's correlation would not be suitable because the independent variable (music type) was qualitative. Standard t-tests were also performed to analyze the 3 central hypotheses: 1. Adolescents exhibit greater focus when listening to their preferred music compared to piped-in music. 2. Type B individuals experience greater focus with piped-in music than compared to Type A. 3. Type B individuals may show less variation in focus across music conditions due to a generally more relaxed disposition.

The Chi Square Test of Independence performed exploring the relationship between average time, personality and music type, showed no statistically significant difference and therefore the null hypothesis (1) failed to be rejected (See Table A).

However, the Chi Square Test for Independence performed analyzing the total omissions that resulted between personality type and music listened to did demonstrate statistical significance. Therefore, the null hypothesis (2 and 3) was rejected. There was a correlation between music and personality type with respect to focus ($p < 0.05$) (See Table B).

Discussion

Hypotheses

Hypothesis 1

Hypothesis 1 proposed that adolescents would exhibit greater focus when listening to preferred music compared to piped-in music, considering both Type A and Type B personality types. A Chi-Square Test of Independence (Table A) was conducted to assess the relationship between music type (preferred vs. piped-in) and focus levels across these personality types using the average times.

The analysis revealed a non-significant association ($p > 0.05$). There was insufficient evidence to reject the null hypothesis. This indicates that, within the scope of this study, there was no statistically significant relationship between the type of music listened to and focus levels, regardless of whether participants were classified as Type A or Type B. In other words, the findings suggest that neither preferred music nor piped-in music significantly influenced focus in this adolescent sample, irrespective of personality type which contradicts the results from Kiss & Linell's 2020 study¹¹. It is possible that with a larger sample, results would have supported Kiss & Linell's study. Kiss & Linell's study could have had a different sample, whether it be with age or culture.

Hypothesis 2

Hypothesis 2 posited that Type B individuals would exhibit greater focus with piped-in music than Type A individuals would experience as Type As are more sensitive to external stimuli. To investigate this, a second Chi-Square Test of Independence was performed, analyzing the average number of omissions between the piped-in groups: AE1 and BE1.

The analysis revealed a statistically significant effect ($p < 0.05$), indicating that the BE1 group's focus was positively influenced by piped-in music. Consequently, the null hypothesis was rejected. Corroborating Shih et al.'s study and contradict-

Time	Control	Expected	Piped In	Preferred	Totals		o-e	(o-e)^2	(o-e)^2/e
Type A	325.33	327.24	295.75	304.25	305.5	295.08	926.58	Control A	-1.91
Type B	348.57	346.66	330.8	322.3	302.17	312.59	981.54	Piped in A	-8.5
Totals	673.9		626.55		607.67		1908.12	Preferred A	10.42
								Control B	1.91
								Piped in B	8.5
								Preferred B	-10.42
									X^2
									degrees of freedom
									(3-1)*(2-1)
								df	2

Table A

Omissions	Control	Expected	Piped In	Preferred	Totals		o-e	(o-e)^2	(o-e)^2/e
Type A	7.33333	11.81	23	21.06	20.25	17.71	50.5833	Control A	-4.4766667
Type B	11.29	6.81	10.2	12.14	7.67	10.21	29.16	Piped in A	1.94
Totals	18.6233		33.2		27.92		79.7433	Preferred A	2.54
								Control B	4.48
								Piped in B	-1.94
								Preferred B	-2.54
									X^2
									degrees of freedom
									(3-1)*(2-1)
								df	2

Table B

ing Chou's study, this significant finding suggests that, similarly to the initial prediction, Type B individuals demonstrated improved focus in the presence of piped-in music. This result provides evidence supporting hypothesis 2 indirectly as BE1 having increased focus compared to AE1 suggests that Type A individuals do have an increased sensitivity to piped-in music.

Hypothesis 3

Lastly, hypothesis 3 proposed that Type B individuals would exhibit less variability in focus across different musical conditions, reflecting a generally more relaxed disposition. While statistical significance was observed solely within the BE1 group, partial support for this hypothesis can be inferred. Specifically, none of the Type A groups demonstrated a significant effect of either music genre on focus levels. This absence of significant variation in the Type A groups, juxtaposed with the significant finding in the BE1 group, suggests a potential trend wherein Type B individuals may display a more stable focus response across varying auditory stimuli.

Overall, only one statistically significant result was observed: Type B individuals' focus is influenced positively by piped-in music indicating a correlation between focus and

piped-in music in adolescents with Type B personality. Type B personalities tend to have a more stable focus across all music genres.

Limitations & Delimitations

Limitations

The biggest limitation to this study was the sample size. The population being tested was around 500 students, however only 29 participated until the end. Having a small sample size makes it difficult to find statistically significant results that can be applied to the general population of all teenagers. Because of the small sample size it is probable that more variability and Type II error is present, leading to a study with a lower power. Additionally, the variable sleep introduces a confounding factor that can affect results. "Their sleep patterns have also gone for a toss, leading to irritability."⁷. This study introduces another variable that only contributed to the issue of focus: sleep. It is known that sleep and focus are correlated very strongly, and the irregular sleep patterns are only hurting teens more. Raj and Vijayakumar's study places significance on a huge issue affecting teens around the world

in their struggle to focus since the pandemic. Furthermore, another limitation in this study was that the personality tests were self-reported data, which could hold self-reported bias. As personality is not a factor that can be measured as right or wrong, the classification of personalities relies solely on the participant answering the questions honestly. This is a limitation because many people are not accurate in how they describe themselves due to either cognitive dissonance, or fear of judgement. An additional limitation similar to this is the assumption that all participants put their maximum effort into the DVT test. If participants were not exerting their best efforts, it is another factor that could lead to skewed results. The participant drop out that occurred in this study was also a big limitation. There was a significant drop out rate, which as stated earlier in this paragraph makes it difficult for the results to be generalized. While piped-in music was controlled for the AE1 and BE1 groups the preferred music was not controlled for the AE2 and BE2 groups, which introduces the factor of music variability. Because of ethical considerations and lack of participants, those with attention deficit disorders were not excluded from this study possibly skewing results. Lastly, because the study was conducted at one school, results are not significant enough to make conclusions involving the whole population.

Delimitations

While delimitations are controlled, they still place limits on research. In this study only Type A and B personalities were studied excluding a smaller population of Type C,D, and X. The ages of participants in this study were strictly 14-18, as the study wanted to examine the cohort of teenagers that were affected by the pandemic. Only two music types were selected, making the results of this study not applicable to any other genres.

Direction for Future Research

Those in the AE2 and BE2 groups were asked what music genre they were listening to during the experiment. The genres that appeared and the number of times they appeared are displayed in Appendix G. This could be a good area for future research to further develop the relationship between personality and music preference. Including qualitative interviews to deepen understanding of music preferences could be included in a future study. Although Knowles' study examined this relationship, specific genres were not associated with specific personality. This could potentially pave the way to establish a new understanding of this topic. Moreover, participants completed the DVT with many different color pens. It could be investigated whether one's mood correlates with the color of pen. For example, if they are sad and bring a blue pen. Gender effects were not examined in this study although the topic provides areas for future research. Lastly, the study should

be replicated with a validated personality test with built in validity scales, a much larger population, including a larger age range, and the exclusion of attention deficit disorders as this could yield different and more significant results. If this study had a bigger sample, there might have been a significant result with Type A personality. This research is very important in both educational and professional fields. Not only have teenagers seen a decrease in focus but so have adults. Further examining the relationships between personality, music, and focus offers a non-clinical solution that would offer a huge benefit to productivity. Additionally, for children who struggle with attention, this is a relatively easy and harmless intervention for parents to integrate into daily homework routines to avoid mind wandering and frustration. Outside of parenting, this is also an intervention that could be utilized in the classroom setting, or even simpler, high school and college students can use the music found to be the most beneficial for them to study and increase their performance on their exams. Moving on to exploring larger scale implications, if students better understand themselves and are able to develop better study habits, they may feel more confident in pursuing more difficult degrees, such as doctorates, which have been declining in recent years.

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Appendix A

1. American Board of Professional Psychology (ABPP)
2. American Counseling Association (ACA)
3. American Mental Health Counselors Association (AMHCA)
4. American Occupational Therapy Association (AOTA)
5. American Psychological Association (APA)
6. American Psychological Society (APS)
7. American Speech Language Hearing Association (ASHA)
8. International Neuropsychological Society (INS)
9. National Academy of Neuropsychology (NAN)
10. National Association of School Psychologists (NASP)
11. National Register of Health Service Providers in Psychology (NR)

Appendix B

DVT
TEST BOOKLET

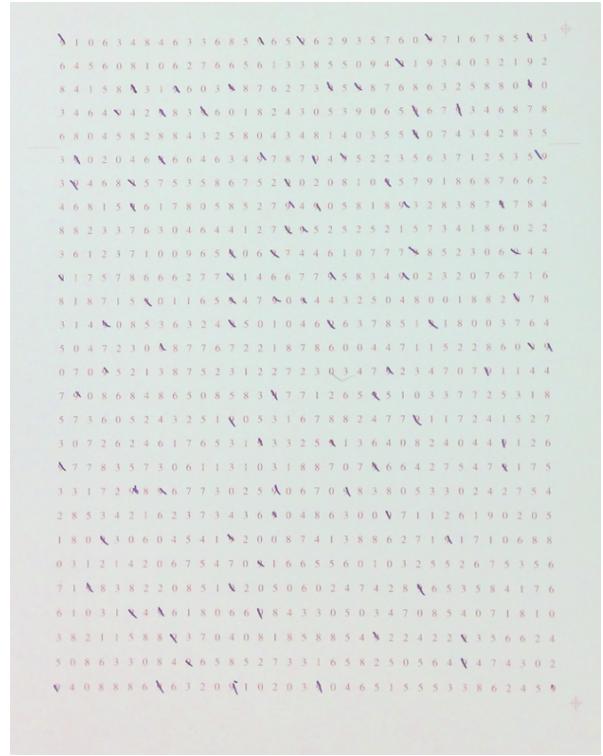
Name _____ Date _____ Age _____ Sex _____
Education _____ Occupation _____ Handedness _____

SAMPLE

8 9 3 6 1 8 1 5 0 6 8 3 9 5 1 1 3 8 8 9 4 3 4 6 9 2 4 7 6 8 2 7 8 1 0
2 6 3 4 0 5 9 6 0 9 3 4 8 3 7 1 1 9 5 8 0 4 2 7 1 3 5 1 4 4 6 3 7 9 9

SCORING AREA

	Raw score	Scaled score	T score	%ile
Page 1 (red) Time				
Page 2 (blue) Time				
Total Time				
Page 1 (red) omission errors				
commission errors				
total errors				
Page 2 (blue) omission errors				
commission errors				
total errors				
Total Errors				
Source of normative data				
Form used (circle one)	6 or 9			



Appendix C

AP Research Participation Survey

Hi everyone, my name is [REDACTED] and I am a participant in the AP Research course. I would greatly appreciate it if you would participate in my research. I will be studying if there is a correlation between piping in and preferred music in high schoolers with Type A and Type B personalities. By participating in this study you will dedicate one free time to complete a very easy task, which will take less than 20 minutes.

How [REDACTED] When you submit this form, the owner will see your name and email address.

* Required

1. AP Research Consent Form Study Title: The Correlation Between Focus, Music Genre, and Personality Types in Adolescents Aged 14-18. Researcher: [REDACTED] Institution: [REDACTED] School, AP Research Program. Contact Information: [REDACTED] Faculty Advisor: [REDACTED] & [REDACTED]

Purpose of the study: This research study seeks to examine whether there is a relationship between focus, music genre, and personality types (Type A or Type B) in adolescents aged 14-18. The goal is to provide insights that may support strategies for academic and professional productivity.

Study Procedures: If you agree to participate you will be asked to: Complete a brief survey that categorizes you as a Type A or Type B personality. Focus Task with Music: Engage in a timed focus task with various background music genres, both of your choice and other assigned genres. This study will take no more than 50 minutes separated over 3 flex times or after/before school.

Participation Requirements: Participants must be between 14-18 years old and enrolled in high school and have no hearing difficulties or learning disabilities. Risks: There is no physical risk involved in participation. Some participants may experience brief distraction when completing tasks with background music. You may discontinue at any time without penalty. Benefits: While there may be no direct benefit, this study's findings could inform strategies to improve focus, productivity, and time management in educational and professional fields.

Confidentiality and Data Protection: All information collected will be confidential and anonymous. Responses will be stored securely, accessible only by the researcher and faculty advisor, and used exclusively for this research project. Identifying information will not appear in any reports or publications. Data will be securely stored and disposed of in accordance with AP Research standards and College Board guidelines.

Voluntary Participation and Withdrawal: Participation in this study is entirely voluntary. You may decline to participate or withdraw from the study at any point without any consequences. You may also skip any questions you do not wish to answer. Consent and Agreement (you must have a parent sign as well if you are under 18 years old): By signing below, you acknowledge that: You have read and understood the information provided. You are voluntarily agreeing to participate. You are aware that you may discontinue participation at any time.

Researcher Contact Information: If you have any questions regarding this study, please contact: Eleni Mekras. Email: [REDACTED] Corp. Phone Number: [REDACTED]

Check "yes" if you AND your guardian give consent.

Yes

Personality Test

Questions Responses 20 Settings

What is your name and grade? *

Short answer text

1. How do you handle deadlines?

A) I work intensely and finish early.

B) I pace myself and don't stress too much.

C) I organize carefully and complete tasks methodically.

D) I feel anxious and worry about finishing on time.

2. When working in a group, what role do you typically take?

Personality Test

Questions Responses 20 Settings

2. When working in a group, what role do you typically take?

A) Leader—I'm quick to take charge.

B) Team player—I go with the flow.

C) Planner—I ensure everything is organized.

D) Supporter—I prefer to work in the background.

3. How do you feel about competition?

A) I thrive on it and aim to win.

B) I enjoy it but don't get overly invested.

C) I prefer cooperation over competition.

D) I feel stressed or overwhelmed by competition.

aner/parent school.

Participation Requirements: Participants must be between 14-18 years old and enrolled in high school and have no hearing difficulties or learning disabilities. Risks: There is no physical risk involved in participation. Some participants may experience brief distraction when completing tasks with background music. You may discontinue at any time without penalty. Benefits: While there may be no direct benefit, this study's findings could inform strategies to improve focus, productivity, and time management in educational and professional fields.

Confidentiality and Data Protection: All information collected will be confidential and anonymous. Responses will be stored securely, accessible only by the researcher and faculty advisor, and used exclusively for this research project. Identifying information will not appear in any reports or publications. Data will be securely stored and disposed of in accordance with AP Research standards and College Board guidelines.

Voluntary Participation and Withdrawal: Participation in this study is entirely voluntary. You may decline to participate or withdraw from the study at any point without any consequences. You may also skip any questions you do not wish to answer. Consent and Agreement (you must have a parent sign as well if you are under 18 years old): By signing below, you acknowledge that: You have read and understood the information provided. You are voluntarily agreeing to participate. You are aware that you may discontinue participation at any time.

Researcher Contact Information: If you have any questions regarding this study, please contact: Eleni Mekras. Email: [REDACTED] Corp. Phone Number: [REDACTED]

Check "yes" if you AND your guardian give consent.

Yes

2. What is your first and last name and grade? *

Enter your answer

3. Are you in the age range of 14-18 years old? *

Yes

No

Send me an email receipt of my responses

Submit

Microsoft 365

This content is created by the owner of the form. The data you submit will be sent to the form owner. Microsoft is not responsible for the privacy or security practices of its customers, including those of the form owner. Never give out your password.

Microsoft Forms | AI-powered surveys, quizzes and polls | [Create my own form](#)

Privacy and cookies | Terms of use

Personality Test

Questions Responses 20 Settings

4. How do you handle stressful situations?

A) I push through and take control.

B) I stay calm and don't let it bother me much.

C) I analyze the situation and solve problems systematically.

D) I feel tense and anxious, often overthinking it.

5. What's your approach to free time or relaxation? *

A) I stay productive, even during downtime.

B) I relax and enjoy it, no pressure.

C) I schedule and plan how to spend it efficiently.

D) I feel restless or uneasy when I have too much free time.

Appendix D

Personality Test

Questions Responses 20 Settings

Personality Test

Here's a 20-question personality test designed to help individuals identify their personality type based on Types A, B, C, and D.

Personality Type Test: Which Are You—A, B, C, or D?

Instructions:

For each question, select the response that best describes how you **usually** behave or feel. At the end of the quiz, tally your responses to see which type you align with most.

*DISCLAIMER: Answer truthfully and authentically. THERE ARE NO WRONG ANSWERS: Ignore any answer patterns. Choose only one answer.

Email *

Valid email

This form is collecting emails. [Change settings](#)

Personality Test

Questions Responses 20 Settings

6. How would your coworkers describe your work ethic? *

A) Driven and results-focused.

B) laid-back but effective.

C) detail-oriented and precise.

D) Cautious and conscientious.

7. How do you react when things don't go as planned? *

A) I get frustrated and try to fix things quickly.

B) I don't let it bother me too much.

C) I review what went wrong and find solutions.

D) I feel anxious and fear things will worsen.

Personality Test All changes saved in Drive

Published Responses 0 Settings

Questions Responses Responses 0 Settings

8. When making decisions, what's your typical approach? *

A) Quick and decisive.
 B) I go with what feels right in the moment.
 C) I analyze all options before choosing.
 D) I worry about making the wrong choice.

9. How do you react to criticism? *

A) I get defensive but use it to improve.
 B) I take it in stride and move on.
 C) I reflect on it deeply to better myself.
 D) I feel upset and dwell on it.

10. What motivates you? *

Personality Test All changes saved in Drive

Published Responses 0 Settings

Questions Responses Responses 0 Settings

16. How would you describe your communication style? *

A) Direct and assertive.
 B) Friendly and laid-back.
 C) Clear and methodical.
 D) Reserved or hesitant.

17. What's your ideal work environment? *

A) Fast-paced, competitive, and challenging.
 B) Relaxed and flexible.
 C) Structured and organized.
 D) Calm, with minimal pressure.

Personality Test All changes saved in Drive

Published Responses 0 Settings

Questions Responses Responses 0 Settings

10. What motivates you? *

A) Success and achievement.
 B) Enjoying life and avoiding stress.
 C) Order, knowledge, and understanding.
 D) Avoiding failure and maintaining security

11. How do you usually feel in social situations? *

A) Energized and eager to lead conversations.
 B) Relaxed and happy to socialize.
 C) I enjoy small groups where I can connect deeply.
 D) I tend to feel nervous or uncomfortable.

Personality Test All changes saved in Drive

Published Responses 0 Settings

Questions Responses Responses 0 Settings

18. How do you deal with mistakes at work or school? *

A) I correct them quickly and move forward.
 B) I don't stress too much, mistakes happen.
 C) I thoroughly assess the situation to ensure it doesn't happen again.
 D) I worry about them and may overthink the situation.

19. How do you feel about change? *

A) I embrace it and see it as an opportunity.
 B) I'm adaptable and go with the flow.
 C) I prefer stability but manage change when needed.
 D) I feel anxious and try to avoid major changes.

Personality Test All changes saved in Drive

Published Responses 0 Settings

Questions Responses Responses 0 Settings

12. What's your approach to multitasking? *

A) I love it and thrive in fast-paced environments.
 B) I handle it well without stressing out.
 C) I prefer to focus on one task at a time.
 D) Multitasking overwhelms me.

13. How do you approach long term goals? *

A) I set ambitious goals and work hard to achieve them.
 B) I take things as they come without overplanning.
 C) I create detailed plans and stick to them.
 D) I worry about the potential obstacles and outcomes.

14. How would you describe your energy levels throughout the day? *

Personality Test All changes saved in Drive

Published Responses 0 Settings

Questions Responses Responses 0 Settings

20. How do you prioritize tasks? *

A) I tackle the most important ones first and quickly.
 B) I don't stress too much about priorities; I get things done.
 C) I carefully plan and prioritize based on deadlines and importance.
 D) I feel overwhelmed when trying to prioritize.

Read Your Results

If your answers are mostly A: Congratulations! You are Type A!

Type A

You are highly ambitious, competitive, and driven. You thrive on challenges but may feel stressed when things don't go your way. You tend to be goal-oriented and proactive in all situations.

If your answers are mostly B: Congratulations! You are Type B!

Type B

Personality Test All changes saved in Drive

Published Responses 0 Settings

Questions Responses Responses 0 Settings

14. How would you describe your energy levels throughout the day? *

A) High energy, always ready to go.
 B) Balanced— I don't let things drain me too much.
 C) I conserve my energy and plan tasks around it.
 D) I often feel tired or drained, especially in stressful situations.

15. How do you handle failure? *

A) I push harder and refuse to accept failure.
 B) I don't let it get me down for long.
 C) I review what went wrong to improve next time.
 D) I feel discouraged and dwell on it.

16. How would you describe your communication style? *

Personality Test All changes saved in Drive

Published Responses 0 Settings

Questions Responses Responses 0 Settings

Read Your Results

If your answers are mostly A: Congratulations! You are Type A!

Type A

You are highly ambitious, competitive, and driven. You thrive on challenges but may feel stressed when things don't go your way. You tend to be goal-oriented and proactive in all situations.

If your answers are mostly B: Congratulations! You are Type B!

Type B

You are relaxed, flexible, and go with the flow. You avoid unnecessary stress and value balance in life. While you're productive, you don't let pressure get the best of you, and you enjoy living in the moment.

If your answers are mostly C: Congratulations! You are Type C!

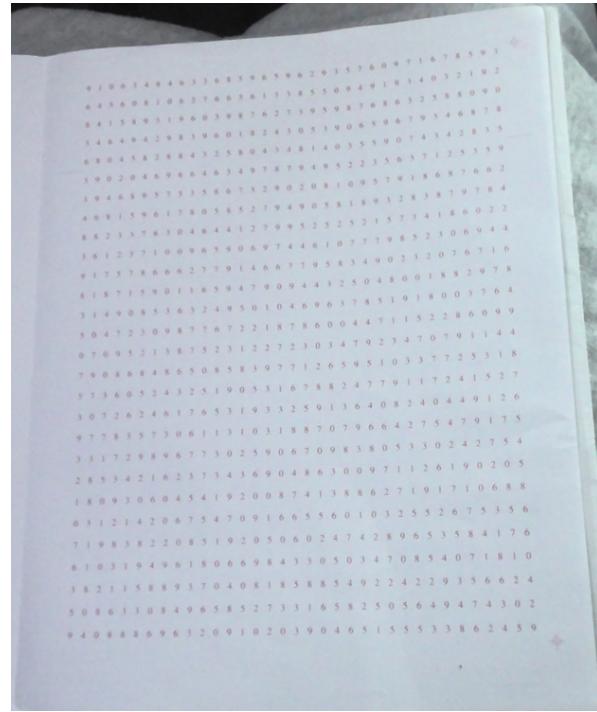
Type C

You are analytical, detail-oriented, and methodical. You like structure and tend to approach life in a logical and systematic way. You value planning and prefer to work at a steady, organized pace.

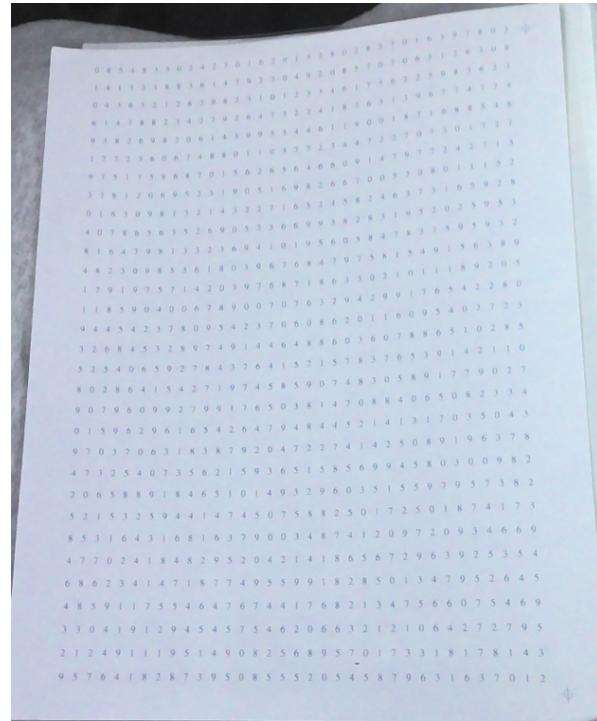
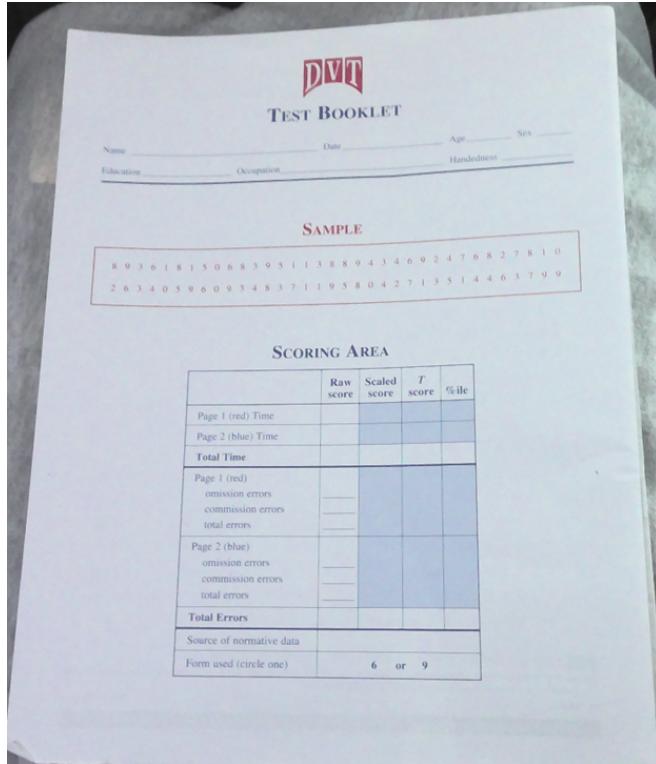
If your answers are mostly D: Congratulations! You are Type D!

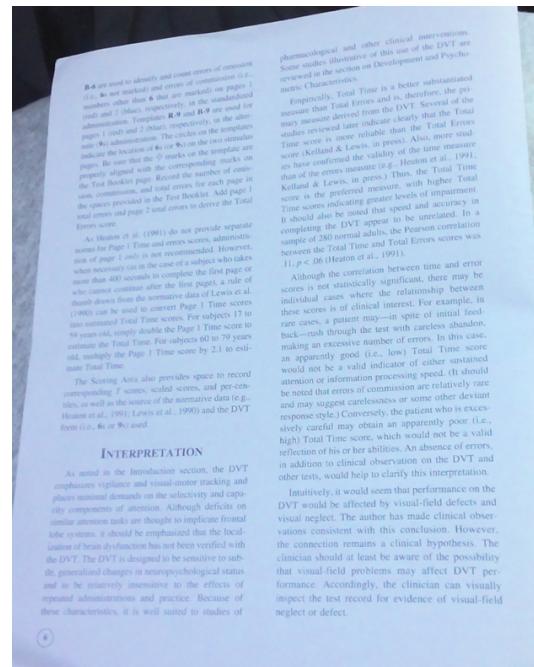
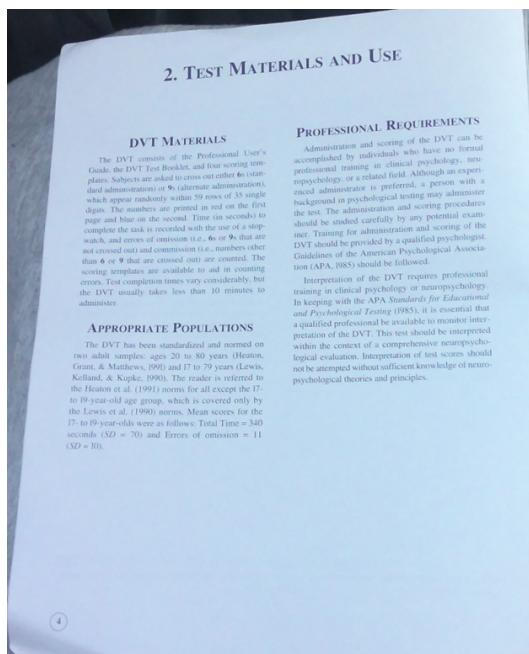
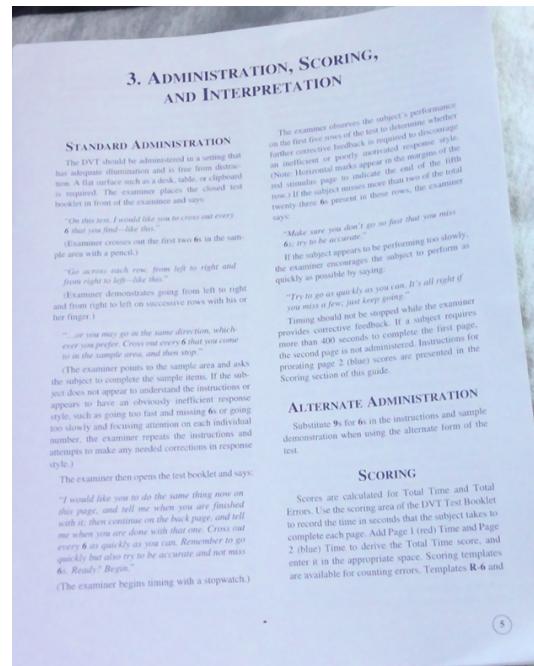
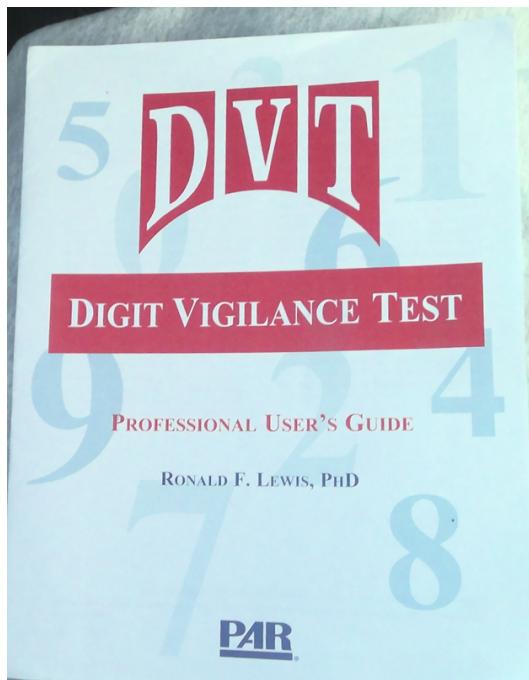
Type	Description	Score
Type C	You are relaxed, flexible, and go with the flow. You avoid unnecessary stress and value balance in life. While you're productive, you don't let pressure get the best of you, and you enjoy living in the moment.	8
Type D	You are analytical, detail-oriented, and methodical. You like structure and tend to approach life in a logical and systematic way. You value planning and prefer to work at a steady, organized pace.	10

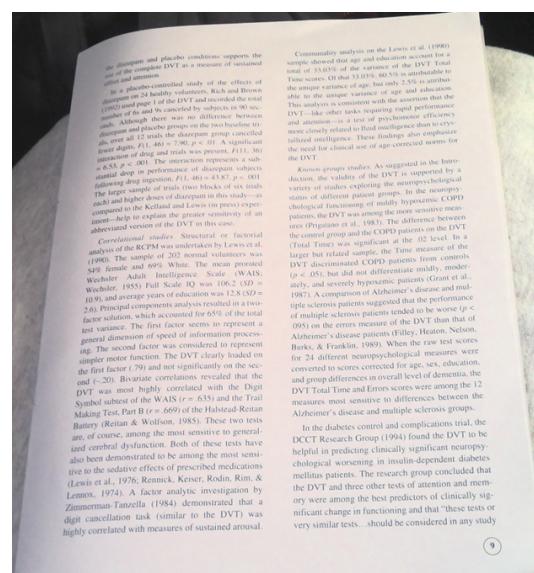
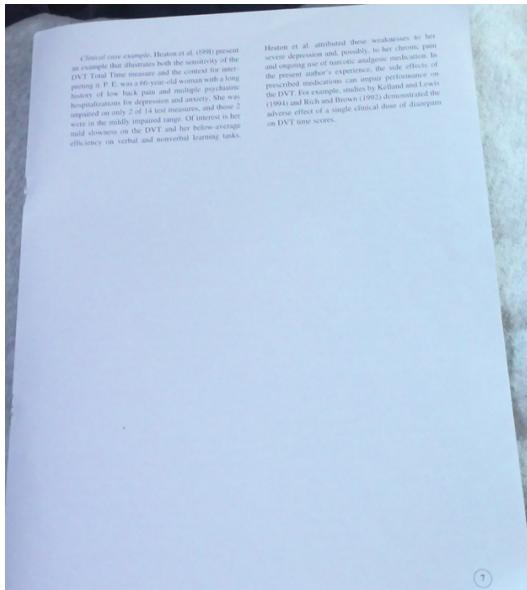
Write your name and what personality type you got.
Short answer text



Appendix E







4. DEVELOPMENT AND PSYCHOMETRIC CHARACTERISTICS

DEVELOPMENT

The DVT was developed as a component of the RCPM Battery, which is described in the RCPM manual (Lewis & Rennick, 1979). The RCPM Battery—composed of cognitive, perceptual, and motor tasks—was designed to be sensitive to arousal level and attentional capacity, thereby reflecting reversible changes in brain physiology. Such changes would generally be produced by either clinical or experimental manipulations of pharmacological or physical agents, by substance abuse, or by other toxic substances.

At the same time, the RCPM was designed to minimize sensitivity to practice effects accruing from repeated administrations. The relative simplicity of the DVT and the use of alternate forms (6s and 9s) were design features aimed at accomplishing this goal. The DVT is longer than many pencil-and-paper tests of the attention and psychomotor speed, and it was specifically designed to measure the ability to sustain effort.

RELIABILITY

Kelland and Lewis (in press) evaluated the DVT in terms of test-retest and alternate forms reliability. A one-page version was compared to the standard two-page format. Results indicate high test-retest reliability (1-week interval, $n = 40$) of the DVT for Total time, $r = .91$, $p < .01$, as well as for Page 1 time, $r = .80$, $p < .01$. Alternate forms reliability was also high for Total time, $r = .90$, $p < .01$, and Page 1 time, $r = .89$, $p < .01$. Test-retest reliability coefficients (1-week interval, $n = 40$) of Total Errors scores were moderately high (Total Errors, $r = .56$, $p < .01$; Page 1 Errors, $r = .61$, $p < .01$).

In their study of the effects of diazepam on sedation amnesia, Rich and Brown (1992) found the DVT to be highly reliable, with average intertrial correlations of .88 for the first block of six trials and .91 for the second block of six trials in the diazepam group.

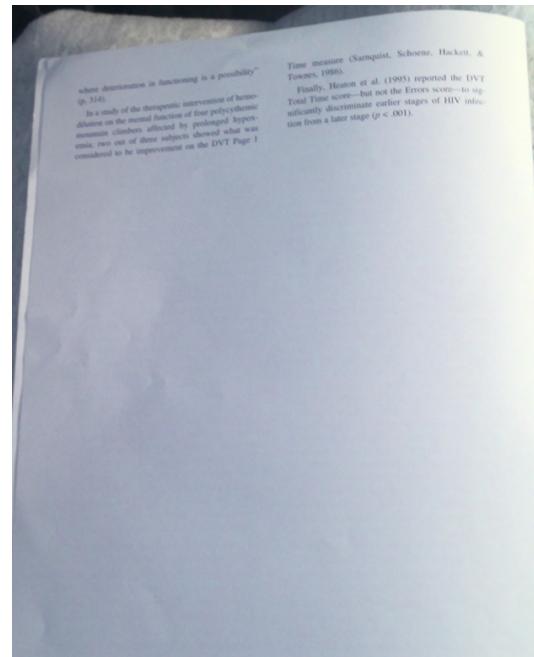
PRACTICE EFFECTS

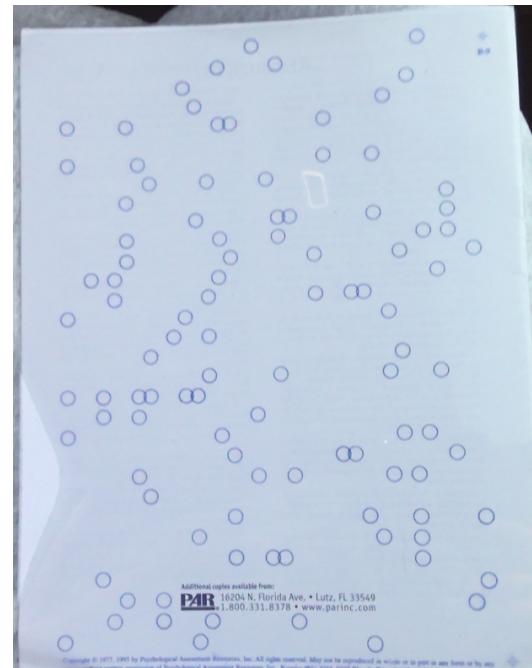
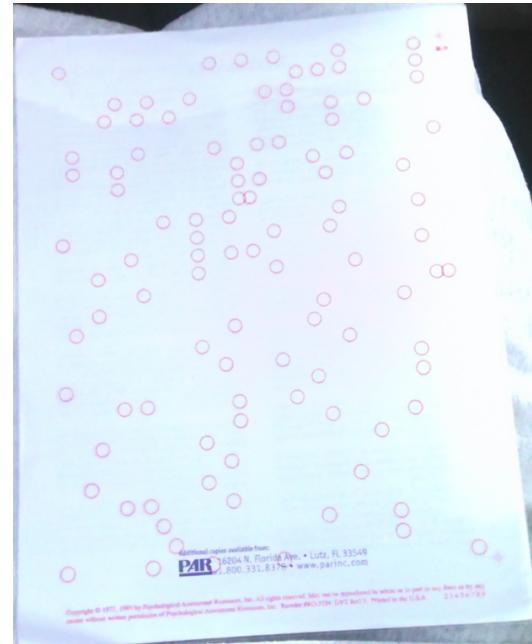
Kelland and Lewis (in press) also examined the effect of repeated administrations on DCT scores. A repeated measures ANOVA of practice effects across the three DCT administrations revealed significant differences, $F(2, 18) = 17.49, p = .001$, with repeated comparisons indicating a significant change in Total Time between Trial 1 and Trial 2, $F(1, 18) = 10.00, p = .001$, but not between Trial 2 and Trial 3, $F(1, 19) = 2.14, p = .16$. The implication is that there is an orientation or initial practice effect from Trial 1 to Trial 2, but not thereafter. This knowledge should be helpful to persons interested in using the test in a repeated-administration format, whether for clinical or for research purposes.

VALIDITY

Diazepam studies. Kelland and Lewis (in press) examined the effects of a single dose of diazepam (10 mg) on DVT performance. Forty undergraduates were tested three times in two sessions (1 week apart) and randomly assigned in a double-blind manner to either the diazepam or placebo condition for the test administration. Subjects were matched for sex and were comparable in terms of education and weight in kilograms. Repeated measures ANOVA indicated a significant group (diazepam vs. placebo) by session (pre- vs. postdrug) interaction, $F(1, 38) = 2.62, p < .05$, for Total Time scores.

Repeated measures ANOVAs of errors scores revealed no significant group by session interactions or either Page 1 Errors, $F(1, 38) = 388, p = .543$, or Total Errors, $F(1, 38) = .77, p = .386$, suggesting the relative insensitivity of DVT errors scores to psychotropic effects. There were significant group by ex interactions for either the Total Time, $F(1, 36) = 13, p = .65$, or Total Errors, $F(1, 36) = 1.05, p = .36$, scores. The fact that the Total Time score—but not the Page 1 Time score—significantly discriminated





Appendix F

Group	Participant	Time on Page 1 (s)	Time on Page 2 (s)	Combined Time on Page 1 and 2 (s)
AC	NR25	136s	175s	311s
AC	APC25	152s	160s	312s
AC	EE25	235s	118s	353s
AE1	SC28	146s	158s	304s
AE1	DL27	180s	220s	400s
AE1	ND26	113s	123s	236s
AE1	AR25	114s	129s	243s
AE2	VV25	162s	124s	286s
AE2	BP26	141s	137s	278s
AE2	LH26	149s	160s	309s
AE2	CE26	183s	166s	349s

Number of Correct Crosses on Page 1	Number of Comissions on Page 1	Number of Omissions on Page 1
97	0	6
100	0	3
102	0	1
101	0	2
97	0	6
83	1	20
87	0	16
97	0	6
93	1	10
91	0	12
101	0	2

Number of Total Errors on Page 1	Number of Correct Crosses on Page 2	Number of Comissions on Page 2
6	96	0
3	99	0
1	102	0
2	98	0
6	100	0
21	78	1
16	87	0
6	100	0
11	89	2
12	79	0
2	93	0

Number of Omissions on Page 2	Number of Total Errors on Page 2	Total Errors Combined on Page 1 and 2
7	7	13
4	4	7
1	1	2
5	5	7
3	3	9
24	25	46
16	16	32
3	3	9
14	16	27
24	24	36
10	10	12

Total Correct Crosses on Page 1 and 2	Total Omissions on Page 1 and 2
193	13
199	7
204	2
199	7
197	9
161	44
174	32
197	9
182	24
170	36
194	12

Type B Groups

Group	Participant	Time on Page 1 (s)	Time on Page 2 (s)	Combined Time on Page 1 and 2
BC	AJ26	174s	229s	403s
BC	FA26	115s	148s	263s
BC	LJ26	183s	200s	383s
BC	AG26	175s	231s	406s
BC	EF28	176s	168s	344s
BC	KW26	139s	186s	325s
BC	GB25	155s	161s	316s
BE1	MZ26	162s	169s	331s
BE1	VR26	142s	174s	316s
BE1	CC27	153s	158s	311s
BE1	LP26	188s	200s	388s
BE1	CS25	143s	165s	308s
BE2	LG26	150s	144s	294s
BE2	CA26	137s	137s	274s
BE2	AM26	124s	146s	270s
BE2	GP28	162s	152s	314s
BE2	JC26	181s	185s	366s
BE2	AT26	141s	154s	295s

Number of Correct Crosses on Page 1	Number of Comissions on Page 1	Number of Omissions on Page 1
103	0	0
91	0	12
100	0	3
102	0	1
92	0	11
89	0	14
96	1	7
100	0	3
101	0	2
95	0	8
96	0	7
100	0	3
97	0	6
91	1	12
95	0	8
101	0	2
100	0	3
100	0	3

Number of Total Errors on Page 1	Number of Correct Crosses on Page 2	Number of Comissions on Page 2
0	100	0
12	100	1
3	101	0
1	102	0
11	87	0
14	100	0
8	100	0
3	101	0
2	99	0
8	91	0
7	98	0
3	98	0
6	96	0
13	89	0
8	90	0
2	98	0
3	97	0
3	102	0

Number of Omissions on Page 2	Number of Total Errors on Page 2	Total Errors Combined on Page 1 and 2
3	3	3
3	4	16
2	2	5
1	1	2
16	16	27
3	3	17
3	3	11
2	2	5
4	4	6
12	12	20
5	5	12
5	5	8
7	7	13
14	14	27
13	13	21
5	5	7
6	6	9
1	1	4

Total Correct Crosses on Page 1 and 2	Total Omissions on page 1 and 2
203	3
191	15
201	5
204	2
179	27
189	17
196	10
201	5
200	6
186	20
194	12
198	8
193	13
180	26
185	21
199	7
197	9
202	4
	0

Appendix G

Appendix G

Country: 1

Pop: 4

Rap: 1

Reggaeton: 3

Rock: 1