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Differences of Listening to Instrumental and Lyrical Music - An Experiment Study on Typing Performance among University Students

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***Abstract* – Nowadays, music can be considered as a part of our lives. Even when studying or working, people tends to listen to music while finishing their task. Studying this topic is important to understand whether music is affecting our performance, thus we can decide if we should or should not listen to music while working. The researcher tested 79 members of ITB Student Orchestra to retype a short story in three different conditions: instrumental music, lyrical music, and no music. The researcher found that instrumental music significantly increased the students' typing speed. The researcher also found that there is no significant difference of typing performance between the instrumental music, lyrical music, and no music group. Therefore, the researcher recommend that students or employees should not worry about their music preferences when listening to music when doing a typing task, since there is no significant difference between instrumental and lyrical music. The researcher also recommends students and employees to listen to instrumental music while doing a typing task, since it increased typing speed.**

***Keywords* – Instrumental Music, Lyrical Music, No Music, Typing Performance, University Students.**

I. INTRODUCTION

The technology today makes it easier for music to be a part of our lives. Based on the data, people listen to music for 32.1 hours per week and 43.5% of the listeners prefer to listen music through their smartphones [17]. This listening to music habit also developed in the business world, with 41.8% of the employee listened to audio for their entire workday [11]. This also applied to university students, who will rule the work place in the near future.

A question arose, is listening to music bring any benefit for those who working/studying while listening to them? Dr. Gordon Shaw claimed in their Mozart Theory that classical music can increase the listener IQs by nine points [15]. A different claim made by Daniel Levitin. He claimed that even though music helped us to relax, elevate mood, and focus easier, listening to music while working takes up some of our attentional capacity [12]. This leads to the listener has a fewer resources left to direct toward the task at hand [12].

Lyric is also a part of music nowadays. This leads to music can be categorized as two separate group, instrumental music and lyrical music. A new question arose, is there any difference between listening to instrumental music and lyrical music? Previous research showed conflicting results. One result stated that the group who listened to instrumental music performed better at a reading test than those who listen to lyrical music [10] Other result stated that there is no significant difference between instrumental music and lyrical [5].

Since most of our work/study is related to typing on the computer, this study aimed to see the relation between listening to music, both instrumental and lyrical, and typing performance. With the result of this study, people can decide what to listen to when doing a typing performance.

II. LITERATURE REVIEW

A. *Instrumental and Lyrical Music*

One study experimented on the relation between music and reading comprehension showed a result that the average people did better when they are listening to instrumental music, compared to lyrical music [10]. Another study that experimented on cognitive performance by using arithmetic test showed a different result [2]. The result showed that there is no significant different of cognitive performance between instrumental music and lyrical music [2]. Two experiment by Harmon, Troester, Pickwick, and Pelosi also showed that there is no significant different between instrumental music and lyrical music [5]. Both of the experiment tested the effect of music on cognitive abilities. There is also a different result from the experiment conducted by Herring and Scott. The experiment is about reading performance. The result showed that a native language lyrical music is not helpful for the participants [6]. Also, the foreign language lyrical music and instrumental music did not help or hurt the participants and there is no significant different between them [6]. In conclusion, there is still a different result from the previous experiments.

B. *Typing Performance*

In an experiment titled "Touch Typing Performance with Sensory Feedback on a Flat Keyboard", the researcher measured the typing performance by looking at the words per minute and the error rate [8]. Another experiment titled "Effect of Computer Keyboard Slope and Height on Wrist Extension Angle" also measured the typing performance by looking at the words per minute and typing accuracy [16]. Words per minute and percentage of error also used in an experiment titled "Quantitative Evaluation of 4 Computers Keyboard: Wrist Posture and Typing Performance" [1]. Thus, for this study, the researcher determined that the typing performance can be calculated by looking at the typing speed and the typing error.

III. METHODOLOGY

A. *Population and Sample*

For this study, university students from Institut Teknologi Bandung (Bandung Institute of Technology) is chosen as the population. For the sample, the researcher chose the members of ITB Student Orchestra. From 195 active members of ITB Student Orchestra, the researcher picked 79 members. The chosen members are all mastered at least one instrument. The chosen members also like both instrumental and lyrical music and is comfortable with listening to music while doing a task.

B. *Experiment Design*

For the experiment, the participants were asked to retype a short story while listening to either instrumental music, lyrical music or no music at all. The experiment consisted of two stages. For the first stage, all of the participants were asked to retype the short story without listening to music. For the second stage, the participants were randomly selected into one of three conditions: instrumental music, lyrical music, or no music. Then, the participants were tasked to retype another short story while in their selected condition. The music was varying for each participant, since they are asked to select their own instrumental music and lyrical music.

This experiment was done online, via zoom meeting or Google meet. The participants typed with their own c-

-omputer, using Microsoft Word or similar software, while the researcher observed. The participants were also required to share their screen. The researcher used a stopwatch in order to record the time taken for the participant to finish the task. Email was used for the researcher to send the short story to the participant, also it was used for the participants to send their result. When listening to music, the participants were required to use either a headphone or an earphone. For the music, the researcher created a playlist, based on the participant's chosen song, on Spotify. The link for the playlist was sent when the stage 2 began.

C. *Variable and Measure*

The independent variable of this study is the condition of the participant when doing the typing task. The dependent variable of this experiment is the typing performance of the participants. Typing performance is calculated by looking at the typing speed and the typing error.

For the measurement of typing speed, the researcher divided the total word from the story with the total time spent by the participant to complete the task. For the measurement of the typing error, the researcher used a website to compare the original story with the result from the participants.

D. *Analysis*

The researcher compared the data of every single participant in the first stage and the second stage, in order to determine whether the participant performance is different from the two condition. If the typing speed increased in the second stage, it means that music is affecting the typing performance positively. If the typing error decreased in the second stage, it means that the music is affecting the typing performance positively. For this analysis, the researcher used Paired T-test analysis (if the data is normally distributed) or Wilcoxon Signed Rank Test (If the data is not normally distributed).

The researcher also compared the data of the three condition in the second stage, in order to determine which condition is the best condition for doing a typing task. The researcher compared the typing speed mean and the typing error mean of the three condition. The condition with the highest typing speed and the lowest typing error is considered as the best condition. For this analysis, the researcher used One-way ANOVA analysis (if the data is normally distributed) or Kruskal-Wallis Test (if the data is not normally distributed).

IV. FINDING AND ARGUMENT

Table 1. Experiment result.

Condition	First Stage		Second Stage		Differences	
	Typing Speed	**Typing Error**	**Typing Speed**	**Typing Error**	**Typing Speed**	**Typing Error**
Instrumental (27 people)	43.14 wpm (SD: 11.94)	3.56% (SD: 2.64)	45.24 wpm (SD: 12.25)	2.85% (SD: 3.03)	2.09 wpm (SD: 2.19)	-0.71% (SD: 1.74)
Lyrical (27 people)	40.31 wpm (SD: 9.83)	3.72% (SD: 3.09)	40.41 wpm (SD: 10.66)	3.18% (SD: 3.47)	0.10 wpm (SD: 2.49)	-0.54% (SD: 3.28)
No Music (25 people)	43.71 wpm (SD: 8.82)	4.32% (SD: 3.29)	45.01 wpm (SD: 9.31)	2.65% (SD: 2.23)	0.88 wpm (SD: 3.52)	-1.67% (SD: 2.28)

Source: Experiment Result.

Table 1 above shows the result of the experiment. The instrumental music group have the highest typing speed difference, followed by the no music group and the lyrical music group. For the typing error difference, the no music group have the highest typing error difference, followed by the instrumental music group and the lyrical music group.

Table 2. Validity Test.

Condition		Test of Normality (Sig.)		Homogeneity of Variance (Sig.)
		First stage	Second Stage	Second Stage Only
Instrumental	Typing Speed	0.200 (v)	0.200 (v)	0.644 (v)
	Typing Error	0.034 (x)	0.000 (x)	0.419 (v)
Lyrical	Typing Speed	0.200 (v)	0.200 (v)	0.644 (v)
	Typing Error	0.008 (x)	0.002 (x)	0.355 (v)
No Music	Typing Speed	0.200 (v)	0.200 (v)	-
	Typing Error	0.070 (v)	0.185 (v)	-
Sig > 0.05 = Passed				

Source: SPSS analysist result from the experiment data.

Table 2 above shows the validity test for the data. The normality test is supplementary to the graphical assessment of normality [4]. The normality test can be tested with the Kolmogorov-Smirnov coefficient [4]. The homogeneity of variance test is an assumption that the population variances of two or more samples are considered equal, and the test can be done by using Levene Test [9]. These tests were done by using SPSS.

Based on the data above, all of the typing speed data passed the test of normality, thus the data is normally distributed. The typing speed data is also passed the homogeneity of variance test. Thus, the data have equal variance in each group. Since the typing speed data is normally distributed and have an equal variance in each group, Paired T-test and One-Way ANOVA will be used to analyze the data.

For the typing error data, only the typing error of the no music group passed the test of normality. Thus, for the typing error, Wilcoxon Signed Rank Test and Kruskal-Wallis test will be used to analyze the data.

Table 3. Paired T-test and Wilcoxon signed rank test analysis.

Condition		Paired T-test (Sig. 2-Tailed)	Wilcoxon Signed Rank Test (Sig. 2-Tailed)	Significant Difference?
Instrumental	Typing Speed	0.000	-	v
	Typing Error	-	0.061	x
Lyrical	Typing Speed	0.836	-	x
	Typing Error	-	0.376	x
Sig > 0.05 = No Significant Differences				

Source: SPSS analysist result from the experiment data.

Table 3 above shows the Paired T-test and the Wilcoxon Signed Rank Test result. Paired T-test is a statistical tool to determine statistical difference between two conditions with the assumption that the data are normally

distributed. In this test, the subject is measured two times with two related conditions that resulted in paired observations [7]. Wilconxon Signed-rank test is a non-parametric statistical hypothesis that is used to compare two related sample and assess if their population mean ranks is differ [3]. It is an alternative for paired t-test, if the data is not normally distributed [3]. These tests were done by using SPSS.

There is a significant difference between the first stage and the second stage of the instrumental music group. Thus, the researcher concluded that instrumental music can significantly increase typing speed. For the lyrical music group, there is no significant difference between the stages. Therefore, listening to lyrical music will not bring any significant difference for typing speed.

For the Wilcoxon Signed Rank Test result, both of the instrumental music group and lyrical music group showed no significant difference of typing error between the two stages. The researcher concluded that listening to either instrumental or lyrical music will not bring any significant difference for typing error.

Table 4. One-Way ANOVA and Kruskal-Wallis test analysis.

Variable	One-Way ANOVA (Sig.)	Kruskal-Wallis Test (Sig.)	Significant Difference?
Typing Speed	0.193	-	x
Typing Error	-	0.976	x
Sig. > 0.05 = No Significant Differences			

Source: SPSS analysist from the experiment data.

Table 4 above shows the One-Way ANOVA and the Kruskal-Wallis Test result. ANOVA is a statistical procedure to compare means of several samples to find if there are significant differences between them, with the samples are independent, have a normal distribution, and have a same population of variance [14]. Krukal-Wallis is the non-parametric equivalent of one-way ANOVA and is used to test whether there is a significant different between more than 2 groups [13]. It does not make assumptions about normality [13]. These tests were done by using SPSS.

Both of the analysis result showed that there is no significant difference of typing speed and typing error between the instrumental music group, lyrical music group, and the no music group. Therefore, there is no significant difference between listening to instrumental or lyrical music when doing a typing task.

V. CONCLUSION

Listening to music is one of the common habits done by most of the people, one of them is proven used by employees in business in working hours. To extend the research, the researcher is interested to find out the relationship between listening to instrumental music and lyrical music, that related with typing performance. The research samples are taken from 60 ITB Student Orchestra members from Institut Teknologi Bandung (Bandung Institute of Technology), in which each respondent has at least 1 mastered music instrument. The test is done through two stages, which are creating short story without listening to music and creating short story with listening to either instrumental music, lyrical music, or no music that are chosen randomly. Meanwhile, the researcher observes the typing speed and total test time spent done by the respondents.

Based on the result, the researcher concluded that listening to music is affecting typing performance. Typing performance of the participants increased after listening to both instrumental music and lyrical music. The

typing speed increased and the typing error decreased. However, only the group that listened to instrumental music showed a significant different. Their typing speed showed a significant increase after listening to instrumental music.

When comparing which one is better to listen to while typing between instrumental and lyrical music, the result showed no significant difference between instrumental and lyrical music. When those groups are compared to the no music group, there is also no significant difference between the music condition and the no music condition. Thus, there is no best condition for typing performance.

Regarding the result of this experiment, business manager can create a rule in the workplace about listening to music while working, especially if the work involving typing task. Instrumental music and lyrical music both have no negative impact on the typing performance. But, it is recommended if the managers recommend their employee to listen to instrumental music, since instrumental music increased the typing speed of the participants in this experiment. For the employee, they can listen to any music of their preferences when working, since there is no different between instrumental music and lyrical music.

For further research of this study, the experiment can be conducted face to face. This experiment happened during the COVID-19. As the result, the experiment is conducted online via online meeting platform. If the experiment is conducted face to face, it can remove some issues, like connectivity issue. The further research can also examine the effect of different genre or tempo of music on typing performance. In addition, further research can examine different kind of performance.

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Rivaldi Rafly Widyasthana was born in Bandung, 7 May 1999. He earned his bachelor degree in management, focusing on human resource, from Institut Teknologi Bandung (Bandung Institute of Technology), Indonesia. He graduated in 2020. He is a member of ITB Student Orchestra. He has an experience in guitar playing for 12 years, orchestra and guitar ensemble conducting, and music composition. He was the Head of Internal Affairs, Head of Logistics for ISO Annual Concert 2018, and Head of General Election Commission for ITB Student Orchestra. He also has experiences in becoming the Chief Financial Officer of Ambrosia and the Chief of Operational Officer of Jenny's B--ucket. His research interest is human resource.

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Dr. Henndy Ginting S.Psi., M.Si. was born in Kabanjahe, 14 November 1971. He earned his bachelor degree in psychology (1997) and master degree in psychology (2008) from Universitas Padjajaran (Padjadjaran University), Indonesia. For his doctoral degree in Psychology, he received it from Radboud University, Netherlands in 2014. He is currently a Lecturer at the School of Business and Management, Institut Teknologi Bandung (Bandung Institute of Technology), Indonesia and Managing Partner at PAIRs Consulting, Bandung. He previously published: (1) Understanding of Narrative Effects: The Impact of Direct Storytelling Intervention on Increasing Employee Engagement among employees of State-Owned Enterprise in West Java, Indonesia (Journal of Workplace Learning Vol. 31 Issue 2, 2019). (2) Analysing Literacy and Other Psychological Tendencies using Linguistic Profile in English Expressive Writing: Are Students Able but Unwilling to Wriite? (Journal of Applied Linguistics Vol. 9 No. 1, 2019). His current research interest is psychology. Dr. Ginting is the Chair of association development in Indonesian Psychology Association (Himpsi). He received research grant from SBM ITB in 2019 for "MBA Outing Team Building Evaluation on participants of Young Professional in MBA ITB" and from Institut Teknologi Bandung (Bandung Institute of Technology) in 2019 for "Model test of relationship between Organizational Health, Employee Engagement, and Human Capital Management (Studies on State-Owned Enterprises in Indonesia". email id: henndy.ginting@sbm-itb.ac.id