

## Effectiveness of Background Music on Aggressive Behavior of Intellectually Disabled Children

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### Abstract

Children with intellectual disabilities show some behavioral and emotional problems especially in school setting like physical and verbal aggression. The purpose of this research is to find out the effectiveness of background music to reduce the aggressive behavior in intellectually disabled children in the classroom. Sample included 40 aggressive students aged between 6 to 16 years, studying in a special education center. Aggression questionnaire of Arnold Buss and Mark Perry was used to gather the responses. Two groups were made by random sampling technique. Experimental group received background music from western classical and new age music pieces with binaural beats for 24 consecutive weeks. Structured music program was played for 120 minutes after the school brake. Control group did not receive any kind of treatment. After treatment the experimental group exhibit significant decrease in aggression. The t-test was used for the comparison of statistical data analysis for both groups. Background music was noted to be effective in the classroom to reduce aggression in children.

**Keyword:** Intellectual disability, aggression, classical music, background music, binaural beats

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## Introduction

Music is a common part of our lives which relaxes the human mind and boosts the mood. It is not only to listen but also to feel. People from all ages, races, abilities, skills and lifestyles enjoy and use music for fun and entertainment (Sausser & Waller, 2006). Different forms of music put different effects on human emotions and personality. Music effects on all human attitudes and help to improve cognition, relatedness and fun (Gold, Voracek, & Wigram, 2004). Behavior can be improved and maintained with the help of music. Violent lyrics, rock, and heavy metal instruments increase the aggression, although the soothing and calming music minimize the aggressive behavior and lower the rate of heartbeat. Bullying behavior of normal school going children and adolescents can be decreased through background music in school environment (Ziv & Dolev, 2013). Music may be used as an effective tool for people with disabilities like autism, developmental disabilities, emotionally disturbs children, learning disability, intellectual disability and aggressive behavior. Vibroacoustic music can be used for different types of problems like hyper muscle tone, pain management, anxiety, and high blood pressure. Challenging behavior of autism can be reduced through Vibroacoustic music (Lundqvist, Andersson, & Viding, 2009).

Aggression is a combination of many difficulties and problems like verbal, sexual, physical, hostility, anger, stereotype, injurious, disruptive and violence. Children with Intellectual Disability (ID) are slower as compared to their age fellows in attention and need extra time to learn their communication, daily living skills, social skills because of their low intellectual capacity and weakness in adaptive behavior (Jameel & Shamim, 2019). Some behavioral and emotional problems are also very common in school settings like physical and verbal aggression. These acting out and uncontrolled behaviors include abusing, bullying, fighting, biting, kicking, hitting etc. Disruptive and self-injurious behaviors found more in ID children as compared to normal children (Newcomb & Hagopian, 2018). Teachers use different techniques to minimize the unexpected behavior through behavior management treatment, exercises, drama, play activity, dance and music intervention (Deb, Sohanpal, Soni, Len tre, & Unwin, 2007; Jameel & Nabeel, 2017). Children with ID have higher rate of emotional and behavior problems as compare to normal individuals. A link was investigated between the behavioral problems and the low efficiency of ID children (McIntyre, Blacher, & Baker, 2002). Students associated the educational work with background

music played. It was found that background music enhance the learning skills (Abdullah, Foley, Suryaputra, & Hellman, 2018).

It is well recognized that the brain is an electro-chemical body part. However this electrical energy is very less and partial. The term brainwave was described as electrical activity measured along the scalp, produced by firing of neurons in the brain. The electrical charge originating from the brain is existing in the type of brainwaves (Andelkovic, 2010). Human brain produces different brainwaves that have direct connection with states of consciousness. Consciousness is known as attentiveness or mindfulness that shows the different states of mind and our situations. When brain produce different patterns of brainwaves, our mind synchronize with it and such state of consciousness take place. Brainwaves are occurred in the result of electrical activity which is continuously happening in the brain. Neuro-scientists measure brainwaves with an electroencephalograph (EEG). There are five categories of brainwaves that correspond with mental states. The delta wave with frequency up to 4 hertz represents the stat of deep sleep. Theta wave represents the state of drowsiness and hypnosis Anger with frequency range from 4-8 Hz. Alpha wave represents with the relaxed, alert state of consciousness and eyes closed with 8-12 Hz. Beta brain wave represents with the active, busy or anxious thinking with 12-30 Hz. Gamma brainwave represented with higher cognitive activity, motor functions with 30-80 Hz. The waves can be seen in the left temporal lobe for the period of a state of wakefulness. Both alpha and beta waves are most prominent during wakefulness and have been studied well (Overman, Hoge, Dale, Cross, & Chien, 2003).

Classical music alters and transforms the brain's organization and capabilities (Mitchell, 2018). Different elements of music like melody, harmony, tempo, and rhythm process in different parts of brain. The rhythm increases the serotonin level which is produced in brain (Moraes et al., 2018). Serotonin is a chemical (5-hydroxytryptamine) produced by human brain and it acts like neurotransmitter. Serotonin transmits nerve impulses which maintain happy moods and give joyful feelings (Maglione, 2006). When serotonin level increased in the brain, tension is reduced and we feel relaxed and happy. It is believed that depression is an outcome of the limited erection of this hormone in human brain. Aggression is very common in ID people who occurs in the result of anxiety and depression and may be the brains of ID produce a very small quantity of Serotonin which causes the depression and aggression (Moraes et al., 2018). Children get advantage from classical music's qualities even more than adults; they experience advantages in maintaining aggressive behavior and improve cognitive skills (Kettering, Fisher, Kelley, & LaRue, 2018).

Music therapy described as “a systematic procedure of music involvement where the therapist supports the individual to improve health, by musical connections and the relations that grow over them as lively forces of variation.” Music therapy is an effective method for rehabilitation of intellectually disabled individuals. Music interventions can be used to improve, reinstate and recover physical, emotional, psychological, and spiritual fitness and happiness. Some researches justify the effect of music on aggressive behavior (Aldridge, 2000). There are two types of music therapy techniques commonly used by music therapists, active and receptive (Gold et al., 2004). The active style includes different forms of musical contact like music making, improvisation, song writing, and invention of melodies or tunes. Receptive music style includes listening to recorded music either by the choice of therapist or client, and listening to music played by the music therapist. Economy and music therapy on aggressive male mentally retarded children and found that music reduce aggression. In educational setting music stimulates the attention and encourages involvement of students. Music Therapy is the evidence-based practice of music interferences to achieve personalized goals in a therapeutic manner. Music therapy is strong and non- aggressive medium and exceptional outcomes are possible.

Negative attitudes can reduce by Happy or Upbeat music. Calming music uses to lower level of undesirable behavior. Music selection is important before starting music therapy intervention. A relationship was explored between the level of intellectual disability and features or types of music therapy. Particular features of an individual’s musical presentation might be associated with individual’s specific level of intellectual disability. In other words the individual’s level of intellectual disability influences the features involved in their musical presentations (Luck et al., 2006). Emotional and behavioral problem can be decreased when music therapy is frequently used along with emotional or psychological therapy, because music therapy helps to improve self-esteem and confidence (Sausser & Waller, 2006). It was found that with the helpful in the improvement of self-esteem and reduction of stress in the children (Choi, Lee, & Lee, 2010). Calming soothing music can slow down the breathing and heart rate and help individuals with aggressive behavior.

Binaural beats seems to provoke variations in cortical arousal, which can be examined with the EEG. The outcomes achieved on the basis of the piloted experiment of the influence of binaural beats with  $f = 10$  Hz frequency and with an acoustic level at SPL = 73 dB on a human which confirm that binaural beats exposition cause statistically significant changes of EEG signal (morphology) (Kasprzak, 2011). Binaural beats

become apparent once we listen to two diverse frequencies. A binaural beat described as the difference among the two tones. For example when 240Hz sound is heard in one ear and 230Hz sound in the other, the listener experiences a 10Hz binaural beat which is the difference between two played pitches. Binaural beats can escalate particular brainwaves as our brain simulates the frequencies we listen from binaural beats. Binaural beats can be recorded in all frequency ranges similar to the brainwaves frequencies which our brain produced.

The purpose of this experiment was to identify the effect of background music on aggressive behavior of ID children. It was hypothesized that there is no effect of background music on aggressive behavior of ID children in the classroom and the alternate hypothesis was vice versa.

## **Methodology**

This study was designed as an experimental research with pretest posttest control group design.

### **Participants**

40 participants with aggressive behavior irrespective of gender discrimination were selected by heterogeneous purposive sampling technique from a special education center in District Faisalabad. This technique of sampling helped the researcher to gain more insight. Sample ID children have ages between 6 to 16 years and have characteristics of aggression, tantrums, self-abusive behavior, destructive behavior, and general over-activity which measured by the Aggression Questionnaire. Mean age of sample was calculated around 10 years and mean IQ score was found between 55 and 59. The sample was divided into two groups by random sampling technique. Experimental group has twenty-one aggressive ID children while control group had nineteen aggressive ID children.

### **Instruments**

The questionnaire of Aggression developed by Arnold. H. Buss and Mark Perry's was used in this research. This Questionnaire has been widely used by the scholars for different researches. It contains 29 items divided into 4 sub-scales as: physical aggression, verbal aggression, anger, and hostility. 1 to 9 shows physical aggression, 10 to 14 shows verbal aggression, 15 to 21 shows anger (emotional components) and 22

to 29 include hostility. The questionnaire comprised of 5-Point Likert scale with following responses: Extremely uncharacteristic-1, Somewhat characteristics-2, Neither uncharacteristic nor characteristics-3, Somewhat characteristics-4, Extremely characteristics-5. Cronbach's alpha coefficient for the total aggression score was 0.89 and for four sub scale were 0.85, 0.72, 0.83 and 0.77 respectively.

### Intervention

Receptive music (listening) technique was used for this study. Experimental group received carefully designed and selected background music for 24 consecutive weeks with daily routine classroom activities after recess for 120 minutes. Normally level of hyperactivity increases in children after lunch break and this is the most appropriate time when background music can be used more effectively. Normally binaural beats are recommended to listen with headphones but if we place speakers in opposite direction with minimum 1 meter away from the center then we can feel the effect of binaural beats. Stereo sound system (Sony CDP-CE 500) with CD player was placed in the classroom; both speakers were placed on the opposite walls to create the effect of binaural beats for brain entrainment. Two CDs of specially designed background music were prepared for the intervention (Table 1).

Table 1  
*Background Music Program for Experimental Group*

Music Piece Name	Composer	Duration
<b>CD1</b>		
Cannon in D with forest sounds and Alpha Binaural Beat	Pachelbel	08:48
Earth Music with Alpha to Delta Binaural Beat	Paul Collier	09:05
Concerto in G Minor Largo for Flute and Strings	J. S. Bach	03:11
Clair de Lune Piano Version	Claude Debussy	05:06
Brainwave Massage No1 Love	Paul Collier	10:13
Creativity with Mozart with Binaural Beats	Mozart-Pete Linforth	23:01
Quintet in Eb Major for Piano and Winds	W. A. Mozart	08:30
<b>CD2</b>		
Bach to the Future with Binaural Beats	J. S. Bach	01:01:04
Mozart Effect with Brainwave Entrainment	W. A. Mozart	07:35

All music pieces for background music program were selected carefully to use with aggressive ID student in experimental group. Classroom had necessary furniture such as table, chairs, and cupboard. Researcher conducted the intervention and class teacher was present in the classroom to assist the researcher and conduct regular classroom activities. Researcher

and class teacher made sure that there should be no outside sound or noise distract students. Participants were seated in the center of the classroom and were performing normal classroom activities. During the designed session all the students were busy in doing their class work and other class activities. Carefully selected “Newage and Classical” music pieces were chosen to play as background music. All music pieces were slower in tempo with the quality to provide relaxation, leveling the blood pressure and heart rate, and reducing hyperactivity in brain. Most of the pieces were selected from repertory of western classical music and new age. Alpha and theta binaural beats were added with some of the classical and new age music pieces. When students came into the classroom after the recess researcher started the background music program with mid volume range. Students were given different tasks by class teacher while listening the music in the background. After 24 weeks of music intervention, aggression questionnaire had been again conducted for experimental group to understand what changes have been occurred in aggressive behavior. Posttest of control group also conducted to know what changes had been found in behavior without music intervention program and to compare results.

### Data Analysis

The mean and standard deviation was calculated for each category and for each participant of the experimental and control group. Overall behavior mean and standard deviation scores were obtained by adding and taking means of all four categories and *t*-test were computed.

### Results

Mean and standard deviation of experimental and control group is shown in Table 2.

Table 2  
*Comparison of Experimental and Control Group*

Variables	Experimental				Control			
	Pretest		Posttest		Pretest		Posttest	
	M	SD	M	SD	M	SD	M	SD
Physical Aggression	3.8	0.51	3.3	0.50	3.8	0.55	3.6	0.62
Verbal Aggression	3.7	0.54	3.2	0.50	3.7	0.53	3.6	0.52
Anger	3.4	0.49	3.0	0.52	3.4	0.50	3.2	0.52
Hostality	3.2	0.53	2.8	0.56	3.3	0.55	3.0	0.69

M = Mean, SD = Standard Deviation

21 Students participated in the experimental and Control group has 19 participants

Table 2 shows the mean and standard deviation values of pretest and posttest scores of experimental group in all categories. Decrease the score of aggression shows the decrease of aggression in the children. Pretest mean score for physical aggression was 3.8, after conducting background music interventions physical aggression mean score was improved to 3.3, verbal aggression pretest score was 3.7 which was improved to 3.2, anger pretest 3.4 and posttest 3.0, and hostility pretest score was 3.2, an improvement was seen after interventions and the posttest score was 2.8. In all four categories major changes can be seen after having the background music interventions. Means of pretest and posttest of control group, pretest mean in physical aggression of control group was 3.8, verbal aggression 3.7, anger 3.4 and hostility was 3.3. Standard deviation of control group in physical aggression was 0.55 verbal aggression 0.53, anger 0.50 and hostility 0.55. The posttest mean scores of control group in physical aggression was 3.6, verbal aggression 3.6, anger 3.2 and hostility 3.0.

Paired sample t-test was applied to the experimental and control group separately and indicated below;

Table 3  
*Comparison of Overall Aggression*

Groups	Pretest		Posttest		t	p
	M	SD	M	SD		
Experimental Group	3.54	0.54	3.1	0.44	-2.8	0.01
Control Group	3.6	0.47	3.4	0.54	-1.3	0.20

Table 3 shows that after the intervention of background music, there was a significant improvement in the aggression behavior of the children in the posttest (M = 3.1, SD = 0.44) than to pretest score (M = 3.54, SD = 0.54),  $t = -2.8$ ,  $p < 0.05$ , negative sign of t value indicated the decrease of mean score of overall aggression. On the other hand, there was a non significant decrease of mean score of control group in the overall aggression of control group from posttest (M = 3.4, SD = 0.54) to (M = 3.6, SD = 0.47),  $t = -1.3$ ,  $p > 0.05$ . The null hypothesis is significant or true, when p-value is greater than the significance level. Thus the null hypothesis was rejected and showed that there was a significant change found in experimental group after having 24 weeks of background music in the classroom.

## **Conclusions and Discussion**

Background music has a positive effect on the aggressive behavior, the findings of the study shows the effectiveness of background music with binaural beats into the classroom significantly reduced aggression in experimental group ID students. Improvement in behavior made positive effect and decreased the four domains of aggressive behavior during the study. Behavior disorders in children and adult with intellectual disability like depression, anxiety, disruptive behavior, fear, attention deficit, aggression, obsessive compulsive disorder, panic disorder, autism spectrum disorder and somatic disorder (Campbell, Shaw, & Gilliom, 2000; Jameel, Rafiq, & Kalsoom, 2016). In these kind of disorders individuals experience loss of concentration in social activities and create difficulties in everyday life and it may cover, or disclose, biological or psychiatric illness. Aggressive behavior may stem from a diversity of physical and verbal aggression, anger and hostility.

The purpose of this study was to determine the effectiveness of background music to decrease aggressive behavior in intellectually disabled children in the classroom. The present study was aimed to investigate the effects of background music to decrease the physical and verbal aggression, and to explore the result of background music to minimize the anger and hostility in ID children in classroom. Findings of this study showed that background music reduced the aggression in the experimental group as compare to the control group. Findings of several studies reveal that inclusion of background music reduces bullying behavior in normal students, improve study and task performance in normal students, improve behavior and academic performance in EBD children (Hallam, Price, & Katsarou, 2002; Ziv & Dolev, 2013). However, the present research is different in some respects from prior researches. In the present study background classical and new age music used for the aggressive ID children in the classroom after recess time to calm down the hyperactivity and relaxed their moods and make a peaceful environment. The study is different because background music used only for aggressive mentally retarded children and classical music used for slow down the heart beat and relaxing muscle especially after the recess time. So the hypothesis of this research that background music would strongly effects on ID children in the class room has been supported. In sum, results of this research deliver some positive evidence for previous findings that aggressive or challenging behaviors of students

with intellectual disability are reduced by using background music in the classroom. In this study, the deterioration of aggressive behaviors in the experimental group after using the background music program was statistically significant. Evidently, these results deserve further study both as to their reproducibility as well as the tool for any carryover effects. Students in the classroom enjoyed listening music which ended up with a positive change in their moods, behavior, and learning (Ali, Jameel, & Naeem, 2016).

### **Recommendations**

Future research is recommended on the basis of this research comprise a recurrence of the results on the effect of background music program with controlled interventions. This research can also work as a model for further studies addressing usefulness and qualitative model of using background music.

Furthermore, this research has shown its significance for the effectiveness of background music with aggressive ID children, and has delivered elucidations on how and why the background music is effective for special education classrooms.

The outcomes deliver empirically based hypotheses for research on different forms of music, and music therapy for ID population and may also help special educators to perform their work more effectively. It is also recommended to ministry of special education that they should start music training programs for teachers and provide suitable resources to all special education centers.

## References

- Abdullah, A., Foley, J., Suryaputra, I., & Hellman, A. (2018). *Elementary school students' mathematical intelligence based on mathematics learning using classical music of the baroque era as the background*. Paper presented at the SHS Web of Conferences.
- Aldridge, D. (2000). *Music therapy in dementia care: More new voices*. London: Jessica Kingsley.
- Ali, H. H., Jameel, H. T., & Naeem, M. (2016). Effects of enthusiastic acts on child's development. *International Journal of Current Research*, 8(2), 27024-27029.
- Andelkovic, I. (2010). Brainwave music. *History, Overview, Artistic and Clinical Aspects*. Retrieved from <https://www.semanticscholar.org/paper/Brainwave-Music-History-%2C-Overview-%2C-Artistic-and-An%20%91elkovi%20%87%8e52651eaa0d7b9620b939a3224f3e280ea47ba9>
- Campbell, S. B., Shaw, D. S., & Gilliom, M. (2000). Early externalizing behavior problems: Toddlers and preschoolers at risk for later maladjustment. *Development and Psychopathology*, 12(3), 467-488.
- Choi, A.-N., Lee, M. S., & Lee, J.-S. (2010). Group music intervention reduces aggression and improves self-esteem in children with highly aggressive behavior: A pilot controlled trial. *Evidence-Based Complementary and Alternative Medicine*, 7(2), 213-217.
- Deb, S., Sohanpal, S., Soni, R., Len tre, L., & Unwin, G. (2007). The effectiveness of antipsychotic medication in the management of behaviour problems in adults with intellectual disabilities. *Journal of Intellectual Disability Research*, 51(10), 766-777.
- Gold, C., Voracek, M., & Wigram, T. (2004). Effects of music therapy for children and adolescents with psychopathology: a meta-analysis. *Journal of Child Psychology and Psychiatry*, 45(6), 1054-1063.
- Hallam, S., Price, J., & Katsarou, G. (2002). The effects of background music on primary school pupils' task performance. *Educational Studies*, 28(2), 111-122.

- Jameel, H. T., & Nabeel, T. (2017). Effect of visual motor integration training on legibility of Urdu handwriting. *Pakistan Journal of Education*, 34(1), 81-94.
- Jameel, H. T., Rafiq, S., & Kalsoom, U. (2016). A study on level of depression, anxiety and stress among parents of down syndrome children versus parents of healthy children. *International Journal of Biology, Pharmacy and Applied Sciences*, 5(7), 1553-1560.
- Jameel, H. T., & Shamim, F. (2019). Relationship of Self-confidence with self body image of visually impaired children. *Journal of Research in Psychology*, 1(1), 9-11.
- Kasprzak, C. (2011). Influence of binaural beats on EEG signal. *Acta Physica Polonica A*, 119(6), 986-990.
- Kettering, T. L., Fisher, W. W., Kelley, M. E., & LaRue, R. H. (2018). Sound attenuation and preferred music in the treatment of problem behavior maintained by escape from noise. *Journal of Applied Behavior Analysis*, 51(3), 687-693.
- Luck, G., Riikkilä, K., Lartillot, O., Erkkilä, J., Toiviainen, P., Mäkelä, A. (2006). Exploring relationships between level of mental retardation and features of music therapy improvisations: a computational approach. *Nordic Journal of Music Therapy*, 15(1), 30-48.
- Lundqvist, L.-O., Andersson, G., & Viding, J. (2009). Effects of vibroacoustic music on challenging behaviors in individuals with autism and developmental disabilities. *Research in Autism Spectrum Disorders*, 3(2), 390-400.
- McIntyre, L. L., Blacher, J., & Baker, B. L. (2002). Behaviour/mental health problems in young adults with intellectual disability: the impact on families. *Journal of Intellectual Disability Research*, 46(3), 239-249.
- Mitchell, A. K. (2018). Seven steps to heaven: time and tide in 21st century contemporary music higher education. *Australian Journal of Teacher Education*, 43(5), 60-77.
- Moraes, M. M., Rabelo, P. C., Pinto, V. A., Pires, W., Wanner, S. P., Szawka, R. E. (2018). Auditory stimulation by exposure to melodic music increases dopamine and serotonin activities in rat forebrain

areas linked to reward and motor control. *Neuroscience letters*, 673, 73-78.

Newcomb, E. T., & Hagopian, L. P. (2018). Treatment of severe problem behaviour in children with autism spectrum disorder and intellectual disabilities. *International Review of Psychiatry*, 30(1), 96-109.

Overman, A. A., Hoge, J., Dale, J. A., Cross, J. D., & Chien, A. (2003). EEG alpha desynchronization in musicians and nonmusicians in response to changes in melody, tempo, and key in classical music. *Perceptual and motor skills*, 97(2), 519-532.

Sausser, S., & Waller, R. J. (2006). A model for music therapy with students with emotional and behavioral disorders. *The Arts in Psychotherapy*, 33(1), 1-10.

Ziv, N., & Dolev, E. (2013). The effect of background music on bullying: A pilot study. *Children & Schools*, 35(2), 83-90.

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