

Effects of Different Music Genres on Concentration Time of Children with Learning Disabilities (LD)

Krittin Hirunchupong, Nannaphat Suwannakul,
Ruamrudee International School, 6 Soi Ramkhamhaeng 184, Khwaeng Min Buri, 10250, Thailand; krittinh23@gmail.com

ABSTRACT: This study aimed to introduce new treatment options through investigating the type of music that is the most effective in extending the concentration time of students. Four groups were established in this study: control, instrumental music, classical music, and pop music groups. The qualitative data was obtained through an online questionnaire assessed by an art teacher monitoring the students, while the quantitative data was collected through photographs of each child's drawings under different experimental group stimulus. Then, they were interpreted by Dr. Supalak Khemthong, an assistant professor with a doctoral research degree in occupational therapy at Mahidol University, Bangkok. All the interpretations were based on The Individualized Music Therapy Assessment Profile (IMTAP), an in-depth assessment protocol developed by Holly Baxter. The results from this study suggested that the three genres of music impacted students in different ways. Overall, instrumental music was the most effective tool to increase the concentration time, while pop music was the least effective and led to some deterioration in concentration.

KEYWORDS: Behavioral and Social Sciences; Physiological Psychology; Music Therapy; Children; Learning Disabilities.

■ Introduction

The number of students with learning disabilities (LD) has been continuously increasing for the past decade in Thailand.¹ Although it is well established that LD cannot be cured, students can seek therapy to manage and alleviate symptoms.^{2,3} LD are a set of disorders that affect a child's ability to understand instructions, speak or write fluently, perform mathematical calculations, coordinate movements, or concentrate on a task for a certain amount of time.³ Students with LD often struggle to interact with others and to perform with their peers academically. In Thailand, the number of students with learning disabilities in schools increased substantially from approximately 60,000 in 2015 to an estimate of 250,000 in 2021. Furthermore, these numbers only accounted for the children enrolled in schools. There are many neglected children that have parents who cannot afford their education nor the special care that they need.¹

However, music and art activities can be utilized to help those children to a certain extent. For people with LD, music therapy has been proven useful in language, speech, auditory, and learning recovery.³ Similar psychological studies corroborate that music therapy has the potential to improve the communication, behavior, and emotional skills of neuro-diverse adolescents.⁴ Additionally, further case studies that investigate the effectiveness of music therapy consistently agree that music therapy enables prolonged attention span and an overall positive behavior.⁵ Despite this, the effect of various types of music have yet to be robustly examined. Hence, the purpose of this study is to compare the effectiveness of instrumental, classical, and pop music on extending the concentration time of children with LD.

■ Methods

Study group:

The study group consisted of 5 children residing at Camillian Home for Disabled Children with learning disabilities (LD) medical diagnosis. Every participant's name was abbreviated to protect their privacy as seen in Table 1.

Table 1: Patient identification and general information

Name	Age	Gender
C.P.	22	Female
P.P.	16	Male
Pi.P.	16	Male
A.P.	18	Male
C.S.	9	Male

Media:

The music content utilized in this study was produced by a group of fifteen student volunteers. All volunteers were informed that the contents would be used to investigate the impact of music on concentration time of children with LD.

Instrumental Musics:

Instrumental music utilized in the study were piano recordings of Thai pop songs that were slow in tempo (performed slower than 100BPM) and consisted of a small dynamic range (performed between mezzo piano to mezzo forte). The recordings were posted on the Musical.Remedy__ youtube channel (<https://www.youtube.com/channel/UCoXFy8RRxf5T1pdliOf21A>). The instrumental music did not contain lyrics but did contain a melody. The duration of the record-

ings was 45 minutes. They were played for the entire time duration when the children were completing their assigned tasks.

Classical Music:

Classical music utilized in the study were piano and cello recordings of classical pieces. They ranged in tempo (performed from below 100BPM to above 150BPM) and dynamics (performed between pianissimo and fortissimo). The recordings were posted on the Musical.Remedy__ youtube channel (<https://youtube.com/playlist?list=PL2gm7sWK2oiSH04p5UI1CkEpBeBERJ6DR>). The classical music did not contain lyrics but did contain a distinct melody. The duration of the recordings was 45 minutes, and each instrument had approximately equal duration of performance time. They were played for the entire time duration when the children were completing their assigned tasks.

Pop Music:

Pop music utilized in the study included vocals, drums, electric and acoustic guitar recordings of Thai pop songs. They were fast in tempo (performed above 120 BPM) and consisted of a large dynamic range. The pop music recordings were posted on the Musical.Remedy__ youtube channel (<https://youtube.com/playlist?list=PL2gm7sWK2oiQci5G-9dX-H2Bh1MPwyJDyt>). The pop music recordings did contain lyrics and had a distinct melody. The duration of the recordings was 45 minutes, and each instrument had approximately equal duration of performance time. They were played for the entire time duration when the children were completing their assigned tasks.

Art Activity:

Each child in the study was assigned to draw and color an image of their choice. The approximate time for this task was 30-40 minutes. The art activity was kept as a controlled variable while the music played for each art session was instrumental music, classical music and pop music, respectively. Then, the drawings were collected and analyzed by a therapist later in the study.

Control Group:

The first music and art session conducted was a control group. Each child was assigned to draw and color an image of their choice in an art room. However, they were working without music playing. Drawings from those sessions were collected for further analysis by Dr. Supalak Khemthong, using IMTAP as reference.

Experimental Groups:

The second, third, and fourth music and art session conducted were experimental groups 1, 2, and 3, respectively. In all of the experimental groups, each child was assigned to draw and color an image of their choice in the same art room. Then, the art teacher played an instrumental, classical, and instrumental pop music recording for children in the order listed above while they were completing the tasks. Their changes in concentration span, behavior, and artwork were documented.

Data Collection:

The qualitative data of the experiment were the interpretations of each child's drawings from the control group,

experimental group 1, experimental group 2, and experimental group 3 in comparison to each other in a single-blind study.

The quantitative data for the experiment was collected through a survey, in which the caretaker took for each child. Following the questions that asked for the child's name, age and medical condition(s), questions asked to assess the improvement in concentration time included:

a. Did the child complete the task assigned?

This question investigated the child's ability to maintain concentration to achieve a task.⁶ An improvement in task completion was reflected when the child did not complete the task assigned in the control group but completed the task in any experimental group.

b. Did the child change their activity while completing the tasks assigned?

The question investigated whether the child is multitasking, which was a sign of low concentration in the assigned activity. An improvement in concentration was reflected when the child changed activity in the control group but did not change their activity while completing the tasks assigned in the experimental group.⁶

c. What is the total time in minutes that the child spent on the tasks assigned?

The question investigated an increase in concentration span of each child. An improvement in concentration was reflected when the child's total time spent on the tasks in the control group was less than the child's total time spent on the tasks in the experimental group.⁶

Results and Discussion

Control group:

All of the children completed their tasks even in the control group. However, 60% of the children multitasked when they completed the activity without background music, which was a sign of concentration loss. The total time spent on their tasks varied, which could be influenced by other factors such as their age and their stages of LD.^{4,7,8} Hence, the total concentration time was not compared between children, but compared between the same child in different experiment groups.

The qualitative data interpretations from the control group by Dr. Supalak Khemthong were translated and reported as seen in Table 2.

Table 2: Qualitative data interpretations from the control group.

Student	Interpretation	Positive or Negative Emotions
C.P.	The drawing reflected her positive emotions. The picture included 2 people and a clear blue sky which indicated optimism.	Positive
C.S.	The picture included a military officer, weapons and people, which indicated a sign of worry and stress.	Negative
P.P.	There were traces of erasing which indicated a fear of failure in this child. There were also repetitive lines over the same area which indicated stress.	Negative
Pi.P.	Similarly, there were repetitive lines, mostly repeated over the same area which indicated stress. The drawing was unfinished, which indicated over-thinking and a sensitive emotion.	Negative
A.P.	There was an imbalance of body parts in the drawing (disproportionate arms to legs) which indicated over-thinking and stress.	Negative

Instrumental music:

All of the children completed the tasks assigned both in the control group and experimental group 1. Hence, there was no difference in the children's ability to maintain concentration to achieve a task. Sixty percent (60%) of the children showed less multitasking when they were exposed to instrumental music compared to the control group, which was a sign of higher concentration (Figure 1). Eighty percent (80%) of the children showed a 15–20-minute increase in the total time spent on their assigned tasks when exposed to instrumental music compared to the control group, which reflected an improvement in attention span (Figure 2).

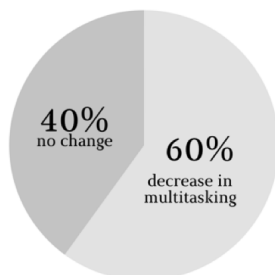


Figure 1: A pie chart illustrating a decrease in multitasking.

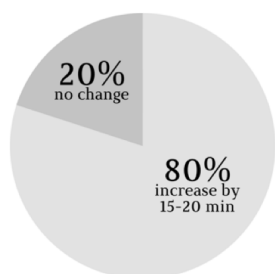


Figure 2: A pie chart illustrating an increase in the total time children spent on their assigned tasks by 15-20 minutes.

The qualitative data interpretations from the instrumental music session by Dr. Supalak Khemthong were translated and reported as seen in Table 3.

Table 3: Qualitative data interpretation from instrumental music sessions.

Student	Interpretation	Positive or Negative Emotions
C. P.	The drawing reflected her positive emotions. There were colorful flowers which indicated optimism.	Positive
C. S.	The drawing reflected his fearful, stress and worried emotions.	Negative
P. P.	The drawing was clearer and there was less traces of erasing visible. It can be interpreted that he had a clarity of thought. Additionally, less erasing meant that he planned ahead, which indicated that he had an optimistic, positive and effective approach to his task.	Positive
Pi. P.	Similarly, the drawing was clearer and there were less traces of erasing visible. It can be interpreted that he had a clarity of thought. Additionally, less erasing meant that he planned ahead, which indicated that he had an optimistic, positive and effective approach to his task.	Positive
A. P.	The drawing was heavily skewed to one side, which reflected over-reasoning and over-thinking. The drawing reflected loneliness, lack of self-confidence and poor self-esteem.	Negative

Classical music:

All of the children completed the tasks assigned both in the control group and experiment group 2. Hence, there is no

difference in the children's ability to maintain concentration to achieve a task. Sixty percent (60%) of the children showed less multitasking when they were exposed to classical music compared to the control group, which was a sign of higher concentration (Figure 3). Eighty Percent (80%) of the children showed a 5–10-minute increase in the total time that they spent on their assigned tasks when exposed to classical music compared to the control group, which reflected an improvement in attention span (Figure 4).

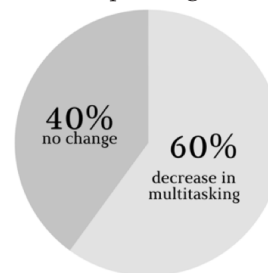


Figure 3: A pie chart illustrating a decrease in multitasking.

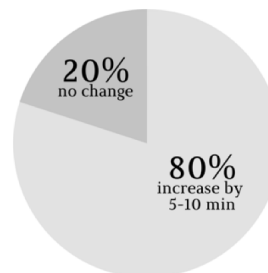


Figure 4: A pie chart illustrating an increase in the total time children spent on their assigned tasks by 5-10 minutes.

The qualitative data interpretations from the classical music session by Dr. Supalak Khemthong were translated and reported seen in Table 4.

Table 4: Qualitative data interpretation from classical music sessions.

Student	Interpretation	Positive or Negative Emotions
C.P.	The drawing was hyper focused on a single person. The sky depicted in the image was unclear. There were dust pathogens floating around a person. The elements combined indicated worry and stress during the pandemic.	Negative
C.S.	The blue color utilized in the drawing indicated that he felt supported and had a hopeful emotion.	Positive
P.P.	Similarly, the blue color utilized in the drawing indicated that he felt supported and had a hopeful emotion.	Positive
Pi.P	The drawing was very similar to previous ones, indicating major artistic limitations. The harsh lines indicated he was coloring in a fast and accentuated manner. It indicated a sensation of worry and stress.	Negative
A.P.	The drawing was very rigid, robotic and lack flexibility. This reflected his limited creativity and could be interpreted as a lack of self-confidence.	Negative

Pop music:

All of the children completed the tasks assigned both in the control group and experimental group 3. Hence, there is no difference in the children's ability to maintain concentration to achieve a task. Twenty Percent (20%) of the children showed more multitasking when they were exposed to pop music compared to the control group, which was a sign of

lower concentration (Figure 5). Forty Percent (40%) of the children showed a 5 to 10-minute increase, while 20% showed a 10–15-minute increase in the total time that they spent on their assigned tasks when exposed to pop music compared to the control group, which reflected an improvement in attention span. However, 40% of the children showed a 5–10-minute decrease in the total time spent on their assigned tasks, which reflected a deterioration in attention span (Figure 6).

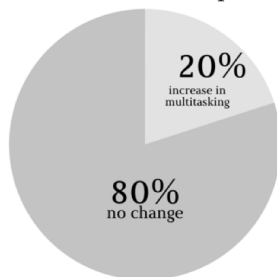


Figure 5: A pie chart illustrating an increase in multitasking.

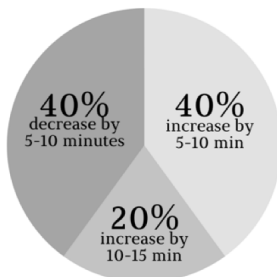


Figure 6: A pie chart illustrating both an increase and decrease in the total time children spent on their assigned tasks.

The qualitative data interpretations from the pop music session by Dr. Supalak Khemthong were translated and reported as seen in Table 5:

Table 5: Qualitative data interpretation from pop music sessions.

Student	Interpretation	Positive or Negative Emotions
C.P.	Birds flying towards the horizon indicated that she felt liberated and free. However, the unfinished ship that was drawn on the same level as the coconut tree indicated some signs of stress.	Negative
C.S.	The drawing was unclear, the lines were thin and there was very light color accentuation. The drawing indicated sensations of loneliness, lack of self-confidence and poor self-esteem.	Negative
P.P.	There were only two colors in the drawing: red and black, which depicted an imbalance of emotions. It indicated that he felt too distracted.	Negative
Pl.P.	The drawing was very similar to previous ones, indicating major artistic limitations. The drawing was also in black and white, which indicated close-mindedness.	Negative
A.P.	The drawing was very similar to previous ones, indicating major artistic limitations. The drawing was skewed to the left, which indicated over-reasoning and over-thinking. The isolation of the person in the drawing indicated loneliness, lack of self-confidence and poor self-esteem.	Negative

■ Conclusion

In this study, it was determined that different types of music played impacted the concentration time, some positively and some negatively, of children with LD. Quantitative data clearly reflected that instrumental music extended the

concentration time of 80% of the children by 15–20 minutes, the most out of the three music genres. The results from the qualitative data corroborated to the findings to a certain extent because two out of five children shifted from reflecting negative emotions to positive ones in their drawings based in Dr. Supalak Khemthong's interpretations. This concludes that instrumental music can be an effective tool to increase the concentration time of children with LD when they need to focus on a task for 30–40 minutes.

The quantitative data reflected that classical music extended the concentration time of 80% of the children by 5–10 minutes, the second most out of the three music genres. The results from the qualitative data were highly individualized. Ms. C.P. deteriorated from expressing positive emotions in the control group to negative ones in the classical music group. However, two other children shifted from reflecting negative emotions to positive ones in their drawings. Hence, the quantitative data and the qualitative data did not corroborate. Additionally, the study's population size was highly limited which could lead to uncertainty with the results and the inability to eliminate outliers. This concludes that classical music can be an effective tool to increase the concentration time of some children with LD, but each child's response to classical music is highly individualize and need to be taken into consideration.

The quantitative data reflected that pop music both extended and decreased the concentration time of the children by 60% and 40%, respectively. Thus, the effectiveness in increasing the concentration time of children of pop music ranked last among the categories. The results from the qualitative data also corroborated to the findings because four out of five children's drawings reflected negative emotions for both the control group and the pop music group. Additionally, Ms. C.P. deteriorated from expressing positive emotions in the control group to negative ones in the pop music group. This concludes that pop music was not an effective tool to increase the concentration time of most children with LD and should be avoided when a child needs to focus on a task for 30–40 minutes.

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■ Author

Krittin Hirunchupong is a 11th grade student studying at Ruamrudee International School (RIS) located in Bangkok. He is a multi-instrumentalist and has a diploma (ATCL) in both piano and cello. He wants to utilize his talents and his knowledge of music to help those with mental disabilities.

Nannaphat (JaJar) Suwannakul is a junior at Ruamrudee International School (RIS) who is especially passionate about science and music. She wants to combine both of her interests to help underprivileged members of society. Hence, she initiated the Musical Remedy Project to open-up new treatment opportunities for neurodiverse children.