

A Case Study of the Use of Taiko Drumming to Improve Attention and Social Interaction Skills for Remote Children with Learning Disabilities

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Abstract: Playing musical instruments helps promote cooperation, enhance attention, increase joint mobility as well as the range of motion, improve rhythm, balance, power, and raise self-esteem. The aim of the study was to explore the effects on remote children's attention and social interaction skills from taiko drumming. It applied a case study methodology with the subject being a fifth-grade boy with learning disability (LD) and assessed to have unfocused behavior and emotional instability. With experiments conducted in taiko group lessons, the research consisted of a three-month pilot study and further a three-month main study. The pilot study was carried out by giving 12 once-a-week taiko group lessons which lasted 40 minutes each, with the Classroom Attention Observation Form developed by researchers recording the inattentive behavior of the child. The findings showed that the percentage of inattentive behavior in the classroom dropped from 100 to 60 percent. In addition, it was found that the child could obtain much experience of communication and more opportunities to have interaction with others through the process of ensemble taiko drumming. The main study was also carried out by giving 12 once-a-week taiko group lessons which lasted 40 minutes each, with the Chinese Version of SNAP-IV (Gao, 2006) and the Elementary & Junior High School Social Skill Behavior and Characteristic Checklist (Meng, 2004) as the tools. The findings showed that the LD child's degree of inattention had turned from severe to mild, and his social skill disabilities had a significant reduction as well. In general, the six-month taiko group lessons could effectively improve the attention and social interaction skills of students with learning disabilities, and it is hoped that the findings of this research would provide a wealth of new information and reference for subsequent research related to the educational counseling of students with learning disabilities.

Key words: *Taiko; Students with Learning Disabilities; Attention; Social Interaction.*

1. INTRODUCTION

1.1. Research Background and Objectives

Students with learning disabilities have normal intelligence yet suffer from learning difficulties and struggle with academic deficits. Though provided with easy goals to fulfill, they still show no willingness to make an attempt and thus be afflicted with low motivation for learning (Kloomok & Cosden, 1994; Hong, Lin, 2005). Learning disability was discovered relatively later than other types of disorders, but the number of cases has increased quite rapidly. According to the estimation by Larry Silver (1990), about 15% to 20% of students with learning disabilities have symptoms of ADHD as well.

Attention is the gateway to learning. People have to pay active attention to a certain object before generating motivation for learning. Inattentive behaviors not only have an impact on the learning achievements of individuals but also affect the learning performance of others, leading to limited learning opportunities and even interfering with the teacher's ability to teach effectively (Tsai, Lin, 1999). Moreover, approximately 75% of students with LD on average exhibit social skill deficits (Kavale & Forness, 1996). Low frustration tolerance and insufficient confidence make them susceptible to unstable emotions such as loss, anxiety and anger, which evolve to an attitude against learning (Yang, 2003). A study indicates that poor academic achievement may cause a decrease in interaction between children with LD and their

peers, lead to a decline in classmates' acceptance of learning disabled students, and even increase the social exclusion in classrooms (Kavale & Forness, 1996).

Music can bring considerable benefits to the development of children with special educational needs and improve their social interaction for better interpersonal relationships. It is supported by many studies from Wu (2015), Wang (2011), Yu (2011), Chan (2011), Hsieh (2009), etc. On the other hand, music can also improve attention, supported by studies from Lin (2010), Yu (2011), Teng (2008), Tsai (2010), Hsieh (2009), etc. In addition, academically proved by studies from Goldstein (1964), Stevens & Clark (1969), Mahlberg (1973), Hollander & Juhrs (1974), Saperston (1973), Schmidt & Edwards (1976), Warwick (1995), music therapy can enhance social interaction skills and improve interpersonal relationships.

Music activities can enhance the attention of both special-needs students and normal students, showing that music has positive effects on education, counseling, and treatment. Gaston (1968) demonstrated that music has features of nonverbal communication and helps patients communicate with others in a harmonious context and build healthy interpersonal relationships to boost self-esteem and confidence through self-actualization. Saroyan (1990) also referred to the effects of music therapy on special-needs children — building confidence, enhancing expression skills, improving interpersonal relationships, adapting to social behavior, increasing concentration, and relieving anxiety. In remote areas, due to the limited resources, lack of cultural stimulation, and the huge gap between the socioeconomic positions of different families, kids are given few opportunities to take music training aside from the music education in schools. However, the founding of Taiko Club in schools just happened to give children in remote areas a chance to learn music and express themselves. This study applied a case study methodology with the subject being a fifth-grade learning disabled boy assessed to have inattentive behaviors and emotional instability. With experiment conducted in taiko group lessons, the research consisted of a three-month pilot study and further a three-month main study. This study took the process of learning taiko as a medium, made the subject and his classmates participate in the group lesson of the Taiko Club together to improve the Attention and social interaction skills of the child.

1.2. Definition of Terms

1.2.1. Learning disability

Learning disability in this study refers to the symptoms of the fifth-grade boy who studied in a remote primary school in Hsinchu County and was assessed to have inattentive behaviors and emotional instability by the Assessment and Counseling Committee. According to the Regulations on Disabled and Gifted Student Identification published by the Ministry of Education, Taiwan (2013), learning disability is defined as follow: "Learning disability referred to in Article 3, Subsection 9 of the Act means a neuropsychological disorder affecting attention, memory, comprehension, perception, perceptual-motor integration, reasoning, and the like, leading to significant learning difficulties in listening, speaking, reading, writing, or counting, and the like; the above disabilities do not directly result from sensory, intellectual, emotional disabilities, or absence of cultural stimulation, or inappropriate teaching, or other environmental factors." The assessment criteria of the aforementioned learning disability is regulated by the following subsections: (i) normal or above-average intelligence, (ii) significant difference in the individual's abilities, and (iii) significant learning difficulties in listening comprehension, oral expression, literacy, reading comprehension, writing, mathematical computation, among others, and proved to be incurable by the interventions of regular education. Kirk, Gallagher & Anastasiow (2000) divide learning disability into three general categories: (i) neuropsychological/developmental learning disability, (ii) academic/achievement disability, and (iii) social disability.

1.2.2. Attention

Attention has a close relationship with learning. One can hardly recognize, learn, and memorize anything without attention (Cheng, 2006). According to Barkley (2014), ADHD is a developmental disorder, and its common symptoms include inattention, impulsivity, hyperactivity, and/or even negative behavior such as attacking others, destroying property, interfering, or making excessive noise. Gao (2016) suggests that poor academic performance of children with ADHD may result from poor concentration which causes many careless mistakes. This study applied the Chinese Version of SNAP-IV as the assessment tool, where the higher the score, the greater the severity.

1.2.3. Social interaction

Social interaction is an exchange of messages between two individuals that builds, maintains interpersonal relationships and expresses personal emotions (Weng, 2012). Lerner (2003) pointed out that people with learning

disabilities may sometimes have behavioral problems in self-adaptation, social perception, social interaction, and the like. Social interaction referred to in this study is the interaction between children with LD and classmates in natural settings of schools. This study applied the Elementary & Junior High School Social Skill Behavior and Characteristic Checklist as the assessment tool, where the higher the score, the more severe the negative behavior of children; a percentile rank (PR) of a raw score exceeding the cut-off PR represents poor performance or deficits in social interaction. The cut-off PR of students above the third grade is 86.

The subject of this study has trouble building good relationships with classmates and rarely interacts with peers. His susceptibility to frustration leads to emotional instability and frequent conflicts with peers.

1.2.4 Ensemble taiko drumming and music therapy for special-needs children

Taiko ensembles arrange barrel-shaped wooden drums (taiko) of various sizes and shapes for stage performance, much like an orchestral percussion section. However, the relatively large size of these drums and their strategic placement on stage encourages much more vigorous use of the body in performance than orchestral drumming would (Shawn Bender, 2012). Playing musical instruments helps promote cooperation, enhance attention, increase joint mobility as well as the range of motion, improve rhythm, balance, power, and raise self-esteem (Thompson, 2009).

Kemper & Danhauer (2005) consider that music functions as an important stimulus when used to affect the body, perception, emotion, thinking or behavior of a child. The relationship between music and children is highlighted and a concept is brought about by them — Music as Therapy.

A more recent definition has been provided by the World Federation of Music Therapy (WFMT 2011): Music therapy is the professional use of music and its elements as an intervention in medical, educational, and everyday environments with individuals, groups, families, or communities who seek to optimize their quality of life and improve their physical, social, communicative, emotional, intellectual, and spiritual health and wellbeing.

For learning disabled students in regular classes with special educational needs, schools are supposed to provide a quality curriculum that meets their

personal requirements and involves effective learning strategies (McLeskey & Waldron, 2011). Music is a talent given to every child by the Creator. The only difference is how much one is gifted. With appropriate guidance, every child can show one's own musical talent (Chang, 2004). The non-threatening and acquiescent nature of music helps to decrease the anxiety experienced during direct interaction with others and improve the social skills as a starting point for individuals with LD to trust people around them (B. Eren, 2015). Wu and other scholars (2008) indicate that when learning music, children are not only trained to keep a melody or a tempo in mind but also given a chance to have cooperation and engagement in ensembles; therefore, effective musical activities are particularly helpful in promoting social interaction and cooperation among groups. Brynjulf Stige (2017) considers that music could become the bridge connecting special needs children with normal ones and uniting the groups.

Taiko drumming helps children build up their inner sense of order, improve their temperament, and enhance attention effectively (Chen, 2012). The study expects to increase the motivation of LD children for learning via the ensemble taiko drumming pedagogy and train the fifth-grade boy to keep the tempo of a taiko song in his memory. Ensemble taiko drumming not only allows children with learning disabilities to cooperate with others but also enriches their social experience, promoting social interaction and cooperation within groups.

2. METHODOLOGY

2.1. Participants

(1) Subject

The subject of this study, a fifth-grade boy with learning disabilities who studied in a remote primary school, was assessed to have inattentive behaviors and emotional instability (shown in Table 1). The common behavioral problems he had in the school included: (i) being inattentive, absent-minded in the classroom or fidgeting with stationery items, (ii) lacking of motivation for learning and refusing to do schoolwork, and (iii) having emotional instability and frequently being conflicts or fights. Through the clinical assessment, the subject of this study was diagnosed with sustained attention deficits and meets the criteria of ADHD.

(2) Instructors: teachers of taiko lessons in the study

(i) Taiko coach: an external professional coach teaching drumming skills

(ii) Associate teacher: a music teacher in school maintaining the order and coaching the after-school practice

(3) Recorders during the pilot study — observing and recording the number of times of inattentive behaviors

(i) Observer (the researcher) with 12 years of teaching experience.

(ii) Associate observer (music teacher in school) with 4

years of teaching experience.

(4) Examiners during the main study — examining the scale performance in attention and social skills

(i) Teacher A(after-school teacher) who knew the child for 3 years as his personal instructor of academic performance

(ii) Teacher B(subject teacher) who knew the child for 2 years as his subject teacher

(iii) Teacher C(itinerant counselor) responsible for giving him Mandarin lessons four times a week and reading instructions

(iv) Teacher D(associate teacher of taiko lessons) who knew the child for 1 year as the music teacher in school

2.2 Research Instrument

(1) Classroom Attention Observation Form (self-developed):

The form counted the number of times of inattentive behaviors from 10 minutes after the class began to 10 minutes before it ended. The subject was observed once per minute during 20 minutes of observation, and multiple inattentive behaviors in the same time slot would be counted as one. The more inattentive behaviors, the more unfocused the child; in the same way, reduction in inattentive behaviors demonstrates an improvement in attention.

(2) Chinese Version of SNAP-IV (Gao, 2006):

The scale included three subsets: inattention (#1-#9), hyperactivity/impulsivity (#10-#18), and opposition/defiance (#19-#26); these items could be divided into several degrees of severity: none, mild, moderate, and severe (shown in Table 2).

Chinese Version of SNAP-IV is developed by Gao (2006). This 26-item rating scale is an abbreviated version of the Swanson, Nolan, and Pelham (SNAP)

Questionnaire. In the parent SNAP-IV, the test-retest reliability scores in subsets of inattention, hyperactivity/impulsivity, and opposition/defiance were 0.72, 0.67, and 0.59 respectively; in the teacher SNAP-IV, the scores in the three subsets had a score range between 0.60-0.84. These scores of subsets in the parent version and the teacher version were found to have high internal consistency (Cronbach's $\alpha \geq 0.88$), and the three subsets of SNAP-IV also shared a high correlation coefficient ($r=0.51-0.72$) with related subsets in the Child Behavior Checklist (CBCL). Therefore, it is confirmed that SNAP-IV, with proven reliability and validity, can facilitate the clinical assessment and diagnosis of ADHD as a valuable instrument for assessing treatment efficacy.

(3)Elementary & Junior High School Social Skill Behavior and Characteristic Checklist (Meng, 2004)

Based on social skill-related theories and social skill characteristics of learning disabled students, the checklist is developed to screen students for social skill difficulties. Its foundational structure comprises self-related behavior, task-related behavior, and interpersonal behavior (shown as Table 3), with a five-level rating scale as the scoring method — for positive statements, score 5 points for each always, 4 points for each often, 3 points for each sometimes, 2 points for each seldom and 1 for each never; for negative statements, score 1 points for each always, 2 points for each often, 3 points for each sometimes, 4 points for each seldom and 5 for each never. The checklist offers the teacher version, the student version and the peer version, with a high reliability of .66-.96 for each. Among the three versions, the teacher version has the highest reliability and provides expert validity. The higher the score, the more severe the negative behavior of students. The more the percentile rank exceeds the cut-off score, the more severe the poor social skills or deficits. The cut-off score of the fifth-grade boy in the case study was 86.

Table 1. Background Analysis of the Case

Gender	Male	Age	12
Category	Learning Disability	Health Status	Good
Intelligence	Full Scale Intelligence Quotient 72 Verbal Comprehension Index 85 Perceptual Reasoning Index 78 Working Memory Index 69 Processing Speed Index 65	Perception	Spelling and literacy problems. Poor vocabulary and writing difficulties. Reluctance to do homework. Memory and comprehension problems. Lack of motivation for learning.
Behavior	Inattention in the classroom. Hyperactive and impulsive behavior. Sudden anger when things do not go his way. Emotional instability. Frequent conflicts and fights with classmates.	Suggestions	Learning how to relieve stress. Enhance attention. Improve the interaction among peers. Boost confidence and frustration tolerance.

Table 2. Score Conversion Chart of Chinese Version of SNAP-IV

Items Subset	Number of questions Total score	Score(Degree)
#1-#9 Inattention	9 27	< 13 (none) 13-17 (mild) 18-22 (moderate) 23-27 (severe)
#10-#18 Hyperactivity/Impulsivity	9 27	< 13 (none) 13-17 (mild) 18-22 (moderate) 23-27 (severe)
#19-#26 Opposition/defiance	8 24	< 8 (none) 8-13 (mild) 14-18 (moderate) 19-24 (severe)

Table 3. Analysis of Elementary & Junior High School Social Skill Behavior and Characteristic Checklist

Items Subset	Number of questions Total score	Description
#1-#14 Self-related behavior	14 70	Self-concept
#15-#31 Task-related behavior	17 85	Task behavior
#32-#56 Interpersonal behavior	25 125	Interaction skills

3. RESEARCH FINDINGS AND DISCUSSION

3.1. Analysis of Classroom Attention Observation Form

(1) Analysis during the pilot study

Classroom Attention Observation Form was used to collect the observation results in the classroom during the 12 weeks of the pilot study, and the data was further converted into percentage values. The subject was observed once per minute during 20 minutes of observation, starting from 10 minutes after the class begins to 10 minutes before it ends. Multiple inattentive behaviors in the same time slot would be counted as one. Therefore, the observation was conducted for 20 times, and the total number of times of inattentive behaviors would be divided by 20 (total number of time slots in each lesson) and multiply by 100 percent to get the percentage of inattentive behaviors. The observation statistics (shown in Table 4) were finally converted into a chart (shown in Picture 1).

According to Table 4 and Picture 1, inattentive behavior percentages of the subject during the first three weeks were all 100 percent, showing that inattentive behaviors had occurred for 20 times during the 20-minute observation in the classroom and the subject had severe inattention problems.

Week 1 — the number of times of inattentive behaviors was 20, and the behaviors were mostly “fidgets with stationery items” and “looks at extraneous objects.” The subject had not adapted to the tempo of taiko yet and failed to keep pace with peers, which indicated that the learning ability of LD children was relatively lower than normal peers.

Week 2 & 3 — the number of times of inattentive behaviors remained 20, and the behaviors were mostly “fidgets with stationery items,” “laughs without any reason,” and “looks at extraneous objects.”

Week 4 & 5 — the number of times of inattentive

behaviors was reduced to 18, and the subject's attention had been slightly improved. The frequency of “fidgets with stationery items” decreased as well. Inattentive behaviors were mostly “laughs without any reason” and “plays with or looks at classmates.” After an interview with the subject, it showed that he had become motivated for learning and wanted to practice taiko drumming by observing and imitating classmates.

Week 6 — the number of times of inattentive behaviors was raised to 19, and the behaviors were mostly “argues with others” and “leaves seat.” After an interview with the subject, he said he had been in a verbal conflict with peers before the lesson started. That explained why he kept leaving his seat to argue with others and refused the coach's orders. The subject had finally left the classroom and never returned again until the lesson ended. This indicated that the subject had a relatively poor emotional control.

Week 7 to 10 — the number of times of inattentive behaviors had been gradually reduced from 17, 16, to 15 times, and the behaviors were mostly “looks at extraneous objects.” Meanwhile, he had made stable progress in taiko drumming.

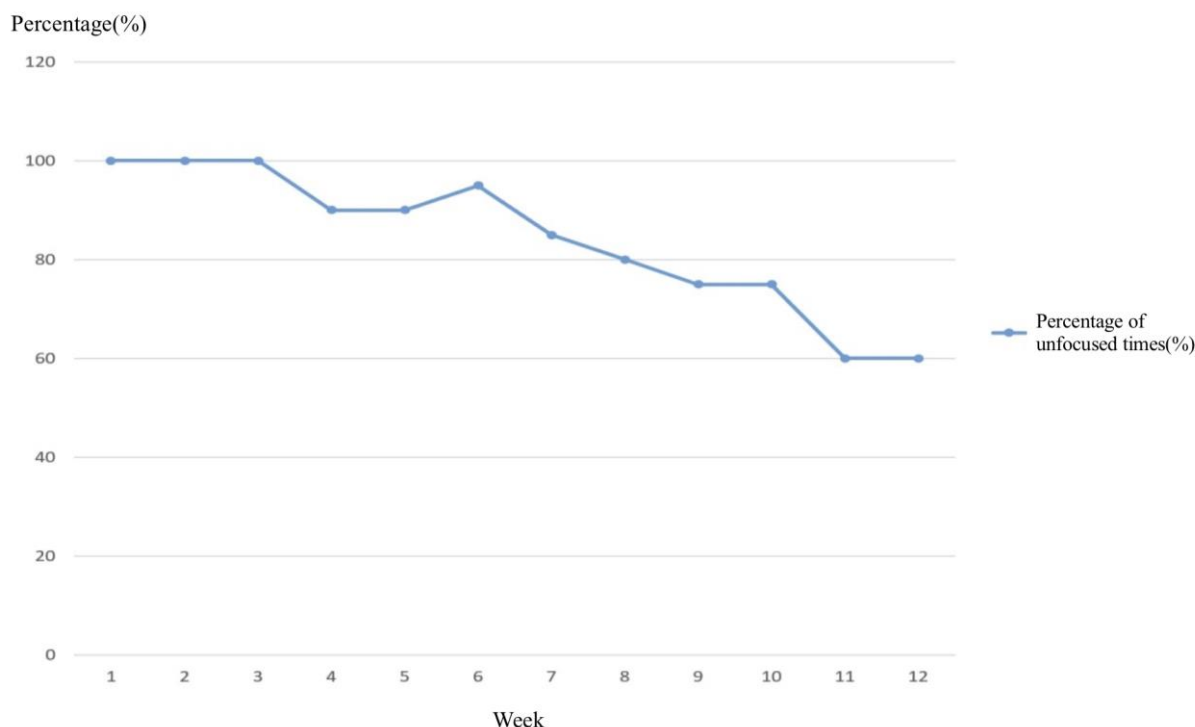
Week 11 & 12 — the number of times of inattentive behaviors dropped to 12. The child could keep pace with peers in learning and even enjoy ensemble drumming with constant smile on his face.

According to the 12-week observation and analysis of the pilot study, the number of times of inattentive behaviors had been reduced from 20 to 12 times, and the percentage had been decreasing from 100 to 60 percent as well. The fact showed that the subject had made significant improvement in attention and memory after learning taiko, and he could remember most parts of the drum scores. Moreover, he had strong motivation for learning and even said he wanted to participate in public performances.

Table 4. Statistics of inattentive behavior observation during the pilot study

Week	1	2	3	4	5	6	7	8	9	10	11	12
Number of times	20	20	20	18	18	19	17	16	15	15	12	12
Percentage(%)	100	100	100	90	90	95	88	88	77	77	60	60

Picture1. Percentage of inattentive behaviors during the pilot study



(2) Analysis during the main study

In order to increase the reliability of data, the main study was conducted by two observers: one was the researcher, and the other was the associate teacher in taiko lessons as an associate observer. Before the lessons started, the researcher explained the program to the associate observer and introduced the criteria of

inattentive behaviors and method of recording observation. During the observation, they kept records on their own without interfering with each other to avoid inconsistency in the interpretation of criteria. The percentage of score consistency between the two observers reached 83 % (shown in Table 5), calculated by the following formula:

$$\frac{\text{number of weeks sharing the same results}}{\text{total number of weeks}} \times 100\% = \text{consistency percentage}$$

Table 5. Forms of consistency between two observers

Week	1	2	3	4	5	6	7	8	9	10	11	12	Reliability
Researcher	18	16	14	11	11	10	17	13	10	9	8	7	83%
Associate observer	18	17	14	11	10	10	17	13	10	9	8	7	

Table 5 shows that the classroom observation results of the two observers disagree on the data of Week 2 and Week 5. Differences were found after an interview with the subject: In Week 2, the number of times of inattentive

behaviors was recorded as 16 by the research while the number was recorded as 17 by the associate observer. The only difference of the two results was “fidgets with stationery items.” According to the subject, he said he had

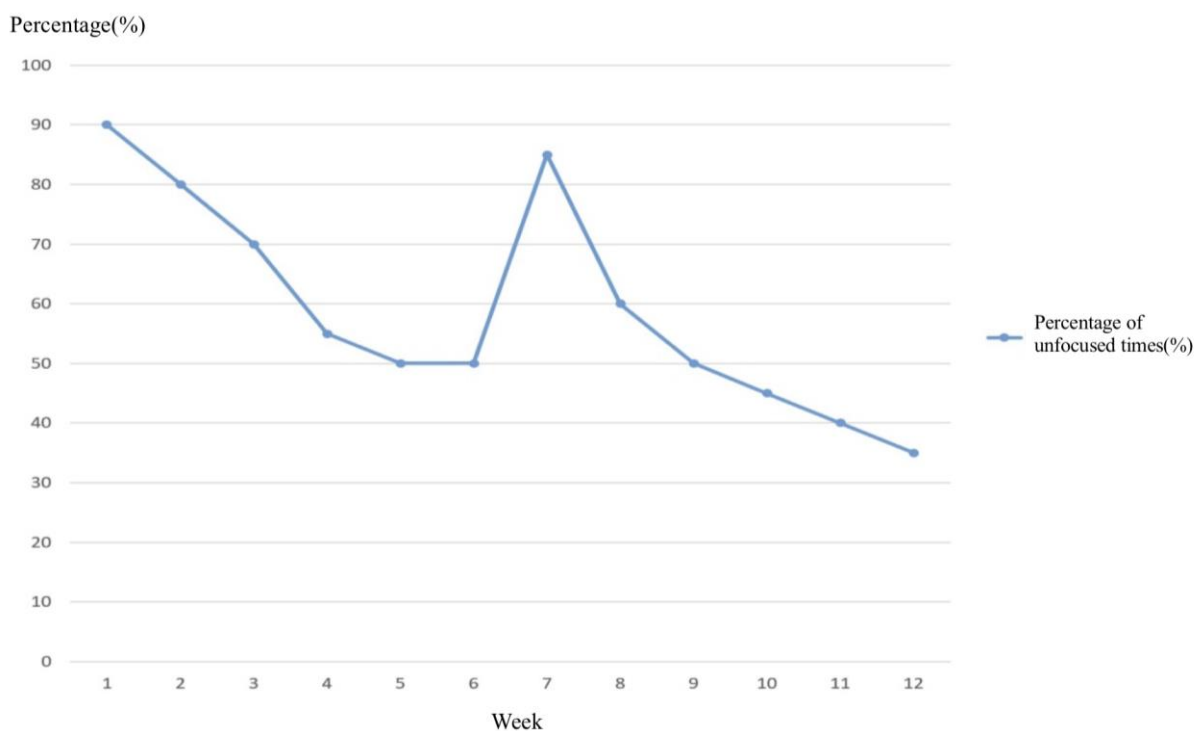
not fidgeted with drumsticks but dropped them accidentally while drumming. In Week 5, the number of times of inattentive behaviors was recorded as 11 by the researcher while the number was recorded as 10 by the associate observer. The difference was “shaking tables and desks.” After discussion, the two agreed that the subject’s

behavior was to move drum stands to the right place and could be excluded. Finally, the research collected the agreed inattentive behavior data which had consistency in results and converted the data into 12 percentage values, shown in Table 6, which was further transformed into a chart (shown in Picture 2).

Table 6. Statistics of inattentive behavior observation during the main study

Week Observer	1	2	3	4	5	6	7	8	9	10	11	12
Researcher	18	16	14	11	11	10	17	13	10	9	8	7
Associate observer	18	17	14	11	10	10	17	13	10	9	8	7
Agreed results	18	16	14	11	10	10	17	13	10	9	8	7
Percentage (%)	90	80	70	55	50	50	85	60	50	45	40	35

Picture 2. Percentage of inattentive behaviors during the main study



According to Table 6 and Picture 2, inattentive behavior percentages of the subject had been increased during the initial stage of the main study, with the numbers of times being 18, 16, and 14 times and the percentages being 90%, 80%, and 70% respectively. The inattentive behaviors included “fidgets with stationery items,” “leaves seat,” and “refuses orders.” The associate teacher in taiko lessons referred that most students had forgotten the tempo of songs and needed some time to practice because the main study was carried out right after the

summer vacation. The subject had relatively worse memory than peers, and he tended to escape from difficulties because of absence of confidence. During the Week 4 to Week 6 in the main study, the numbers of times of inattentive behaviors were 11, 10 and 10 times and the percentages were dropped to 55%, 50%, and 50%, showing that the attention of the subject had been significantly improved.

Week 7 — the number of times of inattentive behaviors grew to 17 again and most behaviors were “refuses

orders.” The associate teacher in taiko lessons explained that the subject was too afraid of challenges to learn the new content (fancy drumming) of taiko lessons. He even asked the coach if he could skip learning the new skills and refused to follow the coach’s orders repeatedly.

Week 8 — the number of times of inattentive behaviors was 13, and the percentage decreased to 60%. During the week, the class was divided into groups to practice for the opening performance celebrating the school anniversary, and two classmates who played well were assigned to group with the subject and teach him. Therefore, he said he was willing to practice fancy drumming skills. It was observed that he could indeed cooperate with others and practice together. Besides, the achievement test before the series of lessons ended also proved that the subject had made huge progress. He was more confident and had smiles on his face more often than before. From Week 9 to Week 12, the number of times of inattentive behaviors had been gradually reduced to 10, 9, 8, and 7, showing a clear fact that the attention of the subject had been improved constantly.

According to all analyses and explanations above, the number of times of inattentive behaviors during the main study had been decreasing from 18 times to 7, and the percentage had gradually dropped from 90% to 35%. It

showed a significant fact that learning taiko could improve the attention of LD children. Supplementary information of words and interviews also showed that the subject had good interaction with peers, and his relationships with others had been improved. He could have friendly communication with classmates, and he became brave enough to perform on stage and obtained confidence.

3.2. Analysis of SNAP-IV

(1)Before experiment — the subject’s results of Chinese Version of SNAP-IV

The subject in the study was assessed with the Chinese Version of SNAP-IV (Teacher) by his homeroom teacher and counselor. In the inattention subset, the scores (shown in Table 7) were 24 and 27, suggesting that both of the examiners considered the subject had a severe degree of symptoms; in the hyperactivity/impulsivity subset, the scores were 23 and 21, suggesting that the homeroom teacher considered the subject had a severe degree of symptoms while the counselor considered he had a moderate degree; in the opposition/defiance subset, the scores were 21 and 19, suggesting that both of the examiners considered the subject had a severe degree of symptoms.

Table 7. Attention deficits assessment of the subject before experiment

Subset	inattention		hyperactivity/impulsivity		opposition/defiance	
	Score	Degree	Score	Degree	Score	Degree
Examiner						
Homeroom teacher	24	severe	23	severe	21	severe
Counselor	27	severe	21	moderate	19	severe
Average score $\frac{C+D}{2}$	25.5	severe	22	moderate	20	severe
Conversion score	< 13 (none) 13-17 (mild) 18-22 (moderate) 23-27 (severe)		< 13 (none) 13-17 (mild) 18-22 (moderate) 23-27 (severe)		< 8 (none) 8-13 (mild) 14-18 (moderate) 19-24 (severe)	

(2)After 3-month pilot study — the subject’s results of Chinese Version of SNAP-IV

After the pilot study, the subject’s degree of attention deficits and hyperactivity was assessed in September, 2017, a week earlier than the taiko lessons in the main study started. The assessment was conducted by Teacher A — the after-school teacher, Teacher B — the subject teacher, Teacher C — itinerant counselor, and Teacher D — the associate teacher in taiko lessons, with responses scored 20, 18, 18, and 19 respectively (shown in Table 8). It showed that in the inattention subset, all examiners considered the subject had a moderate degree of symptoms

with an average score at 18.75 (moderate); in the hyperactivity/impulsivity subset, responses were scored 23, 19, 23, and 21, showing that two examiners considered the subject had a severe degree of symptoms while the others consider he had a moderate degree with an average score at 21.5 (moderate); in the opposition/defiance subset, responses were scored 18, 17, 16, and 18, showing that all examiners considered the subject had a moderate degree of symptoms with an average score at 17.25 (moderate). All the above-mentioned data demonstrated that learning taiko could actually improve the attention of LD children.

Table 8. Attention deficits analysis of the subject after 3-month pilot study

Item	inattention		hyperactivity/impulsivity		opposition/defiance	
	Score	Degree	Score	Degree	Score	Degree
Teacher A	20	moderate	23	severe	18	moderate
Teacher B	18	moderate	19	moderate	17	moderate
Teacher C	18	moderate	23	severe	16	moderate
Teacher D	19	moderate	21	moderate	18	moderate
Average score $\frac{T1+T2+T3+T4}{4}$	18.75	moderate	21.5	moderate	17.25	moderate
Conversion score	< 13 (none) 13-17 (mild) 18-22 (moderate) 23-27 (severe)		< 13 (none) 13-17 (mild) 18-22 (moderate) 23-27 (severe)		< 8 (none) 8-13 (mild) 14-18 (moderate) 19-24 (severe)	

(3)After 3-month main study — the subject’s results of Chinese Version of SNAP-IV

All the post-test scores of the three subsets (shown in Table 9) had been reduced during the week after the lessons finished. Among the examiners, three of them considered that the subject had a mild degree of inattention while the other considered that he had no symptoms anymore, with an average score at 13 (mild); in the subset of hyperactivity/impulsivity, two examiners considered the subject had a mild degree of symptoms while the others considered he had no symptoms anymore, with an average score at 12.75 (none); in the

subset of opposition/defiance, all examiners considered the subject had a mild degree of symptoms, with an average score at 10.25 (mild).

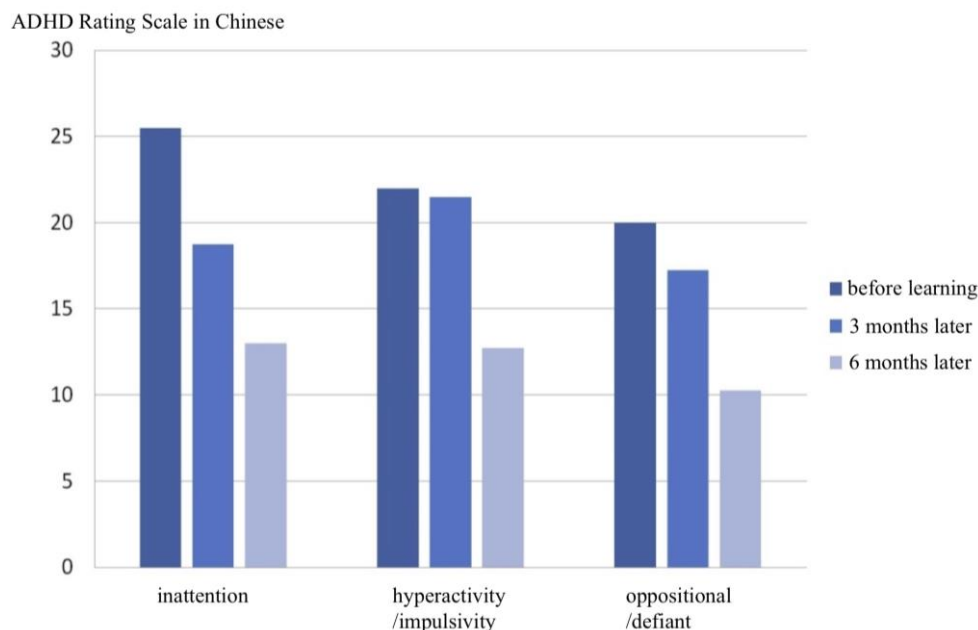
By comparing the scores gained before the experiment, after the pilot study, and after the main study, it was clearly shown that all scores had been decreasing during the period from before the subject had learned taiko through three months later and to six months later. The fact indicated that learning taiko could not only effectively improve the attention of LD children but also reduce their frequency of hyperactive/impulsive and oppositional/defiant behavior occurrence.

Table 9. Attention deficits analysis of the subject after 3-month main study

Item	inattention		hyperactivity/impulsivity		opposition/defiance	
	Score	Degree	Score	Degree	Score	Degree
Teacher A	14	mild	14	mild	11	mild
Teacher B	12	none	12	none	12	mild
Teacher C	13	mild	13	mild	10	mild
TeacherD	13	mild	12	none	8	mild
Average score $\frac{T1+T2+T3+T4}{4}$	13	mild	12.75	none	10.25	mild

	< 13 (none)	< 13 (none)	< 8 (none)
Conversion score	13-17 (mild)	13-17 (mild)	8-13 (mild)
	18-22 (moderate)	18-22 (moderate)	14-18 (moderate)
	23-27 (severe)	23-27 (severe)	19-24 (severe)

Picture 3. Bar chart of the subject’s attention improvement before and after experiment



3.3. Analysis and Check of Social Skill Behavior and Characteristics

(1)Before 3-month main study — analysis of the subject’s degree of social disability

The main study of the research was started in September, 2017, and the pre-test of the subject’s social skill behavior was done a week earlier than the taiko lessons had started, with Elementary & Junior High School Social Skill Behavior and Characteristic

Checklist (Teacher). Table 10 shows the four examiners all considered that the subject had quite severe social skill disabilities, with higher-than-average PR values being more than 50 and even exceeding 86, which was the cut-off PR of students above the third grade. The PR of the scores given by his after-school teacher and subject teacher was even 99, which suggested that the subject had really poor social skill behavior.

Table 10. Analysis of the subject’s degree of social disability before 3-month main study

Examiner	Self-related	Task-related	Inter-personal	Total score in social skills	PR	Cut-off PR
Teacher A	53	71	89	213	99	86
Teacher B	48	61	77	186	99	86
Teacher C	44	56	63	163	91	86
Teacher D	40	61	65	166	93	86

(2)After 3-month main study — analysis of the subject’s degree of social disability

During the week after the main study had ended (December, 2017), when the taiko lessons had finished, the assessment of the subject’s social skill behavior and characteristics was conducted again with Elementary & Junior High School Social Skill Behavior and Characteristic Checklist (Teacher). According to Table 11, after the subject had taken the 12-week taiko lessons, the total scores from all examiners tended to decline. The PR levels of scores from the four examiners were 66, 69,

62, and 64. Though still higher than 50, the PR values were quite lower than 86, the cut-off PR of students above the third grade, which suggested that the subject had made significant improvement in social skills.

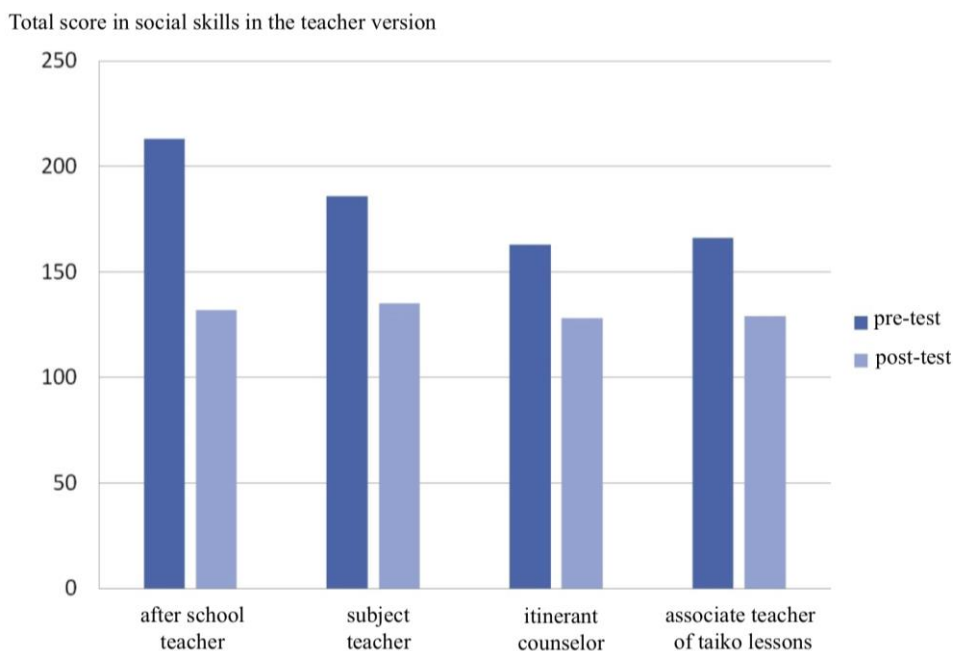
According to Picture 4, the scores of social skill disability given by all examiners had dropped significantly (total score from Teacher A: 213 → 132; Teacher B: 186 → 135; Teacher C: 163 → 128; Teacher D: 166 → 129). This suggested that the social skills of the subject were enhanced significantly after he had learned taiko, and it also showed that learning taiko

could improve the social interaction ability of LD children.

Table 11. Scores of post-test in the teacher version after the achievement test

Examiner	Self-related	Task-related	Inter-personal	Total score in social skills	PR	Cut-off PR
Teacher A	35	42	55	132	66	86
Teacher B	30	50	55	135	69	86
Teacher C	33	40	55	128	62	86
Teacher D	30	43	56	129	64	86

Picture 4. Bar chart of the reduction in social skill disability of the subject before and after experiment



4. CONCLUSIONS AND SUGGESTIONS

4.1. Conclusions

The research findings indicated that the number of times learning disabled children have unfocused behavior in classrooms had gradually decreased during the process of learning taiko, and it was proved that taiko lessons could actually improve the attention of the subject effectively. According to the data of inattentive behavior observation, the percentage of the number of times the subject had inattentive behaviors had declined from 100% to 60% during the three-month pilot study, and it further dropped to 35% after the main study had finished. The sharp, sustained decrease in the number of times of inattentive behaviors proved that the attention of the subject was improved significantly. Furthermore, after the three-month main study, his moderate degree of inattention became mild, or he even showed no symptom at all in some results. This suggested that learning taiko could

have a positive effect on improving the attention of LD children.

Social behavior is an ability to communicate and interact with others in social situations. During the process of learning taiko, the subject had obtained many opportunities to come into contact with others and gained much experience in communicating and cooperating with others. Through the three-month main study, all examiners considered that the social skill disability of the subject had a significant decline, which demonstrated that learning taiko could actually improve the social interaction ability of learning disabled children.

4.2. Suggestions

Despite their normal intelligence, most children with learning disabilities have attention deficits and are put in regular classes. Their unfocused behavior has an impact on their learning achievements and others'

performance, and it even interferes with the teacher's ability to teach effectively. Therefore, aside from the traditional solution of arranging after-school education for LD children, a learning program that can discover their personal strengths and meet their special needs shall be designed to boost their confidence, motivation for learning, and improve their attention and social interaction ability. Ensemble taiko drumming helps enhance normal students' and LD children's concentration, stabilize and relieve their emotions, build their confidence and achievements, and even promote the interaction between peers. In order to achieve the visions of diversified development and integrated education, it is highly recommended for schools to promote ensemble taiko drumming.

The study applied a case study methodology with a learning disabled student as the subject. It is not appropriate to apply the conclusions and findings of this research to students with other types of disabilities or to other cases of learning disability. Researchers suggested that future studies could include more subjects or even get the whole class involved in ensemble taiko drumming to do experiments by dividing students into the experimental group and the control group. It was recommended that future studies could involve students of different ages in the experiment or apply the research method on students with different types of disabilities. Perhaps, non-disabled students might be a good option to be included in the experiment. After all, inattention is a common phenomenon among students, and student's problems with emotional control also cause much trouble for most teachers.

5. REFERENCE

1. Wang Wen-ke, Wang Zhi-hong (2010). Educational Research Law. Taipei: Wunan.
2. Song Shu-hui (1994). Attention deficit and assessment. *High City Buzz*, 4 (2), 21-26.
3. Wu Xing-ru (translated) (2008). Music therapy theory and practice. (Author: Davis, W. B., Gfeller, K. E., & Thaut, M. H.). Taipei: Psychology. (Original publication year: 1999).
4. Meng Ru-ru (2004). National Primary and Secondary School Social Skills Behavior Checklist – Guidance Manual. Taipei: Psychology.
5. Meng Ru-ru (2006). A way to keep your child focused. *Park Life*, 101, 70-72.
6. Zhou Tai-jie (2005). Education for people with learning disabilities. *New Special Education General*, 71-105. Taipei: Wunan.
7. Hong Rong-zhao, Lin Xin-xiang (2005). Research on self-concept and life adaptation of students with learning disabilities in primary and secondary schools. *Journal of Special Education and Rehabilitation*, 14, 55-84.
8. Hong Lan (2013). Learn to play drums and find your confidence. *World Magazine*, 520.
9. Xu Mei-hui (2010). A preliminary study on the learning outcomes of providing educational measures for disadvantaged students under multiple education. *Secondary Education*, 61 (2), 22-31.
10. Gao Shu-fen (2016). *Regain your focus: Adult ADHD full-scale self-help manual*. Taipei: Mind Workshop.
11. Yuan Fang (2002). *Social research methods*. Taipei: Wunan.
12. Guo Mei-mei (1998). Music therapy and communication. *Voice of the State*, 31 (4), 26-31.
13. Zhang Yu-li (1999). From the overview of the implementation of individualized educational programs, we will talk about the direction in which we should work hard in the future. *Special Education New Knowledge Communication*, 6 (2), 1-4.
14. Huang Ci Ai (2002). The field of social skills training. In Hong Yuyu (editor), *the concept and implementation of social skills training* (115-130 pages). Taipei: Department of Special Education, National Taiwan Normal University.
15. Niu Wen-ying (2014). *Qualitative research methods and thesis writing*. Taipei: Double Leaf Book Gallery.
16. Wen Shi-zhen (2012). *Introduction to Psychology*. Taipei: Sanmin.
17. Yang Kun-tang (2003). *Introduction to learning disabilities*. Taipei: Wunan.
18. Yang Xing-zhen (1992). Focus on learning and learning. *Friends of Teachers*, 33 (4), 28-30.
19. Zheng Zhaoming (2006). *Cognitive psychology - theory and practice*. Taipei: Laurel.
20. Cai Ming-fu (1999). The cognitive behavioral orientation intervention program analyzes the counseling effect of the offensive students. *Journal of Special Education Research*, 17, 275-295.
21. Liu Yu-zhi(2006). Attention deficit hyperactivity disorder Chinese version Swanson, Nolan, and Pelham, Version IV (SNAP-IV) scale norm and reliability. *Taiwan Psychiatry*, 20 (4), 290-304.
22. Barkley, R. A. (2014). *Attention deficit hyperactivity disorder: A handbook for Diagnosis and treatment* (4th ed.). New York: Guilford.
23. Bryan, T. (1977). Learning disabled children's comprehension of nonverbal communication. *Journal of Learning Disabilities*, 10, 501-506.
24. Gaston, E. T. (1968). *Music in therapy*. New York: Macmillan.
25. Kavale, K. A. & Forness, S. R. (1996). *Treating social skill deficits in children with learning*

- disabilities: A meta-analysis of the research. *Learning Disabilities Quarterly*, 19 (1),2-13.
26. Kemper, K. J. & Danhauer, S. C. (2005). Music as Therapy. *Southern Medical Journal*, 98 (3), 282-288.
 27. Kirk , S. A. , Gallagher , J. J. , & Anastasiow , N. J. (2000). *Educating Exceptional Children* (9th ed). Boston, MA : Houghton Mifflin.
 28. Kloomok, S., & Cosden, M. (1994). Self-conception in children with learning disabilities: The relationship between global self-concept, academic "discount", nonacademic self-concept, and perceived social support. *Learning Disability Quarterly*, 17 (2), 140-153.
 29. Lerner, J. W. (2003). *Learning disabilities: Theories, diagnosis, and teaching strategies*. Boston: Houghton Mifflin.
 30. Silver, L. B. (1990). Attention Deficit-Hyperactivity Disorder: Is it a learning disability or related disorder? *Journal of Learning Disabilities*, 23, 394-397.
 31. Brynjulf Stige(2017). *Where Music Helps: Community Music Therapy in Action and Reflection*. Routledge.
 32. Ruth JamesJeff Sigafos(2015). *Music Therapy for Individuals with Autism Spectrum Disorder: a Systematic Review*. *Review Journal of Autism and Developmental Disorders*.
 33. B Matney(2016). The use of percussion in therapy: a content analysis of the literature. *Nordic Journal of Music Therapy*, 449-457.
 34. Shawn Bender(2012). *Taiko Boom: Japanese Drumming in Place and Motion*. Univ of California Press.
 35. McLeskey, J., & Waldron, N. L. (2011). Educational programs for elementary students with learning disabilities: Can they be both effective and inclusive? *Learning Disabilities Research & Practice*, 26(1), 48- 57.
 36. Thompson(2009). *Music, thought and feeling: Understanding the psychology of music*. Oxford University Press.