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THE EFFECT OF MOVEMENT AND PLAY-BASED MUSIC EDUCATION ON MUSICAL SKILLS OF STUDENTS AFFECTED BY MENTAL DISABILITY

Research article

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Abstract

The research aims to determine the effect of movement and game-based music education on the musical (exercising dynamics, playing the body, singing) skills of students with moderate intellectual disability. Within the framework of this purpose, it was aimed to improve the musical dynamics application skills, body playing skills and singing skills of students with special needs. In the study, the inter-behavioral multiple probe model, which is one of the single-subject experimental designs, was used. A student affected by moderate intellectual disability participated in the study. The findings showed that the effects of Movement and Play Based (MPBME) music education on the musical dynamics practice skills, body playing skills and singing skills of students with moderate intellectual disability were statistically significant and positive. He has shown that he has developed his skills and that he can demonstrate these skills with different applications and that his skills continue.

Keywords: movement and play-based music education, play, children with special needs, students special needs students' music education

1. Introduction

Although music distinguishes it from other arts, such as the fact that it directly appeals to the human spirit, that it can be listened to while doing a job, that it activates different parts of the brain while listening and performing at the same time, the collective structure of music is of great importance in terms of today's education (Ünver, 2010). Children learn to listen to each other, to move at the same speed, to wait their turn, to express their feelings with sounds, while learning music by playing games, singing, and playing instruments together in the world of sounds (Eskioğlu, 2003). Contemporary music education approaches such as Dalcroze, Orff, Kodaly and Suzuki teach that the student learns music by making and living it; It is defined as a learning process in which the student is active, consisting of activities and games that reveal their creative potential and support the development of social and psychomotor skills (Gürgen, 2006). In this context, besides teaching musical skills, one of the most important functions of music education is to support human development. The importance of music education in

human development is a subject that has been researched since ancient times. Today, studies especially on children show the significant impact of music education on the development of intelligence (Schellenberg, 2011), language skills (Moreno et al., 2013), reading skills, memory, mathematics, motor skills, creativity, and socialization (Özel, 2017; Yalım, 2009). While playing a musical instrument, a complex and motivating activity takes place in which the auditory, visual, somatosensory cortex is active and the multi-sensory structure and motor system work in coordination (Seinfield et al., 2013). In this context, students exhibit a series of musical behaviors that simultaneously activate different parts of their brains while receiving music education.

The common point of these approaches is that when musically appropriate conditions are provided, each child's musical perception can develop, that they can become individuals who understand music, even if they are not virtuosos, and the importance they attach to personality development in children through music education. Every person is born with different characteristics. Individuals try to adapt to society and the environment by living together with many similarities and differences. In order to support this adaptation process, they need to be included in an appropriate education process (Ada et al., 2014). While children in certain age groups and education levels show some developmentally common features with each other, some children, such as children affected by intellectual disability, show some developmental differences from their peers (General Directorate of Disabled and Elderly Services, 2014). While the general education curriculum is sufficient to meet the educational needs of children with developmentally common characteristics, there is a need to make some adaptations in the curriculum or to implement special programs developed for them to meet the educational needs of children with intellectual disability (Balta, 2017).

Contemporary music education approaches accept that every child has an innate musical perception and talent and emphasizes the necessity of focusing on improving this musical skill and increasing the quality of music education with appropriate environments and arrangements (cited in Artan, 2001). In an environment where each student is developing individually and the path to reach each student is different, the method of education plays an important role in the quality of education, reaching the student and changing the student's behavior. The common feature of special education methods in music education literature is that they put play and movement in the center in early music education. Because the child's job is play, and when a little child hears the music for the first time, he moves with the music. The fact that the source of the sound is movement and the necessity of movement in order to produce the sound makes movement education and/or movement education a part of music education. Studies have been conducted on the effects of the music education given with the students who receive formal education and the movement and game-based methods on the various skills of these students and various results have been obtained. Pratt (1991) discussed the importance of music in the education of students with special needs in terms of being a successful activity. Success is of great importance for children with special needs in that it increases motivation, strengthens children's self-confidence, and thus reinforces their desire to be successful in other areas.

In order to meet the educational needs of individuals affected by intellectual disability in various fields, it is necessary to use special education approaches and interdisciplinary approaches effectively (Sart et al., 2016). It provides education in Special Education Practice Schools (SEPS) to students with moderate and severe mental retardation who cannot follow the programs applied in primary schools. The aim of SEPS is to help students adapt to society by improving their self-care, daily life skills and functional aBSSemic skills (MEB General Directorate of Private Education Institutions, 2012; Official Gazette, 2012). SEPS education

programs are different from the programs of formal education institutions. In the SEPS program, the courses for the skills that will prepare the students for life are in the majority. In addition to these lessons at secondary school level, these children are given 3 hours of 'Music and Games' lessons per week. When we look at the 'Music' course education program of SEPS 'Music and Play' course and the 'Music' course of formal education schools, it is seen that affective and psychomotor acquisitions are similar in terms of the development of musical skills, but cognitive acquisitions about using music writing and elements are not included in the SEPS music program (MEB, 2018).

Music education to be given to students with special needs is very important not only in terms of the development of musical skills of children with special needs, but also in terms of the development of psychomotor, social and speaking skills. In this study, the effects of movement and game-based music education on the musical and social skills of the mentally retarded student were examined. Within the scope of this purpose, answers to the following questions were sought:

- What are the effects of movement and game-based music education on the ability of students with moderate intellectual disability to apply musical dynamics (loudness of sounds)?
- What is the effect of movement- and game-based music education on the ability to play the body of students with moderate intellectual disability?
- What are the effects of movement and game-based music education on the singing skills of students with moderate intellectual disability?
- What is the effect of movement and game-based music education on the generalization of musical skills of students with moderate intellectual disability with different test items (applications)?
- What is the effect of movement and game-based music education on the continuity of musical skills of students with moderate intellectual disability?
- Does music education based on movement and play have an effect on the social skills of students with moderate intellectual disability?

2. Method

2.1. Model of the Research:

In this study, "Inter-Behavioral Multiple Probe Model", one of the experimental designs with one subject, was used to determine the effect of Movement and Play-based music education on the musical skills of fifth grade students who were affected by moderate intellectual disability. Single-subject researches are studies that reveal the effectiveness of behavior change or teaching practices by making repeated measurements under standard conditions, with each participant creating self-control (Tekin-İftar, 2018).

2.2. Participants

Two children who were affected by moderate intellectual disability, one five and the other attending the sixth grade, participated in the study. In the selection of the participants, (a) having a diagnosis of moderate intellectual disability, (b) not having any additional disability, (c) not having received or receiving music education in any training center other than school, (d) not having problem behaviors, and (e) 2-3 The prerequisites of fulfilling the word instructions were sought. Three students who met these prerequisites were determined for the research, and then two students (only one student's data was used in the study) were determined

by impartial assignment from among the students who met the prerequisites, taking into account the loss of subjects. The student included in the research has a tendency to sports and music; It has been stated that the student has been studying at the school where the research was conducted for approximately 3 years and 6 months, and in the class where he has been for 6 months, and there is no one in the family of the student who is involved in music. The classroom teacher stated that the student is generally shy, quiet in the environment, and has difficulty in expressing his feelings and thoughts in general. The personal information of the student included in the study is shown in Table 1.

Table 1. *Participant's personal information*

Age	Gender	Diagnosis	Extra D	SE, T	EC, T	Areas of Inadequacy	
						Cognitive D	CS, D
11	M	MID	N	3 Years 6 Months	6 Months	IP (C, A, R, E)	-
						O (S, SI)	-

Note. *M= Male; D= Disability, MID= Moderate Intellectual Disability, N= None, SE= Special Education, T=Time, EC= Education in the Classroom, CS= Communication Skills, IP=Information Processing, C=Classification, A=Association, R=Reasoning, E= Evaluation, O= Output, S=Speaking, SI= Social Interaction.*

2.3. Data Collection Tools

In this study, four types of data forms were used to collect data from students, teachers, and parents: (a) child information form, (b) musical skill analysis registration forms, (c) reliability forms, and (d) social validity data forms. The child information form was developed by the child's teacher in order to collect demographic information about the student participating in the research, such as age, gender, disability, areas with a tendency, number of siblings and education period. The Child Information Form consists of 11 questions in total, four open-ended, three with yes or no answers, and four with options. Musical skill analysis registration forms, three different data collection forms (musical dynamics application skills analysis registration form, body playing skills analysis registration form and singing skills analysis registration form) were used for each dependent variable.

There are ten items in the Musical Dynamics Practice Skills Registration Form (MDPSRF) to record the student's behaviors regarding musical dynamics at the beginning level, application level, generalization level and follow-up level. At the generalization level, the music played, and the instruments used were changed and recorded. At each level, 'plus (+)' was put for the musical behavior that the student practiced and 'minus (-)' for the musical behavior that the student did not apply, and the percentages were calculated by scoring the sessions. There are ten items in the Body Stealing Skills Analysis Registration Form (BSSARF) in order to record the initial level, practice level, generalization level and follow-up level data of the student's behaviors regarding body stealing skills. At the generalization level, the subjects' behaviors were recorded by changing the items. At each level, 'plus (+)' was put for the musical behavior that the student practiced and 'minus (-)' for the musical behavior that the student did not apply, and the percentages were calculated by scoring the sessions. There are ten items in the Singing Skills Analysis Registration Form (SARF) to record the initial level, practice level, generalization level and follow-up level data of the student's singing skills behaviors. At the generalization level, the musical behavior of the student was recorded by making him sing another song of his choice. At each level, 'plus (+)' was put for the musical behavior that the

student practiced and 'minus (-)' for the musical behavior that the student did not apply, and the percentages were calculated by scoring the sessions.

In this study, four types of data were collected: baseline, teaching, generalization and follow-up session. All data were collected by the researcher. Generalization level data were collected by the researcher by changing the questions at the end of the experimental process. The criterion was considered to be met when 80% or more of success was achieved in each behavior. Follow-up level data were collected by the researcher 7 days after the completion of the experimental process, 14 days later and 28 days later.

2.3.1. Reliability Data Sheets

Within the scope of this research, in order to determine whether the movement and play-based music education program was implemented as planned in accordance with its purpose, the application reliability data MDPSRF Application-Level Reliability Form, BSSARF Application Level Reliability Form, SARF Application Level Reliability Form were developed for the application sessions. There are a total of 54 items in the MDPSRF application reliability form, 20 items for one session, 28 items for the other session, 28 items for one session of SARF, and 21 items for the other session. Each item in the forms was coded using either “yes” or “no” options. For each level, the application reliability coefficient was calculated by calculating the percentage of items marked as yes. Inter-observer reliability (IR) forms were collected by two observers at 36% of each level.

2.3.2. Social Validity Forms

In the study, two separate social validity forms were developed by the researcher for classroom teachers and branch teachers in order to collect social validity data from the subject's classroom teachers and branch teachers. The forms consist of 5 Likert-type (strongly disagree, disagree, partially agree, agree and strongly agree) 10 statements and 2 open-ended questions. It was scored as strongly disagree (1), disagree (2), partially agree (3), agree (4), and strongly agree (5). The Teacher Social Validity Form consists of 11 items and 2 open-ended questions.

2.4. Data Collection

In this study, which was conducted to determine the effect of movement and game-based music education on the musical skills of fifth grade students who were affected by moderate intellectual disability, the data collection process was carried out after obtaining official permissions from the relevant persons and institutions. In this context, firstly, after obtaining written permission from the student's classroom teacher and parents using informed consent forms, the student's classroom teacher was asked to fill in the child information form. Then, at the beginning of the study, baseline data, practice level data for each musical behavior, and attendance level data between practices were collected. Generalization level data were collected at the end of the study, and follow-up level data were collected 7 days after the study (Follow-up 1), 14 days (Follow-up 2), and 28 days (Follow-up 3) in three sessions. Finally, social validity data were collected from all teachers and parents who attended the student's classes. The data collection program followed during the experimental study is shown in Table 2.

Table 2. *Experimental study data collection program*

Data Collection Tool	Target Audience to be Applied	Application Time
Child Information Form	Class Teacher	Before the first session
SAMD - B	Participant	Before the first session
SAMD - LI	Participant	1. Implementation Phase
SAMD - AL, BSS - AL, SS - AL	Participant	1. End of Application
BSS - B	Participant	2. Pre-Behavior
BSS – LI	Participant	2. Implementation Phase
BSS - AL, SAMD - AL, SS – AL	Participant	2. End of Application
SS - B	Participant	3. Pre-Behavior
SS - LI	Participant	3. Implementation Phase
SS - AL, SAMD - AL, BSS - AL	Participant	3. End of Application
SAMD - LG, BSS - LG, SS – LG	Participant	After last session
SAMD - ML, BSS - ML, SS - ML	Participant	7 days after last session
SVF Form (Teacher)	Teachers	14 days after last session
SVF Form (Parent)	Parents	28 days after last session

Note. *SAMD= Skills for Applying Musical Dynamics; BSS= Body Stealing Skills; SS= Singing Skills; B= Baseline; LI= Level of Implementation; AL= Attendance Level; LG= Level of Generalization; ML= Follow-up Level; SVF= Social Validity Form.*

2.4.1. Collection of Social Validity Data

After the MPBME program was terminated, social validity data were collected from the participant's teachers and parents in order to determine the lessons applied during the study, the movement and game-based music education program, and the outputs of the program on the subject. In this study, subjective evaluation and monitoring methods, one of the social validity data collection methods, were used to collect social validity data. It is very important to collect social validity data from those who are directly or indirectly affected by the practices implemented in the study, in order to enable them to evaluate the validity of the research in different ways (Atbaşı & Karasu 2018 as cited in Kalkan, 2019). In this context, social validity data were collected using the Teacher Social Validity Form and the Parent Social Validity Form within the scope of this study.

2.5. Experimental Study Process

Experimental process is explained under the titles of development of Movement and Play-Based Music Education (MPBME) Program, pilot implementation, intervention/teaching (experimental procedure), training of observers, and collection of social validity data.

2.5.1. Development of Movement and Game Based Music Education (MPBME) Program

Within the scope of this research, the Music and Game Curriculum for Students with Moderate-Severe Intellectual Disabilities and Autism Spectrum Disorders (II. Level 5,6,7 and 8th Grade) was examined and three musical behaviors were selected to be the basis of the study. For Musical Dynamics Practice Skills (MDPS), “revitalizes the sounds around him by using different sound sources according to their loudness; accompanies with words/movements/rhythms in accordance with the loudness of the piece of music played or sung; He uses his body as a rhythm instrument in accordance with the music he listens for his Body Stealing Skills (BSS) with the acquisitions of "Sings the music he hears around him with a suitable volume and applies the rules of listening to music"; makes a rhythm party; accompanies the music he hears around him with words/rhythm/movement at an appropriate pace; applies the rules of making music; he accompanies game music or melodies with different

rhythmic structures with improvised movements, and in BSS he uses his voice correctly while singing; sings individually to its rhythm; accompanies the music he hears around him with words/rhythm/movement at an appropriate pace; makes musical play studies; Performs rond studies, gains are determined. MPBME teaching sessions were developed based on these achievements. Musical activities with play and movement content developed within the scope of this study have been developed with reference to contemporary music education approaches such as Orff-Schulwerk, Kodaly, Suzuki, whose effectiveness in various fields has been determined through research in national and international literature. The MPBME program aims to support the development of musical skills of children with intellectual disability as well as typically developing children in pre-school and primary education age. The MPBME program aims to improve musical skills even in students with moderate disability step by step with activities that are economical, useful and functional. It is essential to arouse students' curiosity and make them willing to learn in all activities held at MPBME. Along with the fact that the teacher is always in the role of the child's playmate, the games are designed in line with a certain goal, the manager of the game is changing places, and it aims to support the social characteristics along with the development of musical skills. The MPBME Program consists of (a) meeting-breaking the ice, (b) practicing musical dynamics, (c) playing the body and (d) singing.

Meeting – Breaking the Ice: In the first session, which was considered as getting to know, meeting games were played with the students, with these games it was aimed to both express oneself and learn the skills of applying musical dynamics secretly. Practicing Musical Dynamics: First of all, the concept of light and strong (piano-forte) was discussed in the sessions for practicing musical dynamics. Then, the sound that gradually increases in intensity (crescendo) is considered as the sound that gradually decreases (diminuendo). Stealing Your Body: Within the scope of body playing skills, one beat, half beat and 4 beat notes, feet on the ground, hands on knees and chest, clapping, finger snapping and their combinations were first discussed with mirroring, reflection games, working on producing hand games It was aimed to study on the acquisition of body playing skills while singing (the rhythmic duration includes one beat, half beat and two beat sol-mi-re-do sounds). Singing: In the sessions for singing skills, it is aimed to work on the concept of low voice and deep voice. The song to be taught (pentatonic consisting of do-re-mi-sol-la sounds) was studied by playing the body, with movements, tempo work with a glass, and rhythm work. Do-re-mi are studied as deep sounds, left and la as treble sounds. In glass works, the number of measures and the words corresponding to the unit beat were studied in detail.

2.5.2. Pilot Session

The pilot study was carried out in order to evaluate the usefulness and functionality of the MPBME program and data collection tools, and to make revisions in both the syllabus and data collection tools in order to eliminate possible problems that may occur in the experimental process and to eliminate these problems. The pilot study, which was started after the approval of the thesis monitoring committee, was attended by three Intermediate Level Mentally Influenced students who were studying in a secondary school in the Canik district of Samsun province and fulfilling the conditions discussed under the title of participants. The average age of the students participating in the pilot study is 11, and all three do not have any additional disabilities other than intellectual disability. After the pilot application, the duration of the movement and game-based music education lessons for each behavior and the changes to be made in the content of the lessons and the skill analysis registration forms were determined. Afterwards, changes were made in the content of the activities used within the scope of movement and game-based lessons, the repetitive games were reviewed and simplified, and the places of some games were changed. With the arrangements and revisions made, the

movement and game-based music education program and skill analysis registration forms were finalized to be used in the experiment process.

2.5.3. Intervention/Teaching

Experimental study process was carried out in five stages: baseline sessions, practice sessions, probe sessions, follow-up and generalization sessions. In all data collection sessions, tools were kept ready in the music classroom where the application was made beforehand. Before the sessions, a short conversation was made with the student, and the motivation of the student to study was provided. All data collection sessions were video recorded. The experimental process of the MPBME program was completed with 44 sessions consisting of a total of 736 minutes, and this process took 11 weeks. In the MPBME Program, in which introductory sessions were covered within the scope of Musical Dynamics Practice Skills (MDPS), Body Stealing Skills (BSS), and Singing Skills (SSW), skills were studied sequentially in order to provide experimental control, as mentioned above. Before starting the practice sessions of each skill, baseline sessions were held until stable data were obtained five times. MDPS Baseline sessions were held first, followed by BSS Baseline Sessions, and lastly BSS Baseline Sessions. Necessary materials were made available in the music class before starting the Introductory Level sessions. The purpose of the study and the expected behaviors were briefly introduced to the student and the studies were recorded with video. Baseline data were collected in the music class, and MDPSRF baseline data took 48 minutes, BSS baseline data took 44 minutes, and SARF baseline data took 20 minutes.

The practice sessions, MPBME sessions, lasted 86 minutes for the first behavior, musical dynamics practice skills, 165 minutes for body-playing skills, and 208 minutes for singing skills. The practice sessions with the student were held on two separate days of the week, for 20 minutes each. From the second week on, 4 practice sessions of 20 minutes each were held in the 2nd, 3rd, 4th and 5th weeks, and six 20-minute practice sessions were held in the sixth week. In the practice sessions, due to the course of the study due to the individual situation of the subject, the last session of MDPS was prolonged by six minutes, the fourth session of BSS was extended by two minutes, the last session by three minutes, and the last session of SS by five minutes. After collecting data continuously until 80% criterion was met on dynamics application skills and continuous stable data was obtained, the application was started on body stealing skills and the application was continued until the criterion was met and stable data was obtained. After obtaining stable data on body-stealing behavior, the third behavior, singing skills, was implemented. All of the sessions are of a nature that will ensure the active participation of the student, and role changes were made in most of the games. Role changes give the subject the position in the game where they need to produce movement, rhythm patterns, or sounds, and the instructor mirrors the subject. Thanks to these games, it is aimed to contribute to the development of the musical skills of the subject, on the other hand, to enable the development of his social skills in terms of having leadership experience as the person who gives instructions and manages the game. At the beginning of each application, the content was introduced, and at the end the content discussed in the application was summarized, "What part of today's game did you like the most, where was the easiest part for you?" Feedback was received from the subject with questions such as and at the end of the application, almonds were given to him as a reward.

In the probe sessions, probe data were collected in order to check whether the three skills within the scope of this research underwent a change in the process. While baseline data were collected for the skill of applying musical dynamics, attendance data were collected for the other two skills. After meeting the criteria for the ability to apply musical dynamics, baseline data for the second skill and attendance data for the third skill were collected. A functional

relationship has been established between dependent and independent variables in the absence of a change in all skills that will adversely affect the evaluation of the experimental effect (Tekin-İftar, 2018). At the end of the 2nd week, the first probe level data were collected in 43 minutes, at the end of the 4th week, the second probe level data was collected in 42 minutes, and at the end of the 6th week, the third probe level was collected in 38 minutes. Attendance level data was collected on another day in that week after practice sessions. Attendance level data were collected in 40 minutes, in 2 sessions of 20 minutes each.

In the follow-up sessions, follow-up data were collected in order to observe whether the student continued the musical skills developed within the scope of the research. Throughout the follow-up data, the subject did not receive any musical training. The first follow-up data was collected seven days after the end of the study, the second 14 days after the end of the study, and the last follow-up session 28 days after the end of the study. The follow-up sessions lasted 10 minutes for MDPS and BSS, and 5 minutes for SS.

Generalization sessions, a 10-minute session was held in the music class after the study was over. Generalization data were collected by the researcher with different applications for the same behaviors. In the generalization sessions, the questions were asked by playing the instrument with a live performance, instead of playing the MDPS. The questions for BSS were asked by changing the rhythm patterns. For SS, data were collected with another song sung by the student. Generalization data were collected in a 10-minute session at the beginning of the seventh week. MPBME application and data collection times are shown in Table 3.

Table 3. *MPBME Application and Data Collection Times*

Sessions	Intervention Times				
	ST	NS	TSM	AAT	TAT
SAMD					
Starting Level	10	4	40	12	48
Practice Sessions	20	4	80	21.5	86
Polling Sessions	20	2	40	11	43
Follow-up Sessions	10	1	10	10	10
Generalization Sessions	10	1	10	10	10
BSS					
Starting Level	10	4	40	11	44
Practice Sessions	20	8	160	20,5	165
Polling Sessions	20	2	40	20.5	42
Follow-up Sessions	10	1	10	10	10
Generalization Sessions	10	1	10	10	10
SS					
Starting Level	10	2	20	10	20
Practice Sessions	20	10	200	21	208
Attendance Level	20	2	20	19.5	38
Follow-up Sessions	5	1	5	5	5
Generalization Level	5	1	5	5	5
Total		44	700		734

Note. *Data for times is in minutes. SAMD= Skills for Applying Musical Dynamics; BSS= Body Stealing Skills; SS= Singing Skills; ST= Scheduled Time, NS=Number of Sessions, TSM=Total Scheduled Time, AAT= Average Actual Time, TAT=Total Actual Time.*

2.5.4. Training of Observers

Within the scope of the research, 2 observers, who had general information about the study but did not have knowledge about the subject, were trained to collect data on dependent variables by using data collection tools such as MDPS, BSS, SS. One of the observers who took part in the data collection process is a lecturer with a master's degree in special education teaching, the other is a musicologist and an Orff-Schulwerk expert trainer educator. Observer trainings for MDPS, SS and BSS lasted for 1 hour each, and during the training, the observers were explained with examples how to code each item in the observation system. After the training, observations were made with both observers using pilot application videos. Observations continued until at least 80% agreement was achieved between the MDPS, SS and BSS item scores of each observer and the instructor's item scores for the reliability of each skill in three sessions. Observers met the criteria for MDPS in the X Y Z session, for BSS in the Z T V session, and for SS in the W R S session, respectively. Inter-observer reliability was calculated using the formula "Reliability= [Consensus/ (Agreement + Disagreement)]x100" (Erbaş, 2012). During the trainings, the mean interobserver reliability (CIS) coefficient was calculated to be 87% for MDOP, 90% for BSS, and 89% for SS (range=85-92).

2.6. Analysis of Data

In the research, three types of data were collected: experimental procedure data (baseline, application, probe, generalization, follow-up data), reliability data (Inter-Observer Reliability and Practice Reliability data), and social validity data. In the following headings, explanations for the analysis of the data are given. In single-subject experimental studies, data are analyzed graphically. In this study, an inter-behavioral multiple probe model, one of the single-subject experimental designs, was used to determine the effects of movement and play-based music education on the musical skills of students with moderate intellectual disability. In this context, the data obtained within the scope of the research were interpreted by marking on the graphics.

2.6.1. Analysis of Reliability Data

In the study, inter-observer reliability data for each behavior (MDPS, BSS and SS) were obtained from baseline, application, collective probe, generalization and follow-up sessions, and application reliability data from 30% of the practice sessions of each behavior (MDPS, BSS and SS). The records were collected by follow-up. The IR coefficient for each was calculated using the formula "Reliability= [Agreement/(Agreement + Disagreement)]x100" (Erbaş, 2012). In the reliability calculation, the scores given by the two observers independently for each item, instead of the total evaluation score, were recorded in the reliability forms and compared. The inter-observer reliability (IR) coefficient was calculated as 87% for MDPS, 90% for BSS, and 89% for SS. In order to calculate the application reliability coefficient of the research, 30% of the sessions were examined at all session levels. The average application reliability coefficient of the study was 95% for the baseline sessions; 89% for practice sessions; It was calculated as 94% for probe sessions.

2.6.2. Analysis of Social Validity Data

The social validity data explained in the data collection tools and data collection process sections were collected from teachers and parents. There are 10 Likert-type items in the teacher social validity form, 11 Likert-type items in the parent social validity form, and 2 open-ended

questions in both forms. Open-ended questions were analyzed descriptively. Likert type questions were calculated as frequency and percentage.

2.7. Ethical Status

In this study, research ethics principles were observed, and necessary ethics committee permissions were obtained. Within the scope of the ethics committee permission, the document numbered 2018/142 was obtained on 02.05.2018 from the Social and Human Sciences Ethics Committee of Ondokuz Mayıs University.

3. Findings

In this section, findings on the effects of the MPBME program on the musical skills of students with moderate intellectual disability are included. In this context, the findings of the research are summarized on the basis of the research questions. Using the MPBME program, the data obtained on teaching musical dynamics, playing the body and singing skills are shown in Figure 1 on the graph. In the graph, the horizontal axis shows the number of sessions, and the vertical axis shows the correct response percentage of the participant in each target skill in the sessions. In this study, the application-oriented data were collected in four phases: initiation sessions, practice sessions, generalization and follow-up sessions. The correct response percentages of the student were calculated by dividing the number of steps to which the student responded correctly by the total number of steps in the skill analysis and shown in the graph.

3.1. The Effect of the MPBME Program on the Ability to Practice Musical Dynamics

The findings of the research regarding the effects of the MPBME program on the ability to practice musical dynamics (loudness of sounds) of students with moderate intellectual disability are shown in Figure 1. The average of the Musical Dynamics Practice Skills (MDPS) baseline data collected from the participant is 44% (range=40%-50%). The average of the data collected in the daily probe sessions after the practice sessions is 80% (range=70%-90%). This finding shows that the data collected in daily probe sessions during the MDPS implementation process of the participant increased approximately 1.8 times compared to the baseline level. It was determined that the participant had the most problems with the concepts of "the beginning, the end and the middle of the music" in the MDPS probe sessions. The participant can sing the light and strong voices simultaneously in the music they listen to, It was seen that she performed the reflection according to the loudness she heard while mirroring with applause. The average of the participant's data collected from the first batch probe sessions is 86% (range=80%-90%), the average of the data collected from the second batch probe sessions is 86.66% (range=80%-90%), the average of the data collected from the third batch probe sessions is % 93.3 (range=90%-100%). It was determined that although the participant had difficulty in describing the musical dynamic simultaneously with the music he listened to, as he had difficulty in the concept of the beginning, the end and the middle of the music, he had difficulty in expressing it afterwards. It has been determined that the MPBME program has a positive effect on the ability to practice musical dynamics (loudness of sounds) of students with moderate intellectual disability.

3.2. The Effect of the MPBME Program on the Ability to Steal Your Body

The effects of MPBME on the body stealing skills of students with moderate intellectual disability are shown in Figure 1. The average of the baseline level of Body Stealing Skills (BSS) data collected from the participant is 22% (range=20%-30%). The average of the data

collected in the daily probe sessions after the practice sessions is 80% (range=80%-80%). This finding shows that the data collected in daily probe sessions during the participant's BSS implementation process increased approximately 3.6 times compared to the baseline level. It was observed that the participant had problems with the items with high difficulty levels in the BSS probe sessions. The average of the data collected from the first probe sessions of the participant is 20% (for the second behavior, the first probe level data was collected before the baseline level), the average of the data collected from the second probe sessions was 80% (range=80-80%), the data collected from the third probe sessions the average is 93.3% (range=90%-100%). As a result of the application, it was determined that the music education of the MPBME program had a positive effect on the ability to play the body of the students who were affected by moderate intellectual disability.

3.3. The Effect of MPBME Program on Singing Skill

The effects of MPBME on the singing skills of students with moderate intellectual disability are shown in Figure 1. The average of the Singing Skills (SS) baseline data was 36.6% (range=30%-40%). The average of the data collected in the daily probe sessions after the practice sessions is 86.6% (range=80-90%). This finding shows that the data collected in daily probe sessions during the participant's SS implementation process increased approximately 2.3 times compared to the baseline level. It was determined that the participant had difficulty in the sounds that he could not make while learning the lyrics in the SS probe sessions. The average of the data collected from the first collective probe sessions of the participant was 36.6% (for the third behavior, the first and second probe level data were collected before the baseline level), the average of the data collected from the second collective probe sessions was 36.6% (range=30%-40%), The average of the data collected from the third batch probe sessions is 90% (range=90%-90%). It was observed that the participant could sing the song at the right tempo with the instrument accompaniment. As a result of the application, it was determined that the MPBME program had a positive effect on the singing skills of students with moderate intellectual disability.

3.4. The Effect of MPBME Program's Musical Dynamics Practice Skills on Generalization and Persistence

The effect of MPBME on the generalization and continuity of the musical skills of students with moderate intellectual disability with different test items (applications) is shown in Figure 1. The generalization data were determined as 90% for MDPSRF, 90% for BSS, and 90% for SS. This result is statistically significant and positive. It has been shown that movement- and game-based music education is effective in generalizing the musical skills of students with moderate intellectual disability. Findings of MPBME regarding the persistence of musical skills of students with moderate intellectual disability, the level of maintenance of skills seven days after the end of the application, 14 days and 28 days for MDPSRF (range= 80%-90%); For BSS, an average of 86.6% (range=80-90%); It was determined as 90% (range=90%-90%) for SS. At the end of the application, it was observed that the students who were affected by moderate intellectual disability continued their musical skills.

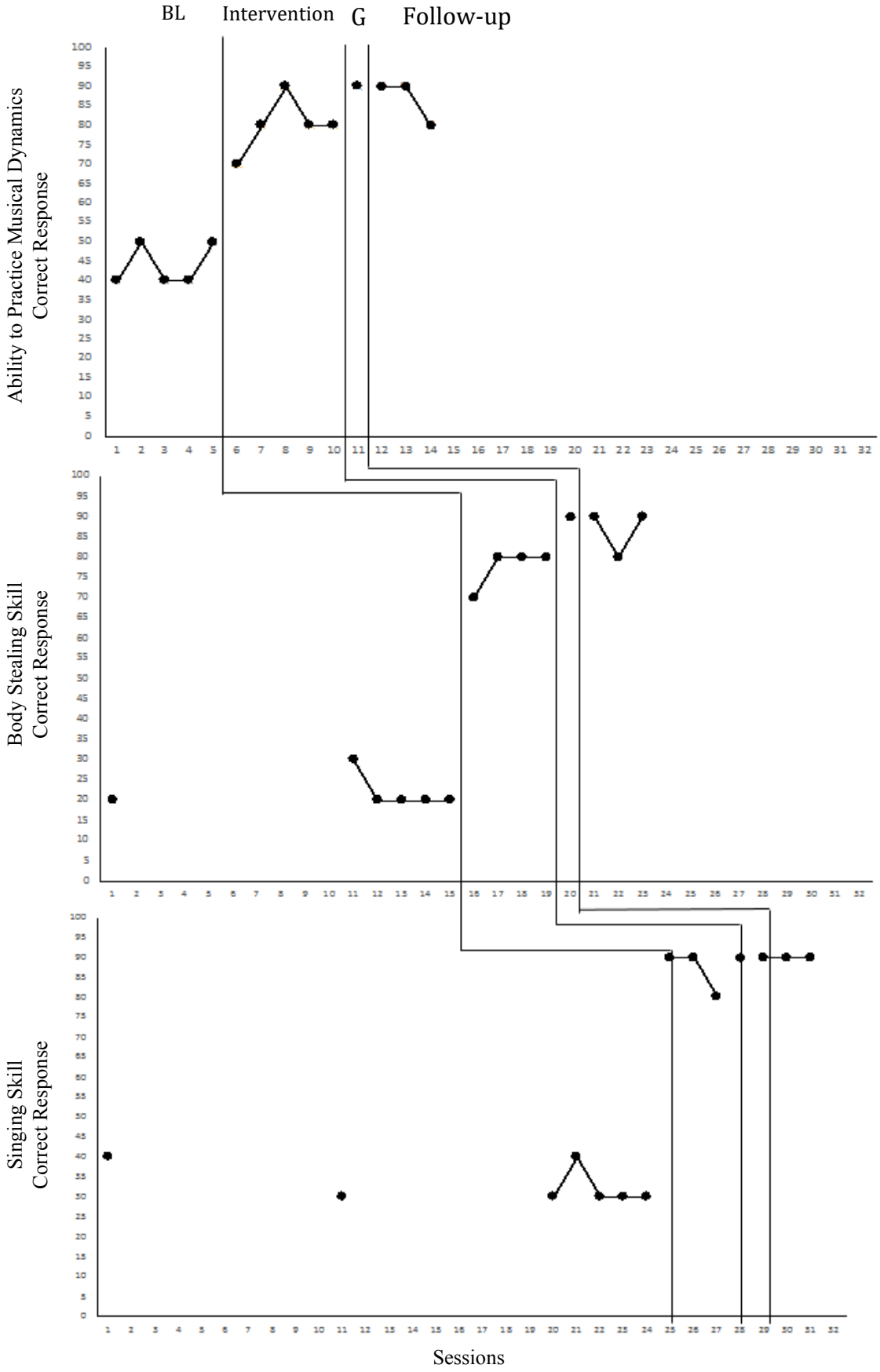

Figure 1. *Correct response percentages for the ability to apply musical dynamics, the skill to play the body, and the ability to sing*

3.5. Social Validity Findings

In the data collected from the teachers after the MPBME applications, the teachers stated that the self-confidence of the students increased; he started to greet his friends when he entered the classroom; he started to say “bon appetit” to teachers and students in the cafeteria; when he didn't want to do something, he started to express it; he started to take a leadership role in classroom educational games; he likes to take responsibility very much; his compatibility with his friends is much better than before; although he was very shy before, he is now very assertive; they stated that they started to act on their own in the physical education lesson and stated that the social skills of the students improved. Parents, on the other hand, stated that after the MPBME applications, the participant started to communicate with the guests who came to the house; that he said welcome now, when he had never spoken before; chatting with them, saying goodbye to the guests on their way; he entered environments with people he did not know and started to communicate and chat with others; stated that they think that their social and communication skills have improved significantly. Social validity data show that the MPBME program has a positive effect on children's social skills.

4. Discussion, Conclusion and Recommendations

Research findings show that MPBME improves the musical skills of students with moderate intellectual disability. Moreover, the findings showed that after the MPBME program was completed, the participant was able to demonstrate these skills with different applications and continued to use all the skills they had acquired. In addition, with the social validity findings collected from the participant's teachers and parents, it was concluded that MPBME had positive effects on the participant's social skills.

At the end of the research, it is seen that the MPBME Program with a moderately mentally retarded participant has a statistically significant and positive effect on the development of the participant's Musical Dynamics Practice Skills (MDPS), Body Stealing Skills (BSS), Singing Skills (SS). These results of the research are similar to the results of the research conducted with students affected by intellectual disability (Kaleci, 2017; Karagöz, 2019; Öner, 2014) and the results of the research conducted with students with normal development. For example, in the research conducted by Karagöz (2019), it was concluded that musical practices with rhythm content have positive effects on the musical desire and skill levels of moderate and severe mentally retarded individuals. Similarly, Sarıkaya (2019) found that the educational game method in rhythm teaching was more effective on students' musical skills compared to traditional teaching methods.

Within the scope of this research, it was concluded that the generalization data collected with different applications regarding the skills acquired by the participant in the MDPSRF, BSS and SS practice sessions were statistically significant and positive. Therefore, the generalizability of the positive effect of MPBME on students with moderate intellectual disability' musical skills has been demonstrated in terms of the participant's ability to demonstrate their acquired skills with different applications. Moreover, follow-up data collected 1 week, 2 weeks, and 4 weeks after the MPBME practices ended, revealed that the participant continued to use the musical skills acquired in the study at a high level. These results of the research coincide with the results of other single-subject studies conducted with students with special needs with movement and play-based music education methods (Kılıç, 2019; Eren, 2013). For example, Kılıç (2019) stated that the use of simultaneous prompting, one of the error-free teaching methods, together with the Orff approach, is effective in teaching the skills

of singing and keeping rhythm using musical instruments to students with autism spectrum disorder attending a special education job application center, and that the taught skills are permanent. It has been determined that they can generalize the skills on the basis of different environments and people. Eren (2013) concluded that among the music activities prepared according to the Orff approach in teaching concepts to autistic children, the effectiveness of embedded teaching with the method of gradually reducing the clue was reached. In addition, it was determined that the participants were able to generalize the skills they learned to different people, tools and environments.

One of the important results of this research is that MPBME has a positive effect on the social skills of the students with moderate intellectual disability. In addition, teachers reported positive effects such as the participant's desire to succeed in all areas with the study, the acceleration of the literacy process, and the counting of numbers in the mathematics lesson. These results show similarities with both other studies in the field of special education and studies based on movement and play (Başar, 2016; Çadır, 2008; Öziskender, 2011; Sökezoğlu, 2010; Uysal, 2009). For example, Başar (2016) stated that in a study that aimed at music education with sound, rhythm and movement practices, children with moderate-to-severe mental retardation showed improvement in their sense of success, self-confidence, and feeling of belonging to a group. Sökezoğlu (2010), on the other hand, reported positive effects on the social development of children aged 7-11 in his research, which aimed at music education based on rhythm, movement and song education. As a result, it is seen that the MPBME program is effective on the musical skills of children with moderate intellectual disability. For this reason, it is necessary to use and develop movement-based programs such as MPBME to support the musical skills of children with intellectual disability.

4.1. Suggestions

- Music lessons should not be considered independent of the movement, which is the source of the sound, and the play, which is the work of the child, even human, in the education of both students with special needs and students with typical development. Studies on movement and play-based music education should be carried out with the students of the preschool teaching department, the classroom teaching department and the students of the special education teaching department of the education faculties.
- Course contents should be arranged in order for the music teaching students of the education faculties to work with both special needs students and students with normal development, so that movement and play can work conceptually and practically.
- Seminars and in-service training courses promoting Movement and Game Based Music Education can be organized for teachers working in the field of Special Education, music teachers, preschool teachers and classroom teachers through the Ministry of National Education.
- In Special Education Practice Schools, in line with the rough evaluations made at the beginning of the academic year, the areas where the students are inclined should be determined and their parents should be informed. Regular and systematic support trainings can be given to students in areas with a tendency, or weekly course hours can be arranged in a way that allows them to take more courses in the area of interest.
- Music classes in Special Education Practice Schools should be arranged in such a way as to provide students with movement space by providing the necessary

materials and materials in order to carry out the music lesson effectively and efficiently.

- Considering the results of this research, the research can be repeated with different researchers, with inter-subject and single-subject models.
- Movement and Game Based Music Education can be researched in primary schools with an experimental control group and its results can be evaluated.
- The effects of Movement and Game Based Music Education on other skills of students can be investigated.
- The effects of Movement and Game Based Music Education on students' academic achievement and their attitudes towards music lessons can be investigated.
- The Movement and Game Based training program can be developed for the gains of other courses, and its effectiveness can be investigated.
- In the theoretical framework of this research, foreign sources were used in the music education part of children with special needs. A theoretical source written in Turkish for the music education of children with special needs could not be reached. It is recommended to conduct an interdisciplinary book study on the music education of children with special needs, both in terms of contributing to the teachers working in the field and contributing to future research.

5.2 Ethical Text

In this article, the journal writing rules, publication principles, research and publication ethics, and journal ethical rules were followed. The responsibility belongs to Bahar Güdek for any violations that may arise regarding the article. " Ethics committee approval within the scope of the research Social and Human Sciences Ethics Committee of Ondokuz Mayıs University. It has been taken from the ethics committee with the decision numbered 2018/142 on 02.05.2018. There is no conflict of interest between the authors. The contribution rate of the first author to the article is 40%, the contribution rate of the second author to the article is 30%, and the contribution rate of the third author to the article is 30%.

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