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# Analyzing the Quality of Attention of a Client with Williams Syndrome During Improvisational Music Therapy

Hyun Kyoung Kim  
*Montclair State University*

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**Abstract**

This study sought to investigate the effectiveness of improvisational music therapy for a client with Williams Syndrome (WS). The study employed both quantitative and qualitative analysis to assess the quality of attention of a client with WS during improvisational music therapy. The participant of this study was a teenage boy with Williams Syndrome who received music therapy at the Rebecca Center for Music Therapy and Molloy College in New York. The study analyzed the participant's attention behaviors in musical-play by reviewing video recordings that had been made of the client's therapy sessions at the Rebecca Center. To analyze the quantitative data, this study measured the client's attention behaviors by using select dimensions (focusing on musical attention) of the Individual Music-Centered Assessment Profile for Neurodevelopmental Disorders (IMCAP-ND; Carpente, 2013). These ratings were examined for directionality of change over the course of five therapy sessions by using a linear regression analysis. For the qualitative analysis, video recordings were reviewed to determine separately the effects of improvisational therapy treatment on the client over the five sessions. The study described the quality of attention based on the linear regression graphs and notes about the sessions, including how the music therapist and client played music interactively, how the client improved, and what the client's behavior meant.

*Keywords:* Williams Syndrome, music, improvisational music therapy, attention.

MONTCLAIR STATE UNIVERSITY

ANALYZING THE QUALITY OF ATTENTION OF A CLIENT WITH  
WILLIAMS SYNDROME DURING IMPROVISATIONAL MUSIC THERAPY

by

Hyun Kyoung Kim

A Master's Thesis Submitted to the Faculty of

Montclair State University

In Partial Fulfillment of the Requirements

For the Degree of

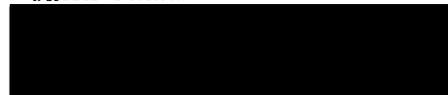
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Dr. Brian Abrams  
Thesis Sponsor



Dr. John Carpena  
Committee Member



Professor Amy Clarkson  
Committee Member

ANALYZING THE QUALITY OF ATTENTION OF A CLIENT WITH  
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A THESIS

Submitted in partial fulfillment of the requirements

For the degree of Master of Arts in Music Therapy

by

Hyun Kyoung Kim

Montclair State University

Montclair, NJ

2017

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### **Introduction**

According to many research studies, children with Williams Syndrome (WS) have attentional challenges (Breckenridge, Braddick, Anker, Whoodhous, & Atkinson, 2013; Martens, et al., 2013; Rhodes, Riby, Matthews, & Coghill, 2011). Some researchers postulate that children with WS exhibit behavior similar to that of children with Attention-Deficit/Hyperactivity Disorder (ADHD; Rhodes et al., 2011).

On the other hand, some research studies indicate that individuals with WS have strong abilities in music (Hodges & Sebald, 2011). A few years ago, I had the chance to teach music to a 3 year-old boy with WS. At the time, I noticed that the boy was very sensitive to sounds, and that he had good musical skills. To my surprise, he remembered the exact lyrics and melodies of songs that he had learned in the past, and he sang them for me. The experience sparked my interest in WS, and I began to wonder how individuals with WS related to music and how music therapy could affect them. There are a number of studies on the relationship between music and WS (Don, Schellenberg, & Rourke, 1999; Levitin et al., 2004; Reis, Schader, Milne, & Stephens, 2003). However, there are only a few studies that investigate the effect of music therapy on clients with WS.

The American Music Therapy Association (AMTA) defines music therapy as “the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program” (AMTA, 1998, p. 1). Music therapy sessions include varied music-based interventions, such as active music making, singing, interactive music play, and improvisational techniques. AMTA also states that the purpose of music therapy for clients with WS is to “optimize their talents and musical affinity in order to address multiple potential outcomes”

(AMTA, 2009, p.1).

Improvisational music therapy is a form of music therapy in which the therapist and client create and play music spontaneously, rather than performing a composition that has already been written. During such sessions, the therapist invites the client to improvise in his or her own unique way, regardless of the artistic or aesthetic merit (Bruscia, 1987). It is critical that the music therapist practice spontaneity and flexibility while improvising in music making so as to invite the clients to engage with the music and to create music as well.

Some researchers have investigated the use of improvisational music therapy to address the needs of clients with autism. Specifically, Kim, Wigram, and Gold (2008) investigated the effects of improvisational music therapy on joint attention behaviors in preschool children with autism. The researchers compared two different conditions, improvisational music therapy and play sessions involving toys, by evaluating behavioral changes through the use of standardized tools and DVD analysis. The improvisational music therapy involved matching the child's pulse, rhythmic patterns of movement or musical play, and dynamic forms of expression and melodic contour, to the point that there was a common musical foundation between the child and the therapist. The researchers found that the improvisational music therapy was more effective at facilitating joint attention than play sessions (Kim, Wigram, & Gold, 2008).

In building upon the aforementioned study where music therapy had a positive effect on the joint attention of children with autism, this current study sought to investigate whether improvisational music therapy can enhance the musical attention of clients with WS. To develop the topic and focus of the study, it is important to understand the characteristics of WS, the relationship between music and WS, the key concepts of improvisational music therapy, and findings in the literature regarding the effectiveness of music therapy for clients with attentional

challenges.

## **Review of Literature**

### **Characteristics of Williams Syndrome**

Williams Syndrome (WS) is a rare neurodevelopmental disorder that was identified in the early 1960s (Blomberg, Rosander, & Andersson, 2005; Castilla, Sotillo, & Campos, 2013). WS is caused by the spontaneous deletion of 26-28 genes on chromosome #7, and the diagnosis of WS can be confirmed by a blood test. The incidence of WS is usually given as 1 in 20,000 live births, but new prevalence estimates are as high as 1 in 7,500 (Lindernberg, Mevis, & Berman, 2006). Individuals with WS have been characterized as having an “elfin” facial appearance and cardiovascular problems (Pagon, Bennett, LaVeck, Stewart, & Johnson, 1987).

Individuals with WS are highly sociable (Fahim et al., 2012) and tend to be overfriendly (Fu, Lincoln, Bellugi, & Searcy, 2015). Moreover, children with WS have hyperactive and impulsive behaviors, and their reactions show patterns similar to that of children with Attention-Deficit/Hyperactivity Disorder (ADHD), who exhibit inattention and hyperactivity or impulsivity (Rhodes et al., 2011). In addition, some researchers reported that anxiety is one of the most common psychopathologies among children and adults with WS. Individuals with WS show hyperacusis, which involves oversensitivity to everyday sounds, and they have noise-related fears (Riby et al., 2014).

According to some studies, children with WS have attentional challenges (Breckenridge et al., 2011). The attention challenges associated with WS are primarily due to the difficulty of general attentional disengagement rather than inappropriate attentional difficulties, such as task-dependent (Lense, Key, & Dykens, 2011). They also mentioned that attentional challenges may contribute to other problematic behaviors, such as difficulties with attention switching and

emotional and conduct problems in individuals with WS (Lense et al., 2014). Attention deficit is regarded as one of the most important problems for individuals with WS.

### **Relationship Between Music and Williams Syndrome**

Some researchers have explored the implications of the affinity for music among persons with WS. A few of them examined the relationship between music and clients with WS. Through assessment of 20 individuals with WS, they found active musical responsiveness in the areas of independence, creativity, self-confidence, engagement, and pleasure (Claussen & Hanser, 2000).

Levitin et al. (2004) found that individuals with WS rated higher in musical accomplishment, engagement, and interest than control groups that included participants with Down Syndrome (DS) and autism (AUT). Additionally, individuals with WS exhibited greater emotional responses to music and spent more hours listening to music than the other three control groups (DS, AUT, and typically developing individuals). Some investigators found that children with WS can learn songs easily and have good singing skills. Moreover, individuals with WS expressed a greater enjoyment of music and a greater range of emotional responses to music than that of typically developing children (Don et al., 1999).

Reis et al. (2003) found that a music- and creative arts-based curriculum helped 16 young adults with WS to understand functional mathematics including fractions, time, money, and measurement. This study focused on using talent development approach for young adults with WS. Through participating this study, the clients with WS showed an improvement of understanding of mathematics and it also provided an opportunity for the students to develop their music abilities.

Interestingly, individuals with WS are often referred to as possessing absolute pitch (AP). Some people who trained in music before the age of 6 are found to have AP, which occurs

in just 1 out of 10,000 persons (Lenhoff, Perales, & Hickok, 2001). Researchers have found that the incidence of absolute pitch among individuals with WS is higher than the general population (Lenhoff et al., 2001).

### **Key Concepts of Improvisational Music Therapy**

According to Bruscia (1987), improvisational music therapy is creating music spontaneously while playing, rather than performing a composition that has already been written. He further clarified that improvising is not always artistically or musically complex. The music therapist invites the client to improvise in his or her own unique way, regardless of its artistic or aesthetic merit; thus, it can be played in simple sound forms. Improvisational music therapy has been practiced in diverse clinical settings and with various client populations (Bruscia, 1987).

There are many different models of improvisational music therapy that can be used in diverse clinical settings such as hospitals, health clinics, special education schools, and private practices. When working with clients, spontaneity and flexibility are important qualities of the music therapist's improvisational music making. It is essential that the music therapist improvise in a way that invites the client to engage with the music in the manner that addresses his/her particular needs.

Nordoff-Robbins Music Therapy (NRMT) is a prominent form of improvisational music therapy that emphasizes the clinical benefits of the unfolding creative process (Bruscia, 1987). NRMT is a music-centered therapeutic approach that involves a collaborative process between therapist and client. The music is created co-actively in the service of expression, communication, and self-actualization. Musical awareness, creativity, and the clinical application of musical elements are essential components of an NRMT session. NRMT often involves a team of two therapists working toward common goals for individual or group therapy, and it

values the sensitive enhancement of the client's musical responses. Both the primary music maker and the co-therapist use musical motives, themes, and forms to focus the client and draw him/her towards a musical relationship. NRMT requires careful assessment and documentation in the form of session audio-or videotaping for detailed study and musical/clinical development. Both individual and group music therapy use live music creatively and interactively. One of the salient characteristics of individual therapy is improvisation-based clinical musicianship that draws on a wide range of archetypal, classical, folk, and contemporary styles. On the other hand, balancing the use of pre-composed music and improvisation are characteristic of group music therapy. During group therapy sessions, clients participate in a variety of experiences, such as cooperation in making music, attentive participation, skill development, musical achievement, the sharing of experience, self-expression, turn-taking, and musical and personal responsibility (Nordoff-Robbins Center for Music Therapy, 2011).

Beyond NRMT, clinicians and researchers have developed other improvisational music therapy approaches, such as analytical music therapy (AMT), free improvisation therapy, and experimental improvisation therapy. Developed by Mary Priestley, Peter Wright, and Marjorie Wardle, analytical music therapy is "the use of words and symbolic music improvisations by the client and therapist for the purpose of exploring the client's inner life and providing the proclivity for growth" (Bruscia, 1987, p. 115). AMT focuses on improvisation that is guided by a client's feelings, ideas, images, fantasies, memories, events, and/or experiences. The therapists use both musical play and verbal discussion for AMT, and they interact with clients through words and music. The client-therapist relationship and the music are the primary agents of therapeutic change in AMT (Bruscia, 1987).

Free improvisation therapy, developed by Juliette Alvin, is employed alongside various

other activities such as listening, performing, notating, composing, and moving (Bruscia, 1987). During free improvisation, the therapist does not impose any rules, structure, or themes on the client's improvisation, allowing the client to explore on a musical instrument. The client has the freedom to find his/her own ways of ordering and sequencing the sounds, unbound by any rules in tonality, rhythm, or form. Free improvisation therapy can be described as musical and comprehensive in nature, and verbal discussion and other art forms become secondary to musical activity (Bruscia, 1987).

Experimental improvisation, developed by Anne Riordan, uses dance to help disabled individuals develop creativity, self-expression, and interpersonal skills (Bruscia, 1987). Bruscia adapted experimental improvisation for music therapy: it is a method of improvisation that involves systematically manipulating variables or allowing them to vary freely, while holding other variables constant. The basic feature of participating in experimental improvisation is problem solving in a group setting. Experimental improvisation involves dance improvisation, musical improvisation, and verbal discussion. It has been used for individuals with mental disorders, learning disorders, and emotional and physical difficulties. This model is appropriate for both children and adults, and it has no limitations for people with physical difficulties because individuals help each other in a group setting and take roles according to their potential contributions to the group (Bruscia, 1987).

### **Effectiveness of Music Therapy on Clients with Attentional Challenges**

Some research studies have shown how music therapy affects clients with attentional challenges. Music therapists often work with children with Attention-Deficit/Hyperactivity Disorder (ADHD) to treat their attentional problems (Jackson, 2015). Orenstein (2015) found that children with ADHD showed improvements in attention, motor control, and academic skills

through rhythmic exercises. During music therapy sessions, children with ADHD wore headphones and sensors on their hands and feet. The researcher asked children to perform exercises to a rhythmic computer beat, and the results showed that their attention, language processing, behavior, and motor control were improved over a period of three to five weeks (Orenstein, 2015).

Carrer (2015) studied time processing with simple sounds and music in children with ADHD. He divided 36 children into an experimental group and a control group, and participants' keyboard performances were recorded on a computer by using Logic Audio Software 9.0. Even though the researcher hypothesized that children with ADHD would have a different performance compared to children with normal development in tasks of time estimation and production, the positive average performance was observed in both groups. The researcher concluded that music has the possibility of modulating the symptoms of inattention in ADHD (Carrer, 2015).

Rickson (2006) introduced the study that compared the impact of instructional and improvisational music therapy on the level of motor impulsivity for thirteen adolescent boys with ADHD. The instructional approach involved direct teaching and modeling of specific beat and rhythm tasks, and the students used simple percussion instruments for rhythmic activities presented in a highly structured and repetitive format. On the other hand, improvisational approach included choosing instruments on which the students could express the style, mood or theme, and the role of the therapist for this approach was to support and challenge them musically. A combination of a multiple contrasting treatment and an experimental control group design was utilized for this study. Participants in control group were not offered music therapy treatment, and participants in treatment group had eight sessions of instructional and

improvisational music therapy. Over the period of the study, both instructional and improvisational music therapy treatment groups significantly improved accuracy on the Synchronized Tapping Task (STT), which can be used to measure of impulsivity. As a result, this study found that both music therapy might contribute to a reduction in a range of ADHD symptoms in the classroom, and increase accuracy on the STT (Rickson, 2006).

In reviewing literature, individuals with WS have characteristics including biological aspects, behavioral patterns in social and emotional domains, and attentional challenges. It has also been found that positive relationship exists between music and individuals with WS and music therapy has effectiveness on clients with attentional challenges. However, some difficulties are also revealed in reviewing literature. There are insufficient research studies indicating that the effect of improvisational music therapy for clients with WS. This fact leads me to focus on improvisational music therapy. The following chapters described in detail the purpose of study, method and procedures of this study.

### **Purpose of Study**

As previous research studies have indicated, individuals with WS have many difficulties in cognitive, physical, and social-emotional domains. In particular, some research studies have demonstrated that clients with WS can have attentional problems. On the other hand, many investigators found that people with WS have strong musical abilities.

The purpose of this study focused on how the literature (1) validates the importance of questions about music and quality of attention for persons with WS, and (2) demonstrates that there is not enough research on this specific topic. The study also addressed the following questions:

- How did different facets of attention change over the course of the improvisational music therapy session series?
- How did attention, relative to different dimensions of music, change over the course of the improvisational music therapy session series?

In summary, the purpose of this study was to investigate the effectiveness of improvisational music therapy by analyzing the quality of attention of a client with WS.

## **Method**

### **Design**

This study was both quantitative and qualitative. It has a single-case design, which is an individually based method and treatment design that is used to study isolated cases (Carpente, 2009). For the study, I examined the video recordings of five sessions of improvisational music therapy that were conducted from April to June 2016 at the Rebecca Center of Music Therapy at Molloy College, where music therapists focus on interactive musical experiences to help children with developmental challenges.

### **Participant and Instrumentation**

The participant of this study (i.e., the client undergoing the five sessions of therapy) was a teenage boy who had been diagnosed with WS. He had already been attending music therapy sessions for more than a year at the Rebecca Center prior to the five sessions examined.

All the sessions were conducted in the music therapy room of the Rebecca Center. Various musical instruments such as piano, drums, xylophone, and marimba were used during the sessions. Several improvisational techniques from NRMT were observed for treatment intervention. A video camera was set up to record each session, and I subsequently viewed the recordings to analyze the client's attentional behaviors. A single-case design that uses both

quantitative and qualitative analysis was used to analyze the video recordings. I received IRB approval from Molloy College and received permission to access the video recordings. Informed consent was obtained from the participant's parents before accessing the video recordings.

### **Procedure**

#### **Data Collection**

The data for this study were collected by watching video recordings of five music therapy sessions at the Rebecca Center. A client with WS who attended music therapy sessions at the Rebecca Center at Molloy College was assigned to this study. The client's music therapist provided a secure internet link for the researcher to view the video recordings. The videos were stored in password-protected documents. The participant's attentional behaviors during the improvisational music therapy sessions were observed over a period of three months.

**Quantitative data collection.** The quantitative data were collected by using the Individual Music-Centered Assessment Profile for Neurodevelopmental Disorders (IMCAP-ND; Carpenle, 2013). IMCAP-ND helps evaluate clients' developmental levels through musical interaction, communication, cognition and perception, and responsiveness in musical-play for individuals with neurodevelopmental disorders. For the data collection, my advisor helped me utilize the scales. The IMCAP-ND includes the Musical Emotional Assessment Rating Scale (MEARS), which helps observe the target responses, such as musical attention, musical affect, adaptation to musical-play, musical engagement, and musical interrelatedness. The present study selected only one framework from IMCAP-ND to assess the client's musical attention. However, all these other aspects showed up separately while describing the result of this study because it was impossible to separate each scale. This framework seeks to understand how the client attends to

musical-play based on four categories: (1) focuses, (2) maintains, (3) shares, and (4) shifts. The description of each category is as follows:

- (1) Focuses – attends to one or more aspects of therapist, music, or play.
- (2) Maintains – sustains attention to one particular aspect of therapist, music, or play.
- (3) Shares – attends to the same aspect as the therapist.
- (4) Shifts – changes focus of attention as indicated by changes of therapist, music, or play.

In addition, IMCAP-ND presents a frequency scale for the client's response. The level of each frequency is as follows:

- 1= exhibits musical response rarely if ever
- 2= exhibits musical response occasionally
- 3= exhibits musical response about half of the time
- 4= exhibits musical response often but not always
- 5= consistently exhibits musical response

Moreover, four musical elements were incorporated with the form of IMCAP-ND: rhythm, tonality, melody, and dynamic in order to assess the client's quality of attention related to each of these elements. The definition of the musical elements, defined by Hanning (2006), is as follows:

- (1) Rhythm– The pattern of music's movement in time.
- (2) Tonality– The system, by which a piece of music is organized around a tonic note, chord, and key, to which all the other notes and keys in the piece are subordinate.
- (3) Melody– Succession of tones perceived as a coherent line.
- (4) Dynamic– Level of loudness or softness, or intensity.

**Qualitative data collection.** The session notes were collected during the viewing of the video recordings. Notes for each session described the music therapy process: what happened, who did what, what the therapist and client did together, and when it happened. This was an open description, based upon whatever seemed to be salient in the musical interactions within the session. No formal process of qualitative data gathering was employed within the scope of this study.

### **Data Analysis**

**Quantitative analysis.** The quantitative data were used to assess the participant's quality of attention. The data focused on how often musical elements (rhythm, tonality, melody, and dynamic) appeared across the four categories of musical attention-focuses, maintains, shares, and shifts-during the sessions. My advisor and I analyzed the data separately. We organized our respective average scales for each frequency scales of musical attention in the table (average scales of musical attention across musical elements are provided in Tables 1-5). We used linear regression graphs to predict the value of a dependent variable. We produced 25 linear regression graphs, which are as follows: focuses/rhythm; focuses/tonality, focuses/melody; focuses/dynamic; maintains/rhythm; maintains/tonality; maintains/melody; maintains/dynamic; shares/rhythm; shares/tonality; shares/melody; shares/dynamic; shifts/rhythm; shifts/tonality; shifts/melody; shifts/dynamic; focuses; maintains; shares; shifts; rhythm; tonality; melody; dynamic, and total attention. Inter-rater reliability (IRR) was used separately to maintain the integrity of the evaluation process.

**Qualitative analysis.** The qualitative analysis explored the client's quality of attention over five music therapy sessions. Attention quality was measured based on the session notes and linear regression graphs, including how the therapist and client play the music interactively, how

the client improved, and what the client's behavior may have meant. This step was employed only to add depth and context to the quantitative results. The qualitative data were not gathered with the intent that they stand on their own in order to address the research questions.

### **Ethical Considerations**

In following ethical procedures, the participant's privacy was protected throughout the study. I provided the participant's parent an informed consent form because the participant was not qualified to read and sign it. I informed the participant's parents that I would use only one computer to watch the video recordings, and that all the data and video recordings would be reviewed confidentially. In addition, all the data and video recordings were deleted after the completion of the data analysis.

## **Results**

### **Quantitative Results**

The rating scales in Tables 1–5 were the average ratings of two observers. The tables include the frequency ratings of musical attention across the musical elements. Tables A1–A4 (see Appendix A) provide specific information about inter-rater reliability measures to ensure the equity of the two independent ratings and to maintain the integrity of the evaluation process.

Table 1.

#### *Frequency Scale of Session #1*

	Rhythm	Tonality	Melody	Dynamic
Focuses	4	3	3	3
Maintains	4	3	3	4
Shares	4	3	3	3
Shifts	3	3	3	3

Table 2.

*Frequency Scale of Session #2*

	Rhythm	Tonality	Melody	Dynamic
Focuses	3	3	3	4
Maintains	3	3	3	3
Shares	3	4	4	4
Shifts	3	2	3	3

Table 3.

*Frequency Scale of Session #3*

	Rhythm	Tonality	Melody	Dynamic
Focuses	3	3	3	3
Maintains	3	4	4	3
Shares	3	4	4	4
Shifts	4	3	4	3

Table 4.

*Frequency Scale of Session #4*

	Rhythm	Tonality	Melody	Dynamic
Focuses	4	3	3	4
Maintains	3	4	4	3
Shares	4	4	4	4
Shifts	2	4	4	4

Table 5.

*Frequency Scale of Session #5*

	Rhythm	Tonality	Melody	Dynamic
Focuses	5	4	4	4
Maintains	5	4	5	5

Shares	5	4	5	5
Shifts	4	4	5	5

Linear regression graphs are presented below (see Figures 1–41). Each graph represents a slope value that can predict the value of a dependent variable. All the slope values of dependent variables are presented in Table 6.

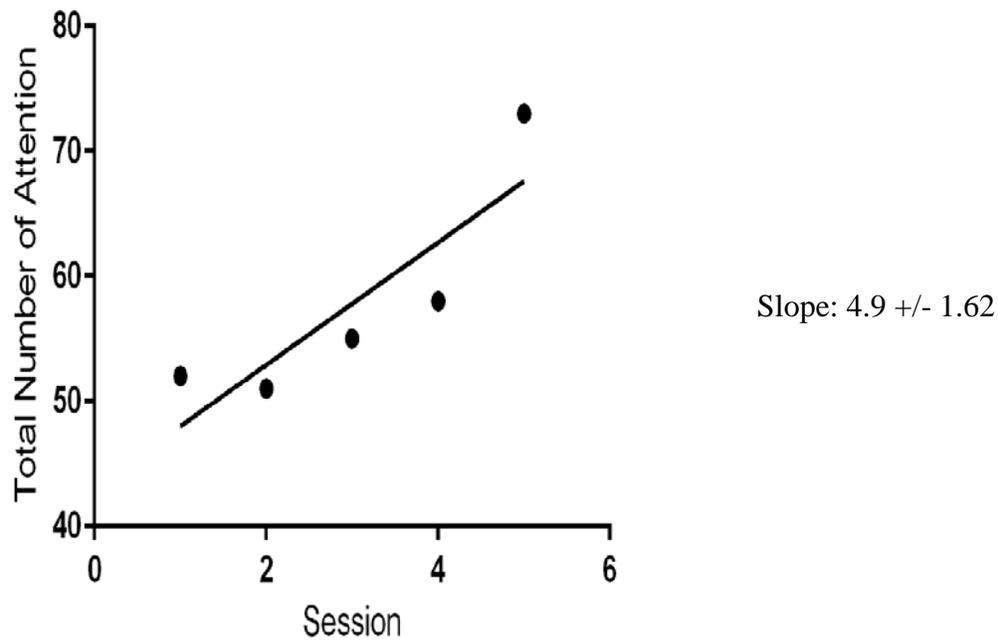
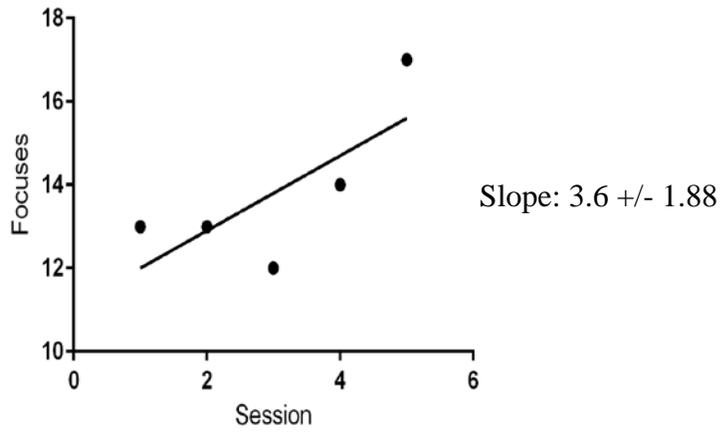
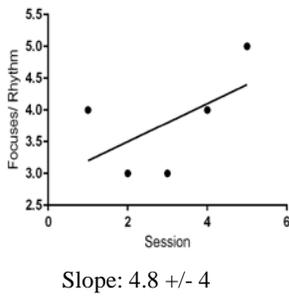


Figure 1. Linear regression of total attention.

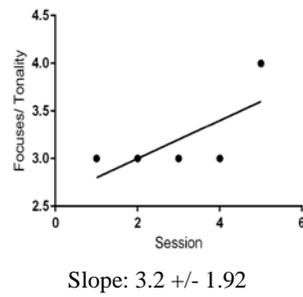
**Areas of Musical Attention**



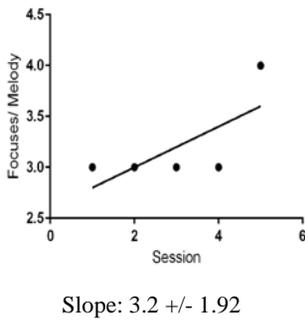
*Figure 2.* Linear regression: focuses.



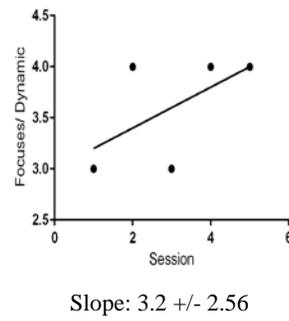
*Figure 3.* Focuses/Rhythm



*Figure 4.* Focuses/Tonality



*Figure 5.* Focuses/Melody



*Figure 6.* Focuses/Dynamic

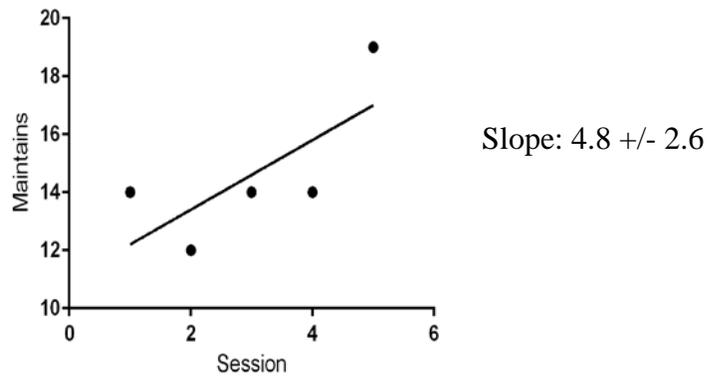


Figure 7. Linear regression: maintains

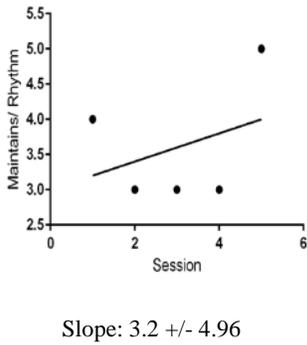


Figure 8. Maintains/Rhythm

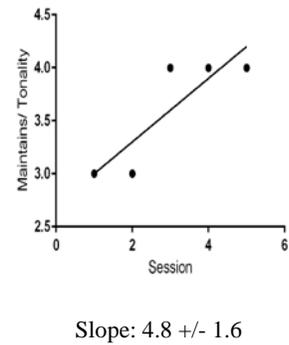


Figure 9. Maintains/Tonality

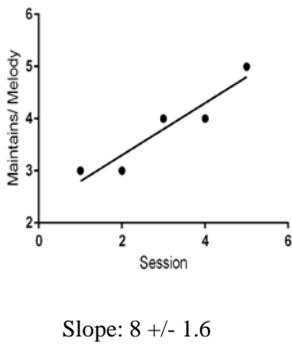


Figure 10. Maintains/Melody

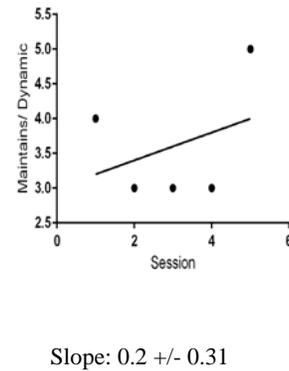


Figure 11. Maintains/Dynamic

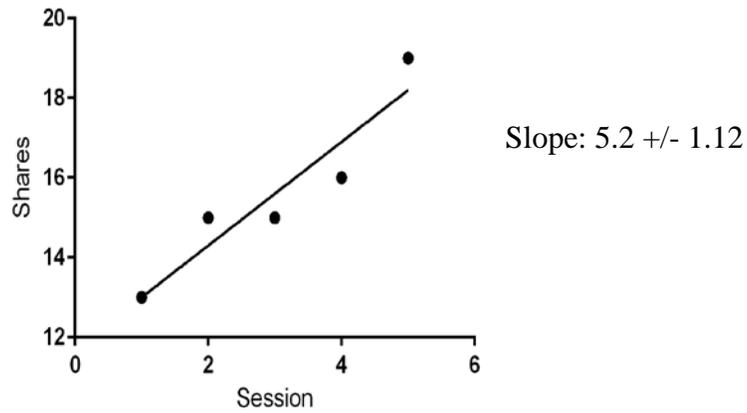
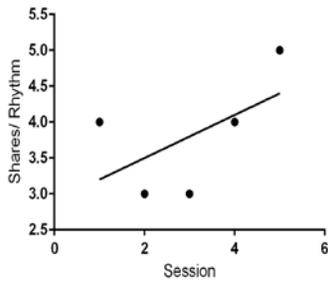
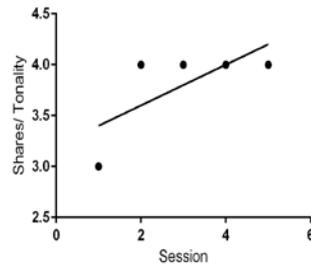


Figure 12. Linear regression: shares



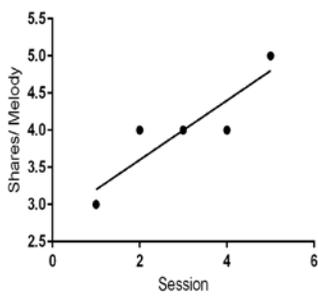
Slope: 4.8 +/- 4

Figure 13. Shares/Rhythm



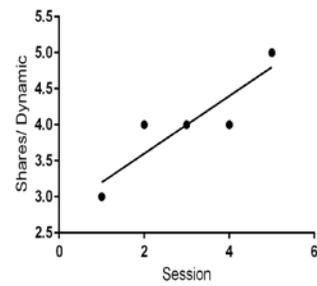
Slope: 3.2 +/- 1.92

Figure 14. Shares/Tonality



Slope: 6.4 +/- 1.92

Figure 15. Shares/Melody



Slope: 6.4 +/- 1.92

Figure 16. Shares/Dynamic

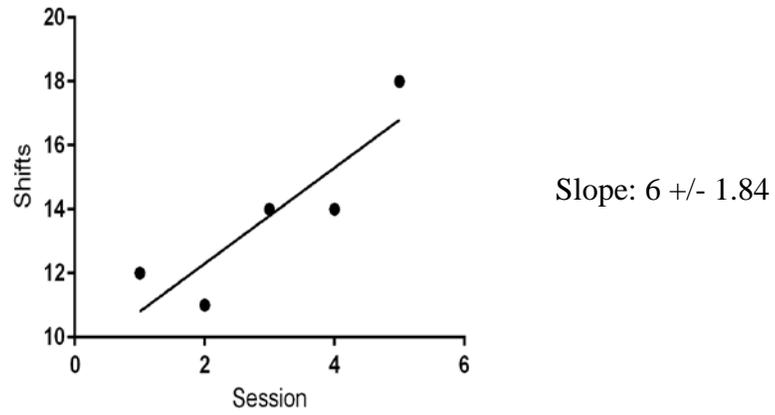
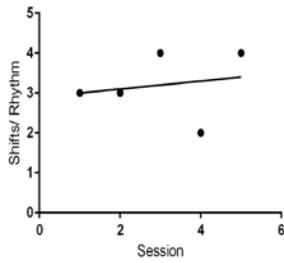
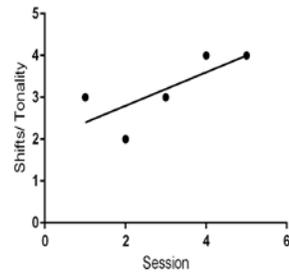


Figure 17. Linear regression: shifts



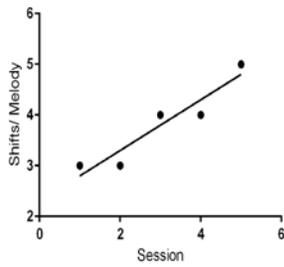
Slope: 1.6 +/- 4.8

Figure 18. Shifts/Rhythm



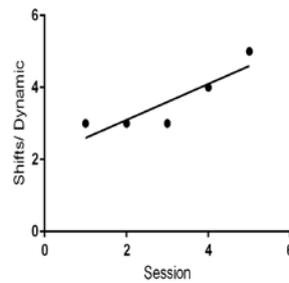
Slope: 6.4 +/- 3.2

Figure 19. Shifts/Tonality



Slope: 8 +/- 1.6

Figure 20. Shifts/Melody



Slope: 8 +/- 2.4

Figure 21. Shifts/Dynamic

**Areas of Musical Elements**

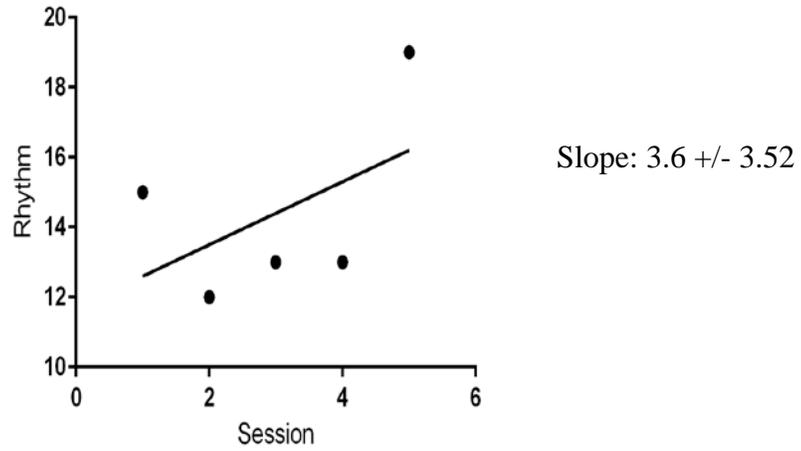
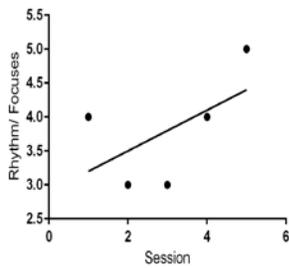
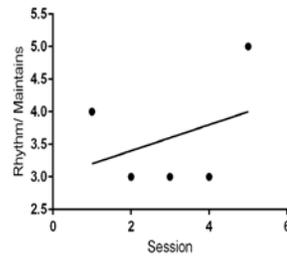


Figure 22. Linear regression: rhythm



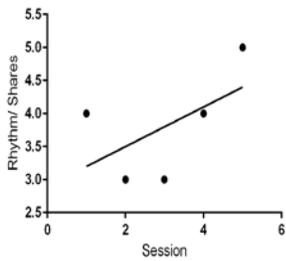
Slope: 4.8 +/- 4

Figure 23. Rhythm/Focuses



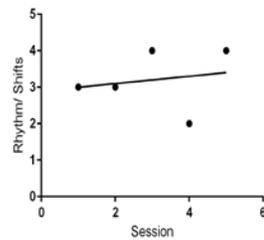
Slope: 3.2 +/- 4.96

Figure 24. Rhythm/Maintains



Slope: 4.8 +/- 4

Figure 25. Rhythm/Shares



Slope: 1.6 +/- 4.8

Figure 26. Rhythm/Shifts

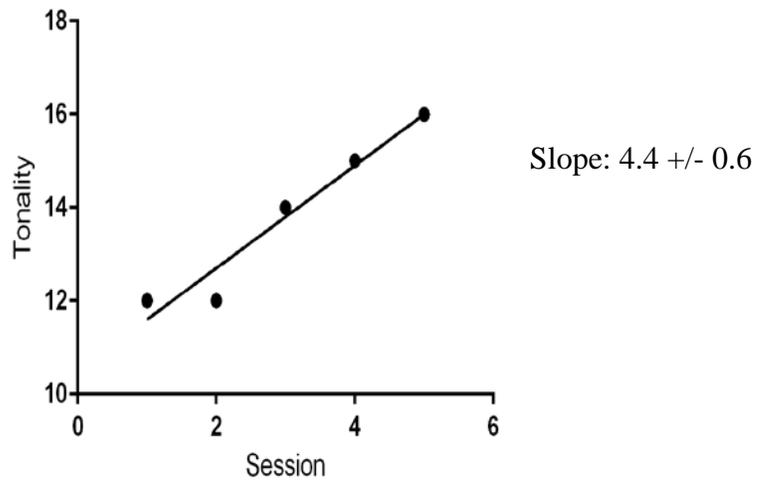
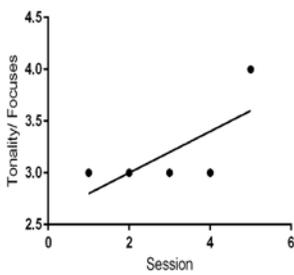
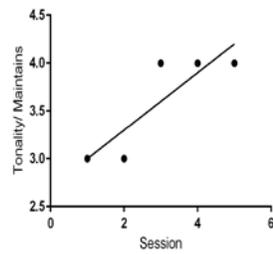


Figure 27. Linear regression: tonality



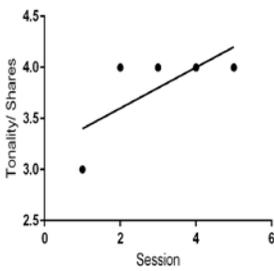
Slope:  $3.2 \pm 1.92$

Figure 28. Tonality/Focuses



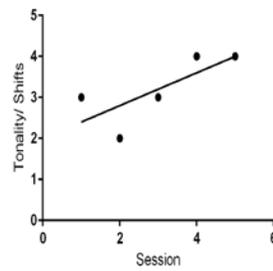
Slope:  $4.8 \pm 1.6$

Figure 29. Tonality/Maintains



Slope:  $3.2 \pm 1.92$

Figure 30. Tonality/Shares



Slope:  $6.4 \pm 3.2$

Figure 31. Tonality/Shift

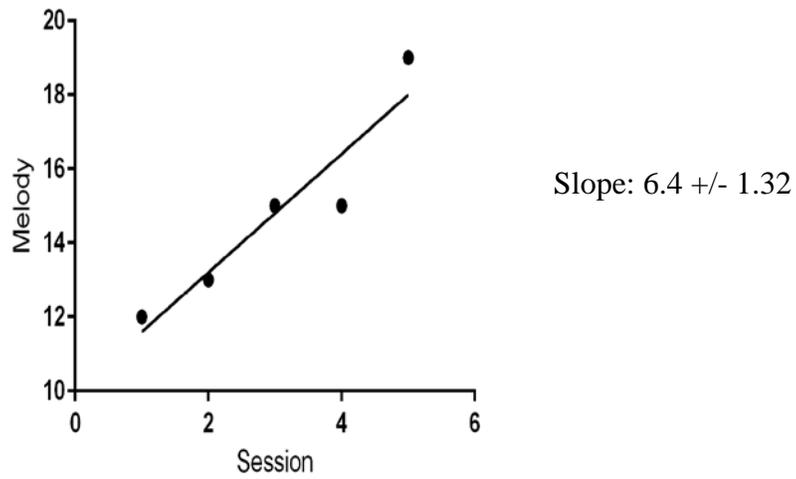
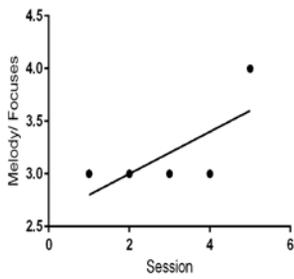
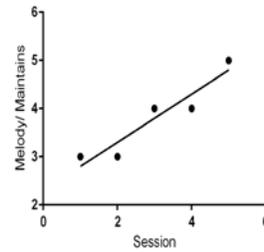


Figure 32. Linear regression: melody



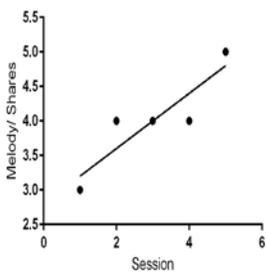
Slope: 3.2 +/- 1.92

Figure 33. Melody/Focuses



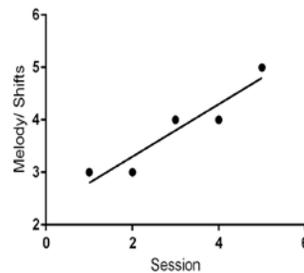
Slope: 8 +/- 1.6

Figure 34. Melody/Maintains



Slope: 6.4 +/- 1.92

Figure 35. Melody/Shares



Slope: 8 +/- 1.6

Figure 36. Melody/Shifts

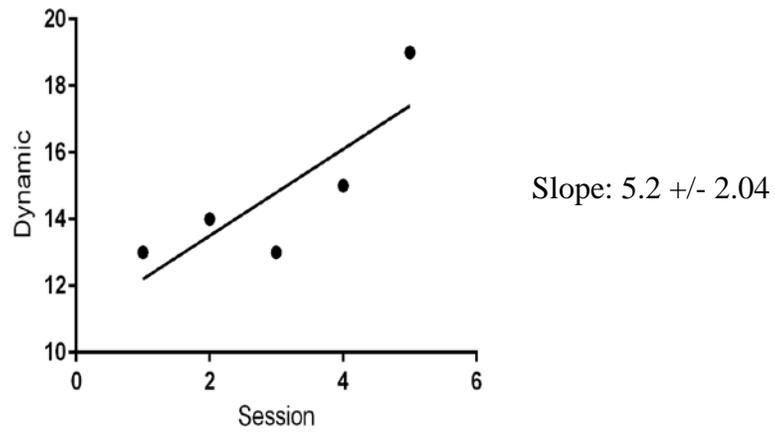


Figure 37. Linear regression: dynamic

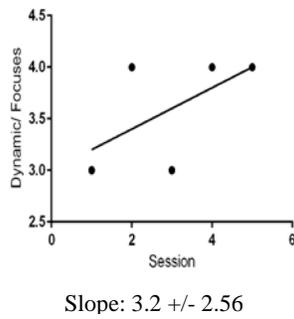


Figure 38. Dynamic/Focuses

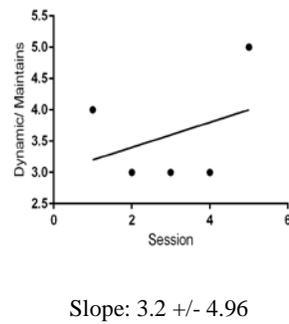


Figure 39. Dynamic/Maintains

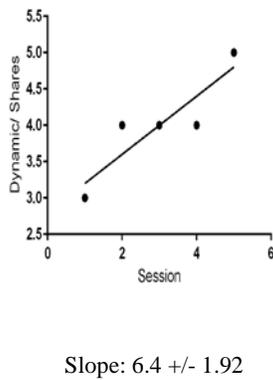


Figure 40. Dynamic/Shares

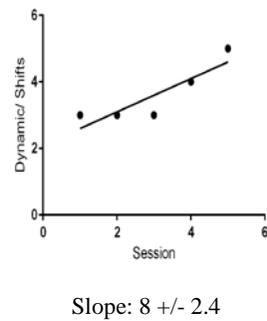


Figure 41. Dynamic/Shifts

Table 6.

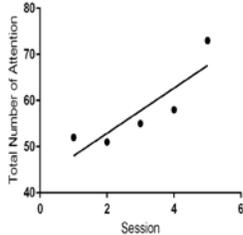
*Linear regression slope based on 5 sessions*

Dependent variable	Slope	Adjusted slope
<b>Total attention</b>	4.9 +/- 1.62	4.9 +/- 1.62
<b>Focuses</b>	0.9 +/- 0.47	3.6 +/- 1.88
<b>Maintains</b>	1.2 +/- 0.65	4.8 +/- 2.6
<b>Shares</b>	1.3 +/- 0.28	5.2 +/- 1.12
<b>Shifts</b>	1.5 +/- 0.46	6 +/- 1.84
<b>Rhythm</b>	0.9 +/- 0.88	3.6 +/- 3.52
<b>Tonality</b>	1.1 +/- 0.15	4.4 +/- 0.6
<b>Melody</b>	1.6 +/- 0.33	6.4 +/- 1.32
<b>Dynamic</b>	1.3 +/- 0.51	5.2 +/- 2.04
<b>Focuses/Rhythm</b>	0.3 +/- 0.25	4.8 +/- 4
<b>Focuses/Tonality</b>	0.2 +/- 0.12	3.2 +/- 1.92
<b>Focuses/Melody</b>	0.2 +/- 0.12	3.2 +/- 1.92
<b>Focuses/Dynamic</b>	0.2 +/- 0.16	3.2 +/- 2.56
<b>Maintains/Rhythm</b>	0.2 +/- 0.31	3.2 +/- 4.96
<b>Maintains/Tonality</b>	0.3 +/- 0.1	4.8 +/- 1.6
<b>Maintains/Melody</b>	0.5 +/- 0.1	8 +/- 1.6
<b>Maintains/Dynamic</b>	0.2 +/- 0.31	3.2 +/- 4.96
<b>Shares/Rhythm</b>	0.3 +/- 0.25	4.8 +/- 4
<b>Shares/Tonality</b>	0.2 +/- 0.12	3.2 +/- 1.92
<b>Shares/Melody</b>	0.4 +/- 0.12	6.4 +/- 1.92
<b>Shares/Dynamic</b>	0.4 +/- 0.12	6.4 +/- 1.92
<b>Shifts/Rhythm</b>	0.1 +/- 0.3	1.6 +/- 4.8
<b>Shifts/Tonality</b>	0.4 +/- 0.2	6.4 +/- 3.2
<b>Shifts/Melody</b>	0.5 +/- 0.1	8 +/- 1.6
<b>Shifts/Dynamic</b>	0.5 +/- 0.15	8 +/- 2.4

*Note:* Based on total attention scale, the slopes of focuses, maintains, shares, shifts, rhythm, tonality, melody, and dynamic were adjusted by times 4, and the slopes of focuses/rhythm, focuses/tonality, focuses/melody, focuses/dynamic, maintains/rhythm, maintains/tonality, maintains/melody, maintains/dynamic, shares/rhythm, shares/tonality, shares/melody, shares/dynamic, shifts/rhythm, shifts/tonality, shifts/melody, and shifts/dynamic were adjusted by times 16 in Table 6.

## Qualitative Results

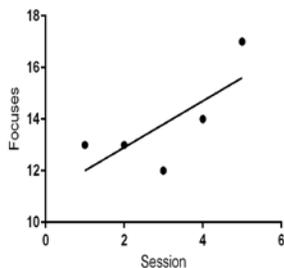
### [Total attention]



Over the five sessions, the client's total attention increased. His musical attention slowly improved until session #4 and showed dramatic improvement in session #5. This was evidenced by focusing on singing and intending to play the instruments. He paid more attention to musical play in session #5 than in previous sessions.

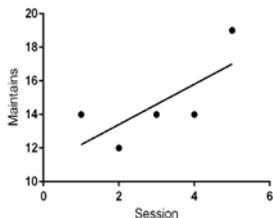
## Areas of Musical Attention

### [Focuses]



The client's focus on one or more musical elements improved dramatically. The client vocalized and played the piano from the beginning of the session. His attention to the therapist's music and playing gradually improved, and focusing on singing and playing an instrument increased over the five sessions.

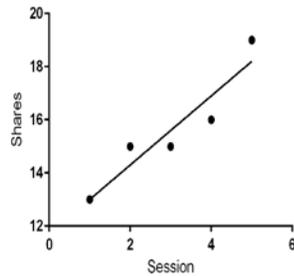
### [Maintains]



The maintaining of musical attention dramatically improved over the five sessions. The client sustained attention to play the piano more than any other instrument. He showed gradual improvement in tempo and dynamic by matching the therapist while playing

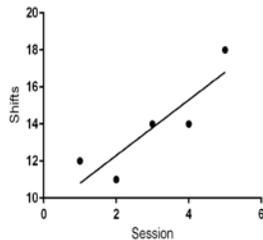
the piano.

[Shares]



The client's capacity to share attention gradually increased over the five sessions. He gradually attended to the same aspect as the therapist during music making. He matched the dynamic with the therapist while singing and tried to follow the therapist's tempo while playing the piano in sessions #2, #4, and #5. The duration of attending to the same aspect of the music as the therapist increased in session #5.

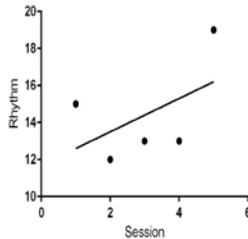
[Shifts]



The client's shifts of musical attention dramatically improved over the five sessions. Moments of shifting his attention to different musical elements in response to invitations or changes initiated by the therapist were limited in sessions #1 and #2. However, he attempted to use a different instrument when the therapist suggested that he to do so in session #4, and then he changed his focus of rhythm and dynamic while playing the piano and changed his melody during xylophone playing when the therapist prompted him to do so in session #5.

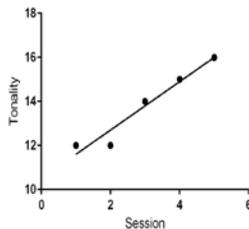
## Areas of Musical Elements

### [Rhythm]



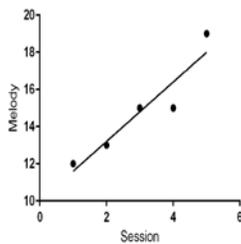
The client's rhythm of music was somewhat unsteady at the beginning. However, his rhythmic expression improved, as evidenced by his body movement during improvisation. His focus on the rhythmic aspect of the play dramatically improved in session #5, as evidenced by playing the piano and xylophone.

### [Tonality]



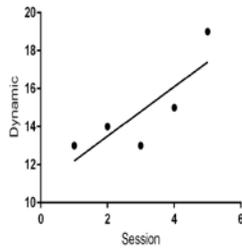
The client's focus in relation to tonality was gradually improved over the five sessions. This was evidenced by matching and harmonizing his voice with that of the therapist during music making. His vocal responding to the therapist improved as well.

### [Melody]



The client's focus on the melody was gradually improved from session #1 to session #4, and his expression of melody dramatically improved in session #5. This was evidenced by singing and playing melodic instruments. His melodic expression while improvising was somewhat limited at the beginning, but he could play more melodies as time passed. He showed varied melodic expression in session #5.

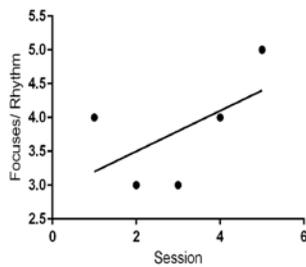
## [Dynamic]



The client showed dramatic improvement in the area of dynamic over the five sessions. This was evidenced by changing his volume while improvising music together with the therapist. The client was able to express dynamic by vocalizing with soft sound while singing in session #2, and he increased his volume while playing the piano and xylophone with that of the therapist in sessions #4 and #5.

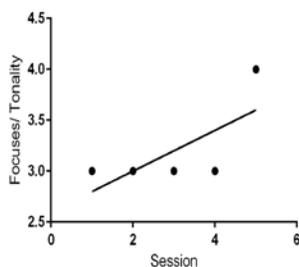
**Specific Combination of Musical Attention and Elements**

## [Focuses/Rhythm]



Over the five sessions, the client showed gradual improvement in the area of focuses/rhythm. In sessions #1, #3, #4, and #5, the client nodded his head to match the rhythm established by the therapist. In sessions #3 and #5, the client and the therapist changed the tempo of the music together. The client's rhythmic focus gradually improved, reaching a rating of five in session #5.

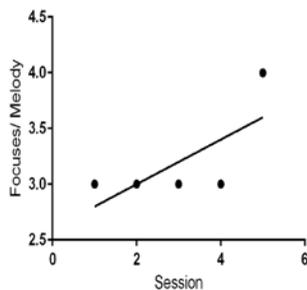
## [Focuses/Tonality]



Over the five sessions, the client showed significant improvement in the area of focuses/tonality. In sessions #3, #4, and #5, the client played the piano and

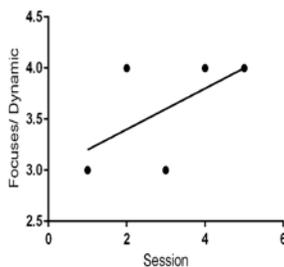
vocalized. His focus on tonality changed little until session #4, and he showed great improvement in session #5 by discovering more keys while using the xylophone. He sustained greater focus on the tonal center in session #5.

#### [Focuses/Melody]



Over the five sessions, the client showed dramatic improvement in the area of focuses/melody. This was evinced by his vocal responsiveness and playing of the piano. The therapist often used the same melody of music to allow the client to have enough time to listen carefully. The therapist patiently waited for the client to focus on the music. The client maintained the same level of scale in the area of focus until session #4, but his focus on the melody suddenly increased in session #5.

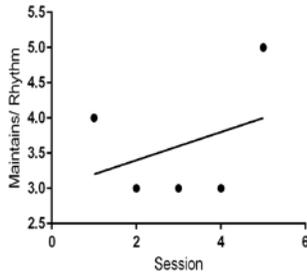
#### [Focuses/Dynamic]



Over the five sessions, the client demonstrated steady improvement in the area of focuses/dynamic. Improvement in this area was evidenced by matching the volume of sound established by the therapist during instrument playing and vocalizing. The client's dynamic focus was not stable during the first few

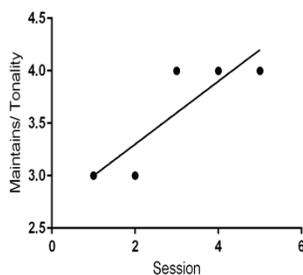
sessions, but he could express more dynamics by attempting to turn down the volume while singing during the final two sessions.

### [Maintains/Rhythm]



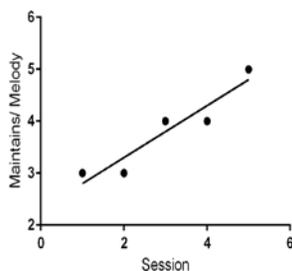
Over the five sessions, the client demonstrated dramatic improvement in the area of maintains/rhythm. His rhythm was somewhat stable while playing the piano with the therapist. He kept a steady beat along by nodding his head in sessions #2, #4, and #5. The maintains/rhythm stayed the same until session #4 and improved greatly in session #5.

### [Maintains/Tonality]



Over the five sessions, the client showed slight improvement in the area of maintains/tonality. He presented vocal responding to the therapist in sessions #3 and #4. The client did not exhibit significant changes in sessions #1 and #2, and it took longer for him to begin to respond vocally within the tonality of the therapist than that of session #3, #4, and #5.

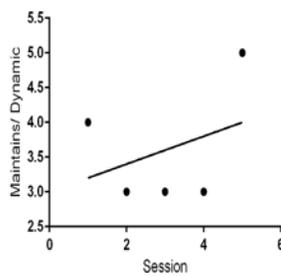
### [Maintains/Melody]



Over the five sessions, the client showed gradual improvement in the area of maintains/melody. This was evidenced by playing the instrument. The client's

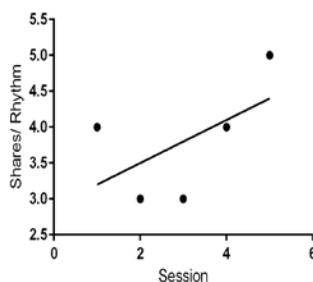
melody during piano playing was not well matched with the therapist's in sessions #1 and #2, but his melody gradually began to follow the therapist's in sessions #3 and #4, and he expressed more melodies by playing the piano and xylophone in session #5.

#### [Maintains/Dynamic]



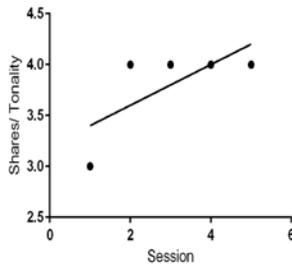
Between sessions #4 and #5, the client showed dramatic improvement in the area of maintains/dynamic. This was evidenced by vocalizing and playing the instrument. The client's expression of dynamic was limited in sessions #2, #3, and #4. However, his expression of dynamic greatly increased in session #5, by playing the piano and xylophone. He expressed more dynamics by playing soft and loud in session #5.

#### [Shares/Rhythm]



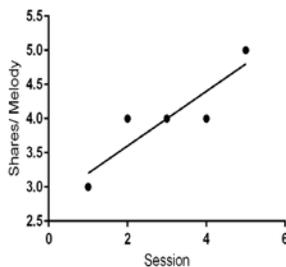
Over the five sessions, the client showed gradual improvement in the area of shares/rhythm. In sessions #1, #3, #4, and #5, the client nodded his head to match the rhythm established by the therapist. In sessions #3 and #5, the client and the therapist changed the tempo of the music together. The client's rhythmic focus gradually improved, reaching a rating of five in session #5.

## [Shares/Tonality]



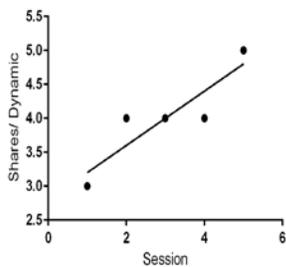
From sessions #2 to #5, the client consistently was rated as sharing the tonal center with the therapist often throughout the session. This was evidenced by playing the piano with the therapist in sessions #3, #4, and #5. The client showed limited shares of musical attention in session #1, but slightly improved starting from session #2 and maintained a similar attention of shares/tonality until session #5.

## [Shares/Melody]



Over the five sessions, the client showed gradual improvement in the area of shares/melody. This was evinced by responding to the therapist through vocalization and through playing an instrument. The client's melody gradually matched that of the therapist. He could play the same instrument as the therapist in sessions #4 and #5.

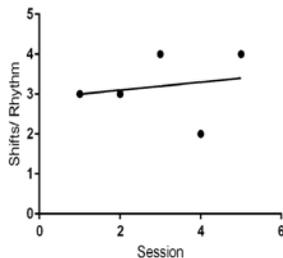
## [Shares/Dynamic]



Over the five sessions, the client showed gradual improvement in the area of shares/dynamic. This was evidenced by matching the volume established by the therapist for longer periods of time over the course of the sessions. The client sang softly while the therapist

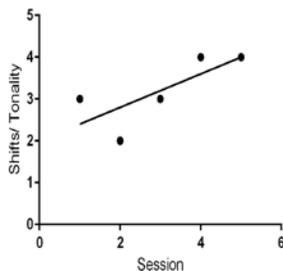
played the guitar softly in session #2, and he played the piano loudly when prompted by the therapist to do so in session #4 and #5. He could express dynamic for longer periods of time in session #5.

### [Shifts/Rhythm]



Over the five sessions, the client showed dramatic changes in the area of shifts/rhythm. The client did not show much rhythmic changes in sessions #1 and #2, and he attempted to follow the therapist's rhythm in session #3. This was evidenced by rocking his body while listening to the therapist's guitar playing. His focus of attention in rhythm suddenly decreased in session #4 because he refused to play the instrument, as suggested by the therapist. However, his focus dramatically increased again in session #5. He could match the rhythm established by the therapist for a longer time in session #5.

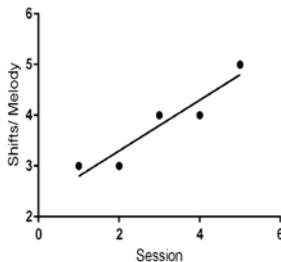
### [Shifts/Tonality]



Over the five sessions, the client showed gradual improvement in the area of shifts/tonality. This was evidenced by matching his voice with the therapist's in sessions #3 and #4. The client attempted to follow the therapist's voice in session #3, and he focused on

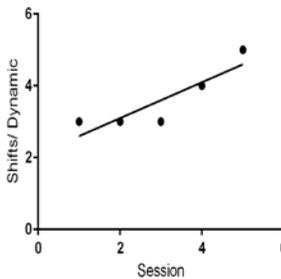
responding to the therapist using vocals and the piano for a longer time in session #5.

#### [Shifts/Melody]



Over the five sessions, the client showed gradual improvement in the area of shifts/melody. This was evidenced by changing his focus on melody while the therapist was making music. The client listened to the therapist's music, and then he attempted to follow the therapist's melody in sessions #3 and #4. The client matched the therapist's melody in session #5.

#### [Shifts/Dynamic]



Over the five sessions, the client showed gradual improvement in the area of shifts/dynamic. This was evidenced by changing his volume while improvising music together with the therapist. The client was able to express dynamic by playing music loud and softly vocalizing while singing in session #2, and he matched the volume established by the therapist in the sessions #4 and #5. The client's focus on dynamic increased up to five in session #5.

### Discussion

This study sought to investigate the effectiveness of improvisational music therapy for a client with Williams Syndrome (WS). The study employed both quantitative and qualitative

analysis to assess the quality of attention of a client with WS during improvisational music therapy. The study analyzed the client's attention behaviors in musical-play by reviewing existing video recordings of his therapy sessions. The quantitative data was analyzed by using selected dimensions (focusing on musical attention) of the IMCAP-ND, and these ratings were examined for directionality of change over five sessions using a linear regression analysis. The study conducted a qualitative analysis of the process by reviewing video recordings and noting the behaviors of both the client and the therapist in order to identify the specific musical interactions that inform the therapeutic process. The quantitative and qualitative analyses were considered together to understand the relationship between improvisational music therapy and changes in the client's attention.

Through its combination of quantitative and qualitative research methods, this study indicated that the quality of attention of a client with WS improved upon receiving five sessions of improvisational music therapy across a period of three months. This study found that the client improved dramatically in the areas of focuses/tonality, focuses/melody, maintains/rhythm, maintains/dynamic, shifts/rhythm, focuses, maintains, shifts, rhythm, and dynamic over the five sessions. More specifically, the client's musical attention did not exhibit significant changes until session #4, and it suddenly increased in session #5. This result indicates that the client's musical attention tended to change after he was exposed to a certain number of improvisational music therapy sessions. The client's musical attention dramatically improved overall, meaning that his musical-play in most of the areas greatly increased during the final session. This study found that improvisational music therapy had a significant positive impact on the client when at least five sessions were conducted.

I specifically analyzed each area of musical attention across the musical elements by

answering the following research questions.

***How did different facets of attention change over the course of the five therapy sessions?***

The client showed dramatic improvement in the area of focuses over the five sessions. Interestingly, the slope of linear regression graph was the same in the areas of focuses/tonality, focuses/melody, and focuses/dynamic, but the slope in the area of focuses/rhythm was slightly higher than in other areas. This means that the client's rhythmic focus was stronger than other areas of musical element, which was evinced by his ability to match the rhythm established by the therapist during improvisation. This finding is related to previous research indicating that improvisational music therapy helped a child with autism increase his/her joint attention by matching pulse, rhythmic patterns of movement, or musical play between the child and the therapist (Kim et al., 2008). This can serve as evidence that improvisational music therapy is helpful for increasing a client's attention through rhythmic invitations and repetition within musical play.

The area of *maintains focus* showed dramatic improvement. However, each area of maintains across the musical elements produced different results. Interestingly, the area of maintains/melody had a slope of 8 in the graph, and in the area of maintains/dynamic 0.2. This means that the client showed great improvement in sustaining his attention to the therapist's melody while playing the piano, and that he had difficulty sustaining attention in response to dynamic elements within the musical play. This finding is related to previous literature indicating that individuals with WS are often referred to as possessing absolute pitch (Lenhoff et al., 2001). It can be hypothesized that the client's maintaining of melodic focus may be affected by his musical ability such as absolute pitch; thus, he showed greater improvement in the area of maintains/melody than in other areas.

The area of *shares focus* demonstrated gradual improvement over the five sessions. The client presented dramatic improvement in every area except the area of shares across the musical elements, in which he showed gradual or steady improvement. This may be evidence that the client maintained similar musical attention per session in the area of shares. However, the client showed somewhat high value of slope in the areas of share/melody and shares/dynamic, at 6.4. It can be interpreted that the client presented more significant improvement in sharing attention with the therapist in relation to the elements of melody and dynamic. This finding is related to previous literature indicating that individuals with WS showed active musical responsiveness, musical accomplishment, engagement, and interest (Levitin et al., 2004). The client's interest in music, which was observed in his smiling, moving his body, playing instruments, and/or singing while music making, may have affected the rate at which he could improve his attendance to the therapist's melody and dynamic. Indeed, he expressed more melodies and dynamics when he seemed to be excited during improvisation.

The client exhibited dramatic improvement in the area of *shifts* over the five sessions. Interestingly, the linear graph in the area of shifts/rhythm showed different results from other graphs. In comparison to the others, it appears flat, which means that the slope value was much lower than in other areas. Interestingly, the client showed dramatic changes of attention by demonstrating sudden changes (decreasing and increasing) of the ratings in the graph; thus, the slope value became lower. The client's rhythm was rarely changed by changes in therapist, music, or play. This was evidence that he had difficulty attending rhythmic changes that were presented by the therapist. However, he presented dramatic improvement again in session #5. This study is related to previous research demonstrating that children with ADHD demonstrated an improvement in attention, motor control, and academic skills through rhythmic exercises over

a period of three to five weeks (Orenstein, 2015). It can be interpreted that rhythmic exercises may help clients improve their attention.

***How did attention, relative to different dimensions of music, change over the course of the therapy sessions?***

The client showed dramatic improvement of attention in the area of rhythm. Most areas of rhythm—such as rhythm/focuses, rhythm/maintains, and rhythm/shares—demonstrated similar slope value in the linear regression graphs. However, the slope value of rhythm/shifts was much lower than in other areas. It appeared almost flat, from which it can be interpreted that the client's rhythmic focus rarely changed due to changes in therapist, music, or play during improvisation. It was evidenced by decreasing his attention in the area of rhythm/shifts during session #4; in spite of that, it dramatically improved again in session #5. This is related to a previous research study demonstrating that children with ADHD show improvement in attention through rhythmic exercises (Orenstein, 2015). This may be evidence that the client with WS has more possibilities to improve his musical attention through various rhythmic practices.

The client presented gradual improvement in tonality during improvisation. This was evinced by his ability to match and harmonize his voice with the therapist's during singing. The slope of each musical attention in the area of tonality was similar. It was approximately 4.0, but the slope in the area of tonality/shifts was 6.4, which was higher than other areas. It can be interpreted that the client changed the focus of attention as indicated by changes in tonality when played with the therapist during improvisation, and he showed great improvement in the area of tonality/shifts over the five sessions. This is related to a previous research study indicating that children with WS can easily learn songs, have good singing skills, and express greater enjoyment of music than normal children (Don et al., 1999). It can be anticipated that the client's musical

abilities, such as good singing skills and the ability to learn songs easily, may have affected the improvement of attention to tonal shifts during improvisation.

The client showed constant improvement in the area of *melody* over the five sessions. His focus on the melodic element gradually improved, as was evinced by his ability to sing with the therapist and play melodic instruments during improvisation. Interestingly, most slopes in the area of melody across the musical attention were high, at 6.4 or 8, but only the slope in the area of melody/focuses was low. The client did not show much improvement in the area of melody/focuses until session #4; however, he demonstrated dramatic improvement in session #5. Significantly, the therapist often used the same melody of the music and allowed the client to have enough time to focus on the melody. Establishing familiarity of the melody may have enabled the client to improve musical attention in the area of melody/focuses. This finding is also related to the research study indicating that many clients with WS have absolute pitch (Lenhoff et al., 2001); the client's special abilities may have affected his attention to melody.

The client showed dramatic improvement in the area of *dynamic* over the five sessions. This was evinced by his ability to change his volume while improvising music together with the therapist. Most slopes in the area of dynamic across the musical attention were similar except the slope in the area of dynamic/shifts, which was much higher than in other areas. The client was able to express dynamic by playing the music loud and singing softly with the therapist while improvising. His attention to the dynamic of the music was strongest during moments of change in the therapist's music making. This is evidence that the client demonstrated improvement of musical attention in the area of dynamic. This finding is related to previous research indicating that improvisational music therapy, which involves matching dynamic forms of expression and melodic contour to the point where there is a common musical foundation between the child and

the therapist, is effective at facilitating joint attention behaviors in children with autism (Kim et al., 2008). Through this study, I have learned that dynamic exercises during improvisation played an important role in helping clients with WS to improve their attention.

As a result, almost all of the ratings throughout the study were at least a three (about half the time). For a client who inherently has difficulty with attention and focus to be attentive at least half of the time throughout the five sessions suggests that music improvisation is an effective means through which to support focus and attention for the client.

### **Clinical Implications**

This study may be beneficial for clients with WS, their families, and music therapists. Clients with WS and their families may look to improvisational music therapy to meet their needs. Meanwhile, this study can provide music therapists with guidance as they learn more about WS, which remains a little known subject in the field of music therapy, and create therapeutic methods for a client with WS.

Based on the results of the study, I have devised recommendations for music therapists that will ideally inform their work with clients with WS. One of the most significant clinical implications of this study is that rhythmic exercises are important for clients with WS during improvisation because this can help them improve their focus. This study supported the previous research indicating that children with WS are reported to have a good sense of producing rhythms (Hopyan, Dennis, Weksberg, & Cytrynbaum, 2001) because the client's rhythmic focus improved over the five sessions of music therapy, as evidenced by the client's ability to match rhythm with that of the therapist during improvisation. Additionally, the client showed dramatic improvement of attention in the area of rhythm, which may be evidence that a client with WS has greater possibilities to improve his musical attention through various rhythmic practices.

Accordingly, I recommend music therapists working with a client with WS to utilize more rhythmic exercises, such as matching and changing rhythms in the area of rhythm/ shifts because flexibility in shifting rhythm was inconsistent from session to session. Thus, I suggest that shifting focus of different rhythm is more challenging than shifting focus to changes in tonality or dynamics.

Another significant clinical implication of this study is that tonality shifts are most effective in supporting the client's shifts in attention during improvisation. In this study, the client showed gradual improvement in attention to tonality during improvisation, observed in his ability to match and harmonize his voice with that of the therapist during singing. The slope value in the area of tonality/shifts was higher than in other areas. A change in the tonal center may elicit heightened attention. For a client who is keenly aware of pitch or may have absolute pitch, it makes sense that he or she would notice a shift in the tonal center or primary pitch. As I mentioned earlier, this is related to previous research study indicating that individuals with WS own outstanding capabilities in absolute pitch as well as they have obvious potentials exceeding their limitations in relative pitch (Lenhoff et al., 2001). Therefore, I recommend music therapists take more time to focus on tonality practice in the area of tonality/ shift to support the client with WS to increase attention, and I also suggest expanding skills in the areas of tonality/focuses, tonality/maintains, and tonality/shares to see how tonality across such musical attention helps clients develop their attention.

Melody was the strongest element in maintaining and sharing attention for clients with WS. In this study, the client demonstrated a strong ability to express melodies by singing and playing instruments. He showed great improvement in sustaining attention to the therapist's melody while playing the piano, and he presented constant improvement of melodic focus, which

was observed through his singing across the five sessions. This is related to the previous research indicating that children with WS produce creative elaboration of melodies after the stimulus music has ceased (Hopyan et al., 2001). Thus, I strongly recommend music therapists to use melodic exercises in the area of melody/maintains, melody/shares, and melody/shifts during improvisation to help clients with WS increase their musical attention. I also suggest that they take more time to focus on melodic practice in the area of melody/focuses, which, in this study, demonstrated a lower slope value than in other areas.

Finally, dynamic was the most significant musical element for supporting the client's shifts in attention. In this study, the client showed dramatic improvement in the area of dynamic, as was observed in his ability to match his volume with that of the therapist during improvising music. The slope value was very high in the area of dynamic/shifts, which means that his attention to dynamic changes (i.e., playing instruments loud or singing more softly) in accordance with changes in the therapist's music gradually improved. He was able to attend to the therapist while imitating the therapist's dynamic expression of music. Therefore, I highly recommend music therapists to practice dynamic expression in the areas of dynamic/shifts during improvisational music therapy when they work with clients with WS in order to increase their shifts in attention.

### **Reflections on Research Process and Considerations for Future Study**

There were several strengths, difficulties, and limitations while conducting this study. First of all, reviewing the video recordings was an effective method of observing the client's behaviors in detail because I could watch them repeatedly and take the time to analyze each session. It was useful to observe significant moments unfold and to consider the meaning of the moment by pausing the video. In addition, it allowed my advisor and I to discuss the session by

focusing on specific parts of the video for analysis.

However, this method came with some difficulties. Both my advisor and I found ourselves rushing to watch the videos due to a limited timeframe for opening the files, and when the files were deleted soon thereafter, we were forced to depend only on the session notes we had compiled during our viewings. In addition, I sometimes had a limited understanding of the situation unfolding on screen because I was not actually present in the session.

There were some broader limitations. I was able to view only the most recent five sessions that had been led by the music therapist. The client had almost a year of music therapy prior to these sessions, but I viewed the only five sessions. This may be a limitation of analyzing the data.

The IMCAP-ND helped assess the client's musical attention because it included a definition of each area of musical attention and guided my analysis of the sessions. However, I used only a select part of the IMCAP-ND, and this may have limited the assessment's effectiveness.

Incorporating musical elements (rhythm, tonality, melody, and dynamic) into the IMCAP-ND had more benefit in order to analyze the client's quality of attention systematically. However, I encountered difficulties in determining the accuracy of the analysis because it may have involved subjective thoughts during measuring frequency of musical elements.

Utilizing session notes during the process of qualitative data collection was useful for recording the important moments of every session and providing insight into the musical interactions between the therapist and the client. However, I could not expect more details to emerge from my notes because they had not included specific behaviors of the client at every minute.

Linear regression was a useful tool in the data analysis process because it enabled me to compare the slopes and to direct my analysis of the quantitative and qualitative data. But, it was difficult to eliminate my thoughts and biases during the qualitative analysis. I tended to determine and analyze data based on my perspectives and experiences when the session notes provided insufficient information.

This study was also limited by the fact that it examined only one participant of a particular age. If a larger sample size had been used for the study, I could have performed a meaningful statistical analysis and increase the reliability of my findings.

There are some considerations for future study based upon these findings. One might consider gathering more participants from a variety of populations for future study in order to establish the robustness of the results of the present study. One might also consider extending the treatment period to systematically view the client's developmental process for a longer period of time. In addition, one might consider using a standardized measure alongside IMCAP-ND in order to look for relationship between each area of musical attention and there would need to be a more detailed assessment tool to compare each area of musical elements during improvisation, and there needs to be more effective way of transcribing session notes while observing video-recorded sessions. Indeed, more research is needed to further explore and support the theories presented in this study.

### **Conclusion**

This study investigated how the musical ability of a client with WS can affect his attentional challenges through improvisational music therapy treatment and recognized the need for music therapy treatment to achieve better outcomes. Through this study, I was able to take a

different point of view of individuals with WS, and I realized that intensive research is needed in order to effectively treat them with music therapy. Overall, this study indicated that improvisational music therapy was an effective method for this client with WS in terms of improving his attention. More research is needed before these results can be generalized. The improvisational music provided by the therapist was a key component in motivating and supporting progress of attention in various musical elements—rhythm, tonality, melody, and dynamic—and the areas of musical attention—focuses, maintains, shares, and shifts. Therefore, this study hopes to inform the work of music therapists and other professionals who work with clients with WS, to better address the attentional difficulties of individuals with WS, and to provide information and suggestions for future study in this area.

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**Appendix A: Average Rating**

Table A1.

*Average Rating and Inter-Rater Reliability-Focuses*

<b>Focuses/Rhythm</b>	<b>Inter-Rater</b>	<b>Average rating</b>
4 4	100	4
2 3	66.66666667	2.5
3 3	100	3
3 4	75	3.5
5 5	100	5
<b>Focuses/Tonality</b>		
2 3	66.66666667	2.5
2 3	66.66666667	2.5
2 3	66.66666667	2.5
3 3	100	3
4 4	100	4
<b>Focuses/Melody</b>		
2 3	66.66666667	2.5
2 3	66.66666667	2.5
2 4	50	3
2 4	50	3
4 4	100	4
<b>Focuses/Dynamic</b>		
2 3	66.66666667	2.5
3 4	75	3.5
2 4	50	3
4 4	100	4
4 4	100	4
<b>Average</b>	78.33333333	

Note: The color blue indicates the advisor's ratings. The color red indicates the investigator's ratings.

Table A2.

*Average Rating and Inter-Rater Reliability-Maintains*

<b>Maintains/Rhythm</b>	<b>Inter-Rater</b>	<b>Average rating</b>
4 4	100	4
3 3	100	3
3 3	100	3
3 3	100	3
4 5	80	4.5
<b>Maintains/Tonality</b>		
2 3	66.66666667	2.5
3 3	100	3
3 4	75	3.5
4 4	100	4
4 4	100	4
<b>Maintains/Melody</b>		
2 3	66.66666667	2.5
2 3	66.66666667	2.5
3 4	75	3.5
3 4	75	3.5
4 5	80	4.5
<b>Maintains/Dynamics</b>		
3 4	75	3.5
2 4	50	3
2 4	50	3
2 4	50	3
4 5	80	4.5
<b>Average</b>	79.5	

Table A3.

*Average Rating and Inter-Rater Reliability-Shares*

<b>Shares/Rhythm</b>		<b>Inter-Rater</b>	<b>Average rating</b>	
	<b>3</b>	<b>4</b>	75	3.5
	<b>2</b>	<b>3</b>	66.66666667	2.5
	<b>2</b>	<b>3</b>	66.66666667	2.5
	<b>3</b>	<b>4</b>	75	3.5
	<b>4</b>	<b>5</b>	80	4.5
<b>Shares/Tonality</b>				
	<b>2</b>	<b>3</b>	66.66666667	2.5
	<b>3</b>	<b>4</b>	75	3.5
	<b>3</b>	<b>4</b>	75	3.5
	<b>4</b>	<b>4</b>	100	4
	<b>4</b>	<b>4</b>	100	4
<b>Shares/Melody</b>				
	<b>3</b>	<b>3</b>	100	3
	<b>3</b>	<b>4</b>	75	3.5
	<b>3</b>	<b>4</b>	75	3.5
	<b>3</b>	<b>4</b>	75	3.5
	<b>4</b>	<b>5</b>	80	4.5
<b>Shares/Dynamic</b>				
	<b>2</b>	<b>4</b>	50	3
	<b>3</b>	<b>4</b>	75	3.5
	<b>3</b>	<b>4</b>	75	3.5
	<b>4</b>	<b>4</b>	100	4
	<b>5</b>	<b>5</b>	100	5
<b>Average</b>			79.25	

Table A4.

*Average Rating and Inter-Rater Reliability-Shifts*

<b>Shifts/Rhythm</b>		<b>Inter-Rater</b>	<b>Average rating</b>
	<b>2</b> <b>4</b>	50	3
	<b>2</b> <b>3</b>	66.66666667	2.5
	<b>3</b> <b>4</b>	75	3.5
	<b>2</b> <b>2</b>	100	2
	<b>4</b> <b>4</b>	100	4
<b>Shifts/Tonality</b>			
	<b>3</b> <b>3</b>	100	3
	<b>2</b> <b>2</b>	100	2
	<b>2</b> <b>3</b>	66.66666667	2.5
	<b>3</b> <b>4</b>	75	3.5
	<b>4</b> <b>4</b>	100	4
<b>Shifts/Melody</b>			
	<b>2</b> <b>3</b>	66.66666667	2.5
	<b>2</b> <b>4</b>	50	3
	<b>4</b> <b>4</b>	100	4
	<b>3</b> <b>4</b>	75	3.5
	<b>4</b> <b>5</b>	80	4.5
<b>Shifts/Dynamic</b>			
	<b>3</b> <b>3</b>	100	3
	<b>3</b> <b>3</b>	100	3
	<b>3</b> <b>3</b>	100	3
	<b>3</b> <b>4</b>	75	3.5
	<b>5</b> <b>5</b>	100	5
<b>Average</b>		84	

### Appendix B: Session Notes

The session notes were described in Tables B1–B5. The notes were presented based upon what music therapist and client did during session. The specific session time were demonstrated in the table as well.

Table B1.

*Notes from Session #1*

Time	Music therapist	Client
<b>0:00-1:01</b>	Matched the client's music by piano	Played the piano
<b>1:02-1:17</b>	Accompanied client's music by piano	Played wide range of keys on the piano
<b>1:18-2:57</b>	Speeded up the tempo and prompted him to say "hey"	Responded "hey" to the therapist
<b>2:58-3:56</b>	Slowed down the tempo	Sang "la la la"
<b>3:57-4:28</b>	Tapped hands together with the client and encouraged him to sing	Focused on singing
<b>4:29-5:37</b>	Kept playing same melody with the client by guitar accompaniment	Played the piano
<b>5:38-7:38</b>	Speeded up the tempo	Nodded his head while playing the piano
<b>7:39-7:58</b>	Prompted him to say "ah"	Responded "ah" to the therapist
<b>7:59-8:58</b>	Played the guitar	Vocalized
<b>8:59-10:38</b>	Used techniques of matching and Modeling along with guitar accompaniment	Vocalized while playing the piano
<b>10:39-11:05</b>	Prompted him to say "ah"	Responded "ah" to the therapist
<b>11:06-15:17</b>	Speeded up the tempo and slowed down the tempo (Modeling)	Responded "ah" along with singing
<b>15:18-17:10</b>	Played the guitar with slow tempo	Played same tempo with the therapist
<b>17:11-17:54</b>	Played the guitar	Played the piano in lower range
<b>17:55-18:22</b>	Played the guitar	Stood up and played the piano in upper range
<b>18:23-19:35</b>	Matched with the client	Vocalized
<b>19:36-21:57</b>	Prompt him to say "goodbye"	Responded him by playing the piano

Table B2.

*Notes from Session #2*

Time	Music therapist	Client
<b>0:00-0:37</b>	Prompted him to respond vocalizing along with guitar accompaniment	Vocalized when the therapist prompted.
<b>0:38-1:20</b>	Presented tempo changes (Slow-fast-slow)	Attempted to match the tempo with the therapist.
<b>1:21-1:28</b>	Keep played the guitar	Played the piano on the key of lower range.
<b>1:29-1:50</b>	Presented technique of matching	Played the piano by two index fingers.
<b>1:51-2:18</b>	Gradually played the guitar louder (Visually prompted him)	Speeded up the tempo
<b>2:19-3:17</b>	Played the guitar while singing “hey hey”	Kept steady beat along with nodding his head
<b>3:18-4:00</b>	Gradually slowed down the tempo	Played lower range of the piano
<b>4:01-4:36</b>	Demonstrated to play the drum and encouraged him to play (Presented technique of grounding)	Stood up and watched the therapist Playing.
<b>4:37-6:09</b>	Kept playing the guitar	Stopped playing the piano and then played it again.
<b>6:10-7:15</b>	Played the guitar softly.	Softly vocalized instead of playing instrument
<b>7:16-8:44</b>	Played the guitar softly with finger picking.	Slightly turned his body to the other side of the therapist
<b>8:45-10:27</b>	Sang “goodbye song”	Listened to the “goodbye” song and Responded “ah ah” to the therapist.
<b>10:28-11:25</b>	Completed the song	Stayed calm

Table B3.

*Notes from Session #3*

Time	Music therapist	Client
<b>0:34-1:58</b>	Sang the song, “welcome back to music” to the client	Started to play the piano with nodding his head
<b>1:59-3:39</b>	Made spaces for the client to respond	Speeded up the tempo of playing the piano
<b>3:40-4:10</b>	Tried to make eye contact with the client	Responded to the therapist with his Voice and made some eye contact with the therapist
<b>4:11-4:56</b>	Slowed down the tempo	Kept playing with fast tempo
<b>4:57-5:08</b>	Tried to match the tempo with the client	Vocalized when the therapist prompted him

<b>5:09-5:54</b>	Played the music slowly	Stopped playing the piano and sang with the therapist
<b>5:55-6:40</b>	Prompted the client to respond	Presented vocal responding
<b>6:41-7:33</b>	Played the guitar	Kept listening to the therapist and rocking his body while listening and then vocalizing
<b>7:34-8:15</b>	Played the guitar with fast tempo	Played the piano
<b>8:16-8:38</b>	Slowed down the tempo and then grabbed client's hand	Grabbed therapist's hand and tried to move back to the door
<b>8:39-9:00</b>	Tried to match the client's beat	Came back to the piano and played it
<b>9:01-9:27</b>	Sang the song "let's play the drum"	Attempted to play the marimba with mallets
<b>9:28-9:42</b>	Encouraged the client to play the drum	Played the marimba instead of drum
<b>9:43-10:16</b>	Kept steady tempo	Came back to piano and played it
<b>10:17-11:10</b>	Tried to match with the client	Played the piano in high range by his right hand and low range by his left hand
<b>11:11-12:05</b>	Played the guitar softly	Stopped playing the piano, and rocked his body along with singing
<b>12:06-13:28</b>	Smiled at the client	Touched his head while vocalizing
<b>13:29-14:34</b>	Accompanied the client's music	Played the marimba
<b>14:35-15:32</b>	Played the guitar along with singing	Dropped the mallet and picked it up and then went back to piano
<b>15:33-16:12</b>	Played the guitar along with singing	Played the piano
<b>16:13-33:47</b>	Sang the song, "all around the music room" with soft sound	Sat down on a chair and vocally responded to the therapist

Table B4.

*Notes from Session #4*

Time	Music therapist	Client
<b>0:14-2:00</b>	Sang "Welcome back to music" to the client	Nodded his head while playing the piano
<b>2:02-4:06</b>	Slowed down the tempo Used dynamic ( soft and loud)	Attempted to follow music therapist's tempo (slowed down), and then went back to fast tempo.
<b>4:09-7:42</b>	Kept the slow tempo	Played the piano in lower range
<b>7:43-7:54</b>	Match the tempo with the client	Attempted to played the xylophone
<b>7:55-9:23</b>	Encouraged him to play the xylophone	Seemed not to interest in playing the xylophone. He tried to play the piano
<b>9:24-10:10</b>	Encouraged him to play the	Kept playing the piano

	tambourine	
<b>10:11-12:52</b>	Prompted him to sing	Vocally responded to the therapist
<b>12:53-13:27</b>	Encouraged him to grab tambourine (Physical prompting)	Denied playing the tambourine when the therapist prompted
<b>13:28-14:06</b>	Kept trying him to play the tambourine (Physical prompting)	Grabbed the tambourine and played it
<b>14:06-14:45</b>	Accompanied the client's music	Moved the tambourine away and played the piano along with singing
<b>14:46-15:29</b>	Grabbed the client's hands and encouraged him to dance with the therapist	Grabbed the therapist's hand and danced together
<b>15:30-16:14</b>	Played the piano with the client	Played the piano with the therapist
<b>16:15-20:22</b>	Visually prompted him. Gradually slowed down the tempo	Played the piano loud when the therapist visually prompted Sometimes vocally responded
<b>20:23-20:54</b>	Prompted him to sing	Vocally responded
<b>20:55-25:02</b>	Gave him stick to play the drum (Physical prompting)	Grabbed the stick, but put that down and sang instead of playing the instrument
<b>25:03-26:20</b>	Played the piano with the client	Played the piano with the therapist (Seemed more comfortable while playing the piano)
<b>26:21-28:04</b>	Sang "goodbye" song	Speeded up the tempo Kept repeating the same melody while singing

Table B5.

*Notes from Session #5*

Time	Music therapist	Client
<b>0:01-1:35</b>	Started the session with steady tempo	Played the piano with nodding his head
<b>1:36-1:43</b>	Matched his music along with guitar accompaniment	Played the xylophone
<b>1:44-3:58</b>	Accompanied his music by guitar	Played the piano
<b>3:59-4:10</b>	Accompanied his music by guitar	Played the xylophone
<b>4:11-9:43</b>	Prompted him to respond	Responded to the therapist with vocal and piano
<b>9:44-16:52</b>	Encouraged him to play the drum Used technique of matching	Played the xylophone
<b>16:53-17:07</b>	Speeded up the tempo	Played the piano with a little fast Tempo (matching tempo with the therapist)
<b>17:09-17:27</b>	Prompted him to play the drum	Played drum and xylophone

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<b>17:28-18:43</b>	Matched the tempo and dynamic with the client	Played the piano
<b>19:00-23:13</b>	Played the piano with the client	Played the piano with the therapist Matched the tempo with the therapist

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**Appendix C: Recruitment Script**

Hello \_\_\_\_\_,

My name is Hyun Kyoung Kim who is a music therapy student of Montclair State University. I would like to invite your child to participate in a research study about Quality of attention in a client with Williams Syndrome during improvisational music therapy. This study will involve reviewing and analyzing video recording from past sessions.

I will review Parent/Guardian Consent Form with you, and answer any questions you have about the form, or about the study in general.

Should find it acceptable to allow your child's video-recorded data to be incorporated into my study, you can sign the form now, or take additional time to review it, and return it (scanned, as a .pdf file, if possible) to: Hyun Kyoung Kim, at kimh39@montclair.edu.

This study has been approved by the Montclair State University Institutional Review Board.

If you have any questions please feel free to call me at 201-951-2912, my faculty sponsor Dr. Brian Abrams at 610-299-9630 or Dr. John Carpente at 516-323-3324 of the Rebecca Center for Music Therapy.

Thank you for taking the time to consider participating in this study.

**Appendix D: Participant Consent****Parent/Guardian Consent Form for Participants Under 18 Years of Age or  
Dependent Adults****PARENT/GUARDIAN CONSENT FORM**

Please read below with care. You can ask questions at any time, now or later. You can talk to other people before you fill in this form.

**Study's Title:**

Quality of attention in a client with Williams Syndrome during improvisational music therapy

**Why is this study being done?**

The purpose of this study is to investigate the effectiveness of improvisational music therapy on promoting quality of attention in a client with Williams Syndrome.

**What will happen while your child or dependent is in the study?**

The participant's attention behaviors in musical-play will be analyzed by reviewing existing video recordings.

10 to 12 video recordings over the three months' period will be reviewed by researcher. The child's name will not be used for the study.

**How data will be stored and what will happen after study?**

The researcher will use only one computer for analyzing the child's behaviors through watching data of video recordings, and all the data and video recordings will be reviewed confidentially. This computer will be stored securely, locked in researcher's home. The video recordings will be deleted after complete study.

**Time:**

No additional time will be required of participants. This is a review of data previously collected.

**Risks:**

Although we will have identifiable video recordings of your child, at no time will those recording be viewed by anyone other than research team members. We will never make the recording public and will destroy them after the research study is completed.

**Benefits:**

There are no benefits to your child or dependent being in this study.

Others may benefit from this study by/because this study will be an evidence of effectiveness of improvisational music therapy if the result is positive, and families of clients with WS will have hope for increasing their member of family's needs through improvisational music therapy.

**Who will know that your child or dependent is in this study?**

Faculty sponsor, two committee members, and graduate program department will know that your child or dependent is in this study.

Your child or dependent will not be linked to any presentations. We will keep who your child or dependent is confidential according to the law.

**Does your child or dependent have to be in the study?**

Your child or dependent does not have to be in this study. She/he is a volunteer! It is okay if she/he wants to stop at any time and not be in the study. She/he does not have to answer any questions that she/he does not want to answer. Nothing will happen to your child or dependent.

Whether or not you agree to have your child participate in this study, it will have no affect on the services you may currently be receiving from The Rebecca Center Music Therapy, or you may receive in the future.

**Do you have any questions about your rights as a research participant?** Phone or email the IRB Chair, Dr. Katrina Bulkley, at 973-655-5189 or [reviewboard@mail.montclair.edu](mailto:reviewboard@mail.montclair.edu).

**Do you have any questions about this study?**

Phone or email to, Dr. Brian Abrams, at 610-299-9630 or [abramsb@mail.montclair.edu](mailto:abramsb@mail.montclair.edu) or to Hyun Kyoung Kim, at 201-951-2912 or [kimh39@mail.montclair.edu](mailto:kimh39@mail.montclair.edu)

The copy of this consent form is for you to keep.

**Statement of Consent**

I have read this form and decided that I agree to my child's participation in the project described above. Its general purposes, the particulars of involvement, and possible risks and inconveniences have been explained to my satisfaction. I understand that my child can withdraw at any time. My signature also indicates that I have received a copy of this consent form.

If you choose to have your child or dependent in this study, please fill in the lines below.

Child's Name: \_\_\_\_\_

_____	_____	_____
Name of Parent/Guardian	Signature	Date
_____	_____	_____
Name of Parent/Guardian	Signature	Date
_____	_____	_____

_____	Signature	_____
Name of Principal Investigator		Date
_____	_____	_____
_____	Signature	_____
Name of Faculty Sponsor		Date

**Appendix E: Rebecca Center Permission**

The Rebecca Center for Music Therapy

Date: 4/20/2016

Attn: Institutional Review Board  
Montclair State University  
1 Normal Avenue  
College Hall, Room 248  
Montclair, NJ 07043

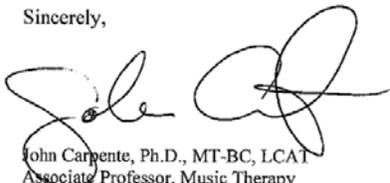
Re: Quality of attention in a client with Williams Syndrome during improvisational music therapy.  
Hyun Kyoung Kim

Dear Review Board,

This letter serves to give permission to Hyun Kyoung Kim to complete her research project, Quality of attention in a client with WS during improvisational music therapy during June, July & August 2016 at our facility- The Rebecca Center for Music Therapy at Molloy College.

Hyun Kyoung Kim will have access to our clients diagnosed with Williams Syndrome in order to conduct her research project. The research project has been described to me to my satisfaction.

Sincerely,



John Carpeno, Ph.D., MT-BC, LCAT  
Associate Professor, Music Therapy  
Founder/Executive Dir., The Rebecca Center for Music Therapy  
Dir., Center for Autism & Child Development