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The Comparison Of Live Therapist Delivered Music To Original Artist Recording Interventions On Reminiscing Responses In Adults With Alzheimer'S

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THE COMPARISON OF LIVE THERAPIST DELIVERED MUSIC TO ORIGINAL ARTIST RECORDING INTERVENTIONS ON REMINISCING RESPONSES IN ADULTS WITH ALZHEIMER'S

RAJAHNA DESIREE SCHNEEKLOTH

49 Pages

Background: As the growing number of older adults diagnosed with Alzheimer's disease is resort to living in residential care facilities, this population requires purposeful activities in which they can improve and maintain their quality of life. Studies have shown that music therapy positively influences older adults in typical settings such as hospice or other residential care facilities, by providing a source of investigation in to the reminiscing aspect of their memory.

Purpose: This study targets the qualitative and quantitative values of reminiscing responses by comparing the data received from a non-musical baseline response, an original artist recorded musical response, and a live therapist delivered musical response. Prior to this study, there has not been former research conducted on comparing the effects of live therapist delivered music to original artist recorded music on these reminiscing responses of older adults diagnosed with middle-stage Alzheimer's.

Method: A music therapy graduate student facilitated all three conditions with four female participants in this study. Participants were randomly assigned treatment conditions. All sessions were audio recorded for manual transcription by two certified transcriptionists. All transcriptions were processed through the Linguistic Inquiry and Word Count software system to

compare the quality and quantity of the reminiscing responses across nineteen variables. Averages between the two copies of transcriptions were followed by a two-tallied t-test in order to analyze the significance between the conditions.

Results: Live therapist delivered music produced the most words reminisced compared to the original artist recorded condition and the non-musical baseline condition, however original artist recorded music had higher responses in eight of the nineteen variables assessed.

Conclusion: Although only two variables had a statistical difference between conditions, recorded music elicited more words per variable than the live music condition and the non-musical condition. Further research will determine if there is a greater difference in overall responses between the two methods of music delivery to older adults diagnosed with Alzheimer's.

KEYWORDS: Music Therapy; Reminiscing; Episodic Memory; Alzheimer's; Live Music; Recorded Music; Quality of Life; Elderly Adults

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CHAPTER I: INTRODUCTION

According to the U.S. Census Bureau, by 2035 there will be 78 million people over the age of 65 living in the United States (United States Census Bureau, 2018). As a result, "baby boomers" will outnumber the youth in America. More elderly adults will soon find themselves living in care facilities, such as general hospitals or nursing homes. As expected with the increased population of older adults, there will also be an increase of older adults being diagnosed with Alzheimer's disease. The Centers for Disease Control and Prevention (CDC) reports nearly 14 million people with be diagnosed with Alzheimer's disease by 2060 (2018).

Alzheimer's Disease and Older Adults

Alzheimer's can be diagnosed as a major or a minor neurocognitive disorder based off of the intensity of qualifying characteristics. Persons diagnosed with probably Alzheimer's disease contributing to a major neurocognitive disorder must present one of two conditions: 1. Evidence of a genetic mutation causing Alzheimer's disease or 2. Demonstrating clear decline in memory and learning, showing a steady decline without extended plateaus, and having no evidence of mixed etiology. Persons diagnosed with probably Alzheimer's disease contributing to a minor neurocognitive disorder must have evidence of a genetic mutation causing Alzheimer's disease, either through genetic testing or based off family history. Persons diagnosed with possible Alzheimer's disease contributing to mild neurocognitive disorder must have a clear decline in memory and learning, showing a steady decline without extended plateaus in memory, and have no evidence of mixed etiology (Diagnostic Statistical Manual of Mental Disorders, 2013, p. 611-614).

The Diagnostic and Statistical Manual of Mental Disorders (2013) classifies Alzheimer's as a neurocognitive disorder. The impairments of this growing population can extend from

physical ailments to decreases in cognition. Common conditions effecting this population include, but are not limited to, visual or hearing loss, cardiovascular disease, diabetes, cancer, arteriosclerosis, and memory loss (Palmer, 1977).

In addition to biological and physiological ailments, older adults also suffer from emotional distress. The Alzheimer's Association (2019) describes signs of middle-stage Alzheimer's symptoms as persons having communication deficits (such as jumbling of words), difficulties with activities of daily living (such as dressing and bathing), and struggling with following a daily routine. This leads to various emotional conditions such as depression, the loss of independence, and difficulties maintaining a sense of identity (Melendez, Torres, Redondo, Mayordomo, & Sales, 2017). The criteria set forth for middle-stage Alzheimer's was incorporated into this study when recruiting participants.

Quality of Life in Older Adults

With the increase of older adults living in additional care facilities, such as nursing homes, retirement communities, or general hospitals, transitions into a new environment highly affect their mental health and quality of life (Palmer, 1977). Especially for persons diagnosed with Alzheimer's and other types of neurocognitive disorders, it is even more important for these residents to find activities that will enhance their lives (Clair, Bernstein, & Johnson, 1995). Music therapy is a non-invasive treatment strategy to help increase the quality of life of older adults. The present study seeks to compare how quality of life can be enhanced through reminiscence.

Research Purpose Statement

This study compares the effects of live therapist delivered music and original artist recorded music on individuals diagnosed with middle-stage Alzheimer's disease in order to

examine differences in episodic reminiscent responses. It has been suggested that one musical condition has a stronger influence over the elicited responses than the other musical condition. The quantitative component of this study extrapolates the differences in overall number of words elicited per participant within each condition, in addition to the percentages of grammatical parts of speech within the total number of words elicited. The qualitative component of this study analyzed the different parts of speech utilized through the Linguistic Inquiry and Word Count (LIWC) software.

The participants in this study are four individuals living in an assisted living facility focused on caring for persons with Alzheimer's. The facility's activities director recruited these participants for the study. Each participant consented to participate in the study through a power of attorney. Before each non-musical or musical conditions were implemented, the researcher obtained verbal assent from each participant before beginning the experiments. All sessions were audio recorded for manual transcription in order to find the elicited words from each participant for comparison of quantitative and qualitative responses.

Each participant began by receiving a non-musical treatment. Following the non-musical condition, participants were randomly assigned to receive either the live therapist delivered music condition or the original artist recorded music condition first. The second musical condition the participants received was the opposite from the first musical condition randomly assigned to them, so that all participants received both the live therapist delivered musical condition and the original artist recorded musical condition.

Research Question

Music therapy is an evidence-based, musical intervention-focused profession used to address individualized goals within a therapeutic relationship (American Music Therapy

Association, 2019). Research has shown that music therapy specifically elicits reminiscent responses from persons diagnosed with Alzheimer's disease. The purpose of this study is to compare the effectiveness of live therapist delivered music compared to original artist recorded music when eliciting reminiscing responses from persons diagnosed with middle-stage Alzheimer's disease.

Studies have supported the use of music therapy interventions to elicit episodic reminiscent responses from persons diagnosed with Alzheimer's disease (Bartlett & Snelus, 1980), yet there is currently a gap in the literature pertaining to comparing live therapist delivered music to original artist recorded music when working with the population of middle-stage Alzheimer's persons specifically. In addition, literature is inconclusive on live music being more effective than recorded music when presented to participants. Based on Silverman's 2003 study, it has been suggested that live therapist delivered music will elicit more quantitative and qualitative reminiscent responses because participants were seen to be more attentive and active during the live music condition than the recorded music condition. The research question poses the following: Is there a difference in reminiscing responses with older adults diagnosed with Alzheimer's when receiving live therapist delivered interventions or original recorded artist interventions?

Definition of Terms

Throughout the study, the term *Alzheimer's disease* (AD) will be classified as a decrease in the ability to learn and remember new information (Melendez, Torres, Redondo, Mayordomo, & Sales, 2017). Two subcomponents of Alzheimer's disease that are discussed are *episodic memory* and *reminiscence.* Episodic memory is defined as a person recalling specific personal

experiences (Krause & Corts, 2012). For the purpose of this paper, reminiscence will be defined as talking about a past experience (Cambridge Dictionary, 2019).

CHAPTER II: REVIEW OF RELATED LITERATURE

Music therapy is one type of non-invasive treatment for persons diagnosed with Alzheimer's to help offer enrichment that improves their quality of life (Hays & Minichiello, 2005; Solé, Mercadal-Brotons, Gallego, & Riera, 2010). For example, in Solé, Mercadal-Brotons, Gallego, and Riera's 2010 study, 83 participants participated in one of three musical activities: choir, music appreciation, or a preventative music therapy program. Participants were asked to rate their quality of life during the first month of musical activities, and again during the final weeks of the activities. Although the results were not statistically significant, improvements in quality of life were seen after attending musical activities from pre-test to post-test.

Music therapists have worked with Alzheimer's patients to target specific functional outcomes to improve their qualities of life (Koger, Chapin, & Brotons, 1999). Therapists have incorporated singing exercises as a way for patients to express themselves when typical forms of speech are too intense for the patients to produce (Dassa & Amir, 2014), as well as utilize singing as a reenergizing stimulus for patients (Pricket & Moore, 1991). Engaging in musical activities by Alzheimer's patients shows physical responses to music, such as tapping their fingers and toes to the rhythms and moving their bodies to the music (Olson, 1984). Since being more active is essential to combat the negative health effects of leading more sedentary lives, music therapy provides an outlet to target multiple physical and cognitive symptoms of memory loss (Hays & Minichiello, 2005; Solé, Mercadal-Brotons, Galati, & De Castro, 2014)

In addition, music therapy techniques have assisted in increased socialization between patients, especially when discussing music from their pasts. In addition, music therapy has been proven to increase positive emotions, a sense of accomplishment, and feelings of belonging

(Dassa & Amir, 2014; Solé, Mercadal-Brotons, Galati, & De Castro, 2014). Furthermore, researchers have utilized music therapy techniques to assist in reality orientation outcomes for patients diagnosed with Alzheimer's (Palmer, 1977; Riegler, 1980). Melendez, Torres, Redondo, Mayordomo, and Sales' 2017 suggests reminiscing can help persons diagnosed with dementia to reconnect in the present with family and friends during conversation. There are innumerable ways in which music therapists can assist persons diagnosed with Alzheimer's when it comes to their mental, physical, and psychological health.

Live Music Compared to Recorded Music

The primary focus of this study is to compare the effectiveness of live music compared to recorded music when eliciting reminiscing responses from persons with Alzheimer's disease. A germinal work in the field, Moore, Staum, and Brotons' 1992 study indicates that the participants consistently preferred live performances with recorded piano accompaniment. Although there has not been research conducted on the effects of live music compared to recorded music when working with Alzheimer's persons specifically, other research studies have tested the effectiveness of live versus recorded music on other populations to see if one form of musical presentation produces different outcomes compared to the other form (Bailey, 1983; Silverman, 2014; Silverman, 2003; Moore, Staum & Brotons, 1992).

In contrast to the previous studies, Silverman (2003) analyzed the differences between live, recorded, and mixed musical presentation styles across 19 studies. Silverman concluded both live and recorded music had an effect on psychosis symptoms, however there were no statistically significant differences between the two. Silverman states, "an argument against this case might state that live music employs more of the senses (visual and auditory) and distracts the patient from their withdrawn world more than recorded music" (p. 37). Bailey (1983)

investigated the effect of live singing and guitar playing compared to tape-recorded music on the mood statuses of 50 hospitalized cancer patients. Bailey emphasized, "the tape-recorded form of music presentation naturally does not possess the human elements that the live form of music presentation does" (p. 26). Based off of the findings of Bailey's 1983 study and Silverman's 2013 study, live music is hypothesized to have a greater effect on episodic reminiscing responses.

In Silverman's 2014 research study, differences between four testing conditions are discussed: "live educational music therapy, recorded educational music therapy, education without music, or recreational music therapy without education" (p. 228). Silverman found that participants felt a higher level of support from friends under the live educational music condition when compared to the recorded and recreational music conditions. Findings from Silverman's research influenced this study's research design by implementing a non-musical condition in addition to live and recorded music conditions to compare reminiscent responses across conditions. The current study will look at the differences between therapist-delivered live music compared to original artist-delivered recorded music.

Music Preference with Older Adults

An extensive amount of research studies has been conducted to deduce the musical preferences of elderly persons (Gibbons, 1977; Bartlett & Snelus, 1980; Moore, Staum, & Brotons, 1992; Jonas, 1991; Otto, Cochran, & Johnson, 1999; Dassa & Amir, 2014). Most notably, Gibbons' (1977) sought to determine if elderly people preferred popular music from their young adult years or music from their later years. The results of their study concluded that the participants preferred music from their young adult years to music of their later years. Bartlett and Snelus (1980) conducted a similar study and found that the subjects' song

recognition judgments correlated with the decades in which they heard them. Moore, Staum, and Brotons (1992) also found similar findings to Gibbons (1977) and Bartlett (1980). In their design, 118 songs were played for 135 participants all over the age of 65. The mean score across genres indicated participants favored songs from their young adult years compared to popular songs later in life.

Familiar music can assist in increasing communication for people diagnosed with middle stage Alzheimer's. Dassa and Amir's (2014) results indicated that the more familiar the songs were, the more socially engaging the participants became. In addition, songs from the past appeared to elicit more vivid memories. Solé, Mercadal-Brotons, Galati, & De Castro (2014) also suggest that incorporating familiar music into musical interventions could help patients feel more positive about themselves because they become cognizant that they are remembering or learning new information. For the purpose of this study, popular songs from the participants' young adult years will be played during the musical conditions to help elicit reminiscing responses.

Musical Influence on Reminiscing Responses

Reminiscing has been shown to have an effect on episodic memory in elderly adults with Alzheimer's disease (Melendez, Torres, Redondo, Mayordomo, & Sales, 2017). Although reminiscing has been shown to benefit Alzheimer's patients by reconnecting their past and present memories, the content that is reminisced should be analyzed for its validity and quality. Music therapy is unique because it can elicit reminiscing responses from hearing songs that have personal associations with the listener.

Wylie (1990) tested reminiscing responses in sixty participants under four different test conditions: older songs, antique objects, historical summaries, and general questions.

Participants were randomly assigned to each of these four categories. Music for the "older songs" condition was between 1915 and 1932 for participants' ages 80 to 90, and songs between 1926 and 1942 were selected for participants' ages 70 to 79. The songs selected were specifically from the participants' younger adult years. Within the song conditions, the researcher allowed the participants to take time to reminisce about the music and discuss what they had heard after the song had finished.

Wylie recorded the frequency of reminiscing statements involving people, places, events, and activities. A statement made prior to 10 years was considered a reminiscent. Statements were further divided into subcategories, such as childhood versus adult memories and personal versus historical memories. The results of this study indicated that participants recounted memories of listening to music or dancing when they heard familiar songs.

Other researchers have also studied the effects music has on reminiscing responses. Dassa and Amir (2014) incorporated content and song analysis into eight music therapy sessions. After analyzing the content analysis results, the researchers found that the participants' past memories were elicited more when they heard songs relating to their social and national identity. Reminiscing responses were also found to affect other domains of participants' behaviors, such as depressive symptoms (Ashida, 2000) and verbal communication (Brotons & Kroger, 2000). Lipe (1991) suggests that although listening to preferred music was effective when treating persons with Alzheimer's, the rate of general responses varied based upon the level of cognitive impairment the participant had. Silber (1999) supports Lipe's (1991) report by concluding that persons at stage two of dementia may respond differently to background music when compared to persons at different stages of dementia.

The present study will analyze the quantitative and qualitative values of reminiscing responses made by each participant. Through the Linguistic Inquiry and Word Count software program, the number of occurrences spoken will quantify the following categories: summary variables, parts of speech, emotions, time orientation, and personal concerns. Through Microsoft Word, the number of words and sentences produced by the participants will be calculated, as well as the level of communication complexity. In addition, staff and family members will be asked to provide feedback on reminiscing responses to verify the validity of the statements.

CHAPTER III: METHODOLOGY

Participants

Research participants were residents from a mid-Western Alzheimer's care facility. Four female participants were involved in the study. The inclusion criteria for this study was the participants had to have been born between the years of 1930 to 1950. The mean age of the participants was 81 years old. The study involved a convenience sample of participants who were recruited by the facility's activities director. Further inclusion criteria was the participants had to demonstrate symptoms of middle-stage Alzheimer's. In addition, participants had to have had no visual or hearing impairments that would prevent them from engaging in the music therapy interventions. Participants also had to demonstrate intelligible verbal communication.

Setting

The Alzheimer's residential care facility was a 24-hour center where nursing staff and other aides assisted residents with activities of daily living. Residents were divided into separate living quarters based on the severity of Dementia diagnosis, although common areas for visitation and socializing were placed throughout the facility. Visitors were allowed to spend time with the residents during regular business hours. Three meals were provided each day for each resident, as well as a snack time between meals. Physical and occupational therapists worked one-on-one with residents as needed. Activities coordinators planned meaningful games and events for the residents to attend and participate in each day. Staff members would attend to residents as needed when assisting with bathing, toileting, feeding, and cleaning.

The research study was conducted at the end of a hallway inside the residential care facility. This area of the facility was designated as the Day Room. The setting consisted of one couch for a seating capacity of two that flanks the left side of the hallway, as well as two single

chairs that flank the right side of the hallway. Furnishing were rearranged as needed to ensure the student music therapist and participants were seated across from one-another and facing each other directly. The Day Room featured windows on both sides and the end of the hallway. Additional residents and staff members not participating in the study were in the Day Room without restrictions. No restrictions were set in place in order to keep consistency with the residents' and staff members' daily routines.

Interventions

Baseline

The baseline condition was a non-musical intervention that served as a control variable. The student music therapist asked the four participants questions that were stated similarly to both the recorded music and live music conditions. The student music therapist waited for responses from the participants before moving on to the next question. The student music therapist did not incorporate additional prompting when waiting for responses from participants. See appendix B for questions asked during the baseline condition.

Recorded Music Condition

The researcher selected the following songs for the recorded music condition: *Edelweiss* (Christopher Plummer & Julie Andrews), *This Land is Your Land* (Woody Guthrie), *You Are My Sunshine* (Gene Autry), and *Ring of Fire* (Johnny Cash). Song recordings of the original artist were played during the interventions. The student music therapist asked the participants to listen to the music and encouraged the participants to sing along. Recorded music was played over a DOSS touch wireless Bluetooth V4.0 portable speaker with HD sound and bass. Following each song, participants were asked identical questions as the live music condition in order to prompt reminiscing responses.

Live Music Condition

The songs utilized in the live music condition were the same songs utilized in the recorded music condition. Songs chosen were based on personal repertoire and have proven to induce favorable responses from this population prior to conducting this study. In addition, the release dates of these songs coincide with the participants' young adult years, defined as between ages of 20 and 30.

The live music intervention consisted of a student music therapist singing the songs with guitar self-accompaniment. The participants were asked to listen to the music and encouraged participants to sing along. Following each song performed within the condition, participants were asked one question per song pertaining to the general influence of music in their lives, their experiences growing up, the places that they have visited, and the emotions that they felt toward significant people in their lives. The purpose of these questions was to elicit episodic reminiscing responses. The order of questions and songs were identical for each participant to maintain consistency.

Research Design

This experimental study was a randomized within-subjects control study. The participants were randomly assigned to receive either the live music condition first followed by the recorded music condition second, or to receive the recorded music condition first followed by the live music condition second. All participants received both the live music and recorded music conditions. In addition, all participants underwent a baseline condition prior to the two experimental conditions. All three conditions were predetermined and approved before the researcher conducted the study. Table 1 indicates the order participants received treatment conditions.

Table 1

Order of Conditions Received by Participants

Participants	*Day 1* *Baseline*	*Day 2* *No Session*	*Day 3* *1st Treatment*	*Day 4* *No Session*	*Day 5* *2nd Treatment*
Participant 1	No Music		Recorded		Live
Participant 2	No Music		Live		Recorded
Participant 3	No Music		Live		Recorded
Participant 4	No Music		Recorded		Live

Procedure

The research university's affiliated Institutional Review Board granted the researcher approval to conduct the study. To conduct the study, the researcher had to have sufficient experience in working with older adults, as well as have the musical and educational training to provide therapeutic services that aligned with the music therapy standards at the university. The student music therapist conducting the research study was under the supervision of a board certified music therapist (MT-BC).

The activities director of the care facility recruited research participants for this study. Guardians of the participants were given a letter of informed consent prior to the research being conducted for them to sign (see Appendix A). The letter of informed consent outlined the components of the study, as well as informed the guardians of the risks associated with the experimental study. Permissions for audio recordings were included in the letter of informed consent. Guardians were made aware that there would be no financial compensation for the participants for taking part in the research study. Instead, they were informed of the opportunity to engage in a positive, active music therapy experience.

During the baseline condition, staff members obtained verbal assent from the participants before accompanying the participants to the Day Room to meet with the student music therapist.

Participants were asked questions that would elicit episodic reminiscing responses. The questions were asked in the same order for each participant. See Appendix B for baseline questions.

After completing the baseline condition, participants were randomly assigned to one of two experimental conditions: live music or recorded music. In both conditions, participants were prompted to listen to the music and encouraged to sing along. Following each song, the participants were asked one question that prompted them for reminiscing responses related to their episodic memory. These questions were similar to the questions asked during the baseline condition. All conditions were visually and audio recorded.

Transcribing Data

A transcriptionist approved by the institutional review board manually transcribed the 12 sessions of visual and audio recordings with the researcher from the baseline, live music, and recorded music conditions. All transcriptions were typed and saved on Microsoft Word documents. Each document was kept on a password-protected computer with access limited to only the researcher and approved transcriptionist. Identifiable data of participants were replaced in the transcriptions with filler words to compensate for the discrepancy. For instance, if a participant identified a city they grew up in, the transcription would read as: "I grew up in (city) when I was younger." All audio files were destroyed after the transcriptions were complete. The researcher and transcriptionist had predetermined standards to limit irrelevant data from the transcriptions before transcription. The predetermined standards were:

1. Only reminiscent responses from participants made directly following a question by the student music therapist were transcribed. Additional statements from the participants made in relation to other residents or staff members were not included.

2. No additional punctuation marks were to be used, other than periods, question marks, and quotation marks.
3. All numbers were to be spelled out, including numbers zero through ten.
4. Filler words and slang were spelled: “ah,” “okay,” “er,” “ ’cause,” “gonna,” wanna,” “ ’em,” and “uh.”

These standards for transcribing were set in place prior to beginning typing out responses for the purpose of limiting the variance between both of the transcriptionists, as well as lowering the variance between the transcriptions analyzed by the Linguistic Inquiry and Word Count (LIWC) software. An interclass correlation coefficient test was used to find the reliability (*r*) rating between the 24 transcriptions. A reliability rating equal-than or greater-to 0.9 represents a high percentage of reliability. Table 2 lists the r-coefficient values for each pair of transcriptions for all four participants.

Table 2

Transcription Reliability Ratings

Participants	*Baseline Reliability Rating*	*Recorded Music Reliability Rating*	*Live Music Reliability Rating*
Participant 1	(*r*) = 0.9996	(*r*) = 0.9495	(*r*) = 0.9730
Participant 2	(*r*) = 0.9499	(*r*) = 0.9592	(*r*) = 0.9728
Participant 3	(*r*) = 0.9726	(*r*) = 0.9705	(*r*) = 0.9709
Participant 4	(*r*) = 0.9726	(*r*) = 0.9723	(*r*) = 0.9680

LIWC Software

The Linguistic Inquiry and Word Count software utilized in this study analyzed transcribed texts. The 2015 version of LIWC included a *text analysis module,* which enabled the researcher to upload Microsoft Word documents and generate an output of both total word count,

as well as percentages of overall word counts that pertained to specific variables. The total word count is operationally defined as the averages between the two versions of each transcriptions. Percentages within each variable signified the amount of overall words that fit into each category based off the LIWC automated dictionary, which "the dictionary identifies which words are associated with which psychologically-relevant categories" (Linguistic Inquiry and Word Count, 2015). Nineteen variables were analyzed within each transcription. These variables can be seen in Table 3.

Table 3

Linguistic Inquiry and Word Count Definitions of Variables

Variable Category	*Variable*	*Definitions*
Quantity	Word Count	Total words within each transcription.
Summary Variables	Analytical Thinking	Formal, logical, and hierarchical thinking (associated with higher percentages), compared to informal, personal, and narrative thinking (associated with lower percentages).
	Clout	Speaking from extensive experience and having confidence (associated with higher percentages), compared to tentative and anxious speaking (associated with lower percentages).
	Authentic	Honest, personal, and disclosing speech (associated with higher percentages), compared to distanced, guarded, and non-disclosing speech (associated with lower percentages).
	Emotional Tone	Positive associations (associated with higher percentages) compared to negative emotions (associated with lower percentages).
Parts of Speech	Pronouns	Words such as *I*, *we*, *you*, *she/he*, and *they*.

(Table Continues)

Variable Category	*Variable*	*Definitions*
	Social Words	Proper nouns, such as words referring to family, friends, and female/male references.
	Adjectives	Words used to describe nouns.
Emotions	Positive Emotions	Words related to positive emotions, such as *happy*, *excited*, and *jubilant*.
	Negative Emotions	Words related to negative emotions, such as *sad*, *depressed*, and *anxious*.
Time Orientation	Past Focus	Past-tense verbs and references to past
	Present Focus	Present-tense verbs and references to present events/times.
	Future Focus	Future-tense verbs and references to future events/times.
Personal Concerns	Work	Words related to work, such as *job* and *career*.
	Leisure	Words related to leisure, such as *music* and *relaxing*.
	Home	Words related to home, such as *house* and *residence*.
	Money	Words related to money, such as *finances* and *income*.
	Religion	Words related to religion, such as *spirituality* and *God*.
	Death	Words related to death, such as *dying* and *dead*.

CHAPTER IV: RESULTS

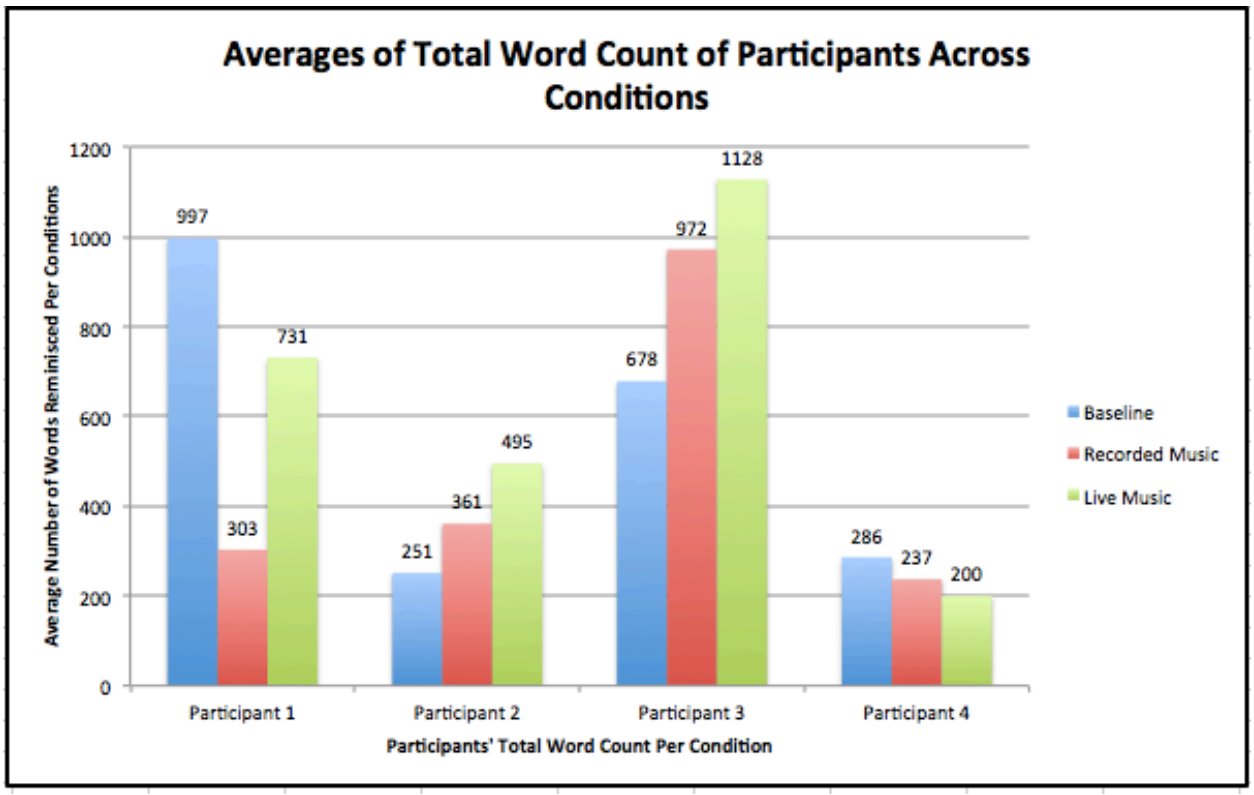
The purpose of this study was to compare the effects of live therapist delivered music compared to original artist recorded music on older adults diagnosed with middle-stage dementia. For this study, a student music therapist, operating under the direction of a board-certified music therapist, delivered the non-musical baseline conditions, original artist recorded musical conditions, and the live therapist delivered musical conditions. The researcher hypothesized live therapist delivered music would have a greater influence over the reminiscent responses than the original artist recorded music due to the more personalized approach. Four female participants from a mid-Western Alzheimer's care facility were involved in this research study. All participants received a non-musical baseline intervention, though the sample was randomly assigned to receive either live therapist delivered music first or original artist recorded music first.

Data Analysis

All interventions were manually transcribed by two transcriptionists and entered into the Linguistic Inquiry and Word Count software, creating a total of 24 transcription data sets. After uploading the transcribed documents, the LIWC system provided total word counts for each document, as well as the percentages of each variable. The researcher found the averages of the transcriptions of each participant per condition, resulting in 12 data sets. *Figure 1* represents the averages of the word counts for the participants across the three conditions. A two-tailed t-test was utilized to calculate the participants' statistical significance levels.

Figure 1

Averages of Total Word Count of Participants Across Conditions



The average baseline word count for the participants was 553 words (*SD* = 353.67). The participants responded to the non-musical baseline condition by 15.37% more than the recorded music condition. For original artist recorded music, the average word count across participants was 468.25 words (*SD* = 339.63). Lastly, the participants had an average of 638.5 words (*SD* = 392.02) during the live music condition. The live therapist delivered condition produced the most amount of words out of all three conditions. Live music produced 13.46% more words than the baseline condition and 26.76% more words than the recorded music condition.

Table 3 displays the variable percentage-averages for the participants' reminiscent responses across the three conditions. Within the summary variables category, *analytical thinking* had the lowest percentage (5.39%) of words during the live therapist delivered musical

condition. Original artist recorded music produced 12.24% more words than the baseline condition in relation to *analytical thinking*, and 58.76% more words than the live music intervention. The recorded music condition was statistically more significant when compared to the live music condition due to the p-value being less than 0.05 ($p = 0.029$).

Although not statistically significant, recorded music also produced more words (74.26%) pertaining to *authenticity* when compared to both baseline and live music. Still, live music produced more words in relation to *clout* (59.22%) and *emotional tone* (95.97%) than recorded music and baseline. It is of interest to note that although the live music condition produced the greatest percentage of words reminisced for *emotional tone*, the baseline condition produced 6.93% more words pertaining to *positive emotion* than the live music condition. Similarly, the live music condition did not produce any words (0%) pertaining to *negative emotions* when compared to baseline (0.59%) and recorded music (1.03%).

Under parts of speech, the non-musical condition produced the least amount of pronouns (23.06%), while the live music produced the next greatest amount (25.76%), and the recorded music produced the most pronouns (28.77%). In the recorded music condition there was statistically greater use of pronouns ($p=0.028$) in relation to the other two conditions. Recorded music elicited 10.46% more pronouns than live music and 19.85% more pronouns than baseline. Although recorded music outranked the other conditions in *pronouns*, live music produced the largest percentage of adjectives (5.54%) and social words (15.42%) across conditions. Within the time orientation variables, baseline outranked both live and recorded music when participants were eliciting *past focused* (20.51%) words and *present focused* (10.75%) words. Recorded music elicited the most words relating to *future focused* (1.07%) responses.

Table 4

Percentage of Words Spoken per Linguistic Inquiry and Word Count Software Across All Participants

Variables	*Baseline % Out of 553 Words*	*Recorded Music % Out of 303 Words*	*Live Music % Out of 639 Words*
Analytical Thinking	11.47%	13.07%	5.39%
Clout	52.61%	51.85%	59.22%
Authenticity	68.65%	74.26%	61.97%
Emotional Tone	94.94%	76.56%	95.97%
Pronouns	23.06%	28.77%	25.76%
Social Words	13.80%	13.43%	15.42%
Adjectives	5.30%	4.22%	5.54%
Positive Emotions	5.34%	4.31%	4.96%
Negative Emotions	0.59%	1.03%	0.11%
Past Focus	11.26%	9.15%	10.11%
Present Focus	10.71%	10.23%	10.11%
Future Focus	0.72%	1.07%	0.73%
Work Concerns	1.19%	0.93%	0.86%
Leisure Concerns	1.75%	3.45%	2.61%
Home Concerns	1.10%	1.39%	1.30%
Money Concerns	0.17%	0.35%	0.29%
Religious Concerns	0.30%	0.20%	0.05%
Death Concerns	0.44%	0.00%	0.27%

Although the objective of this study was to assess reminiscent responses, it is important to note the variance within conversation. The act of reminiscing about older information can help dementia patients become more aware of their present surroundings, thus allowing them to converse in the present, as well as make comments toward future events. According to the LIWC software system, *future focused* words were elicited the least (M = 0.84%), *past focused* words were elicited the next greatest (M = 10.17%), and *present focus* words were elicited the most (M = 10.35%) across conditions.

Participants varied between personal concerns elicited. Across the three conditions, participants commented the most on *home concerns* (M = 3.54%), followed by *leisure concerns* (M = 2.60%), *work concerns* (M = 0.99%), *money concerns* (M = 0.81%), *death concerns* (M =

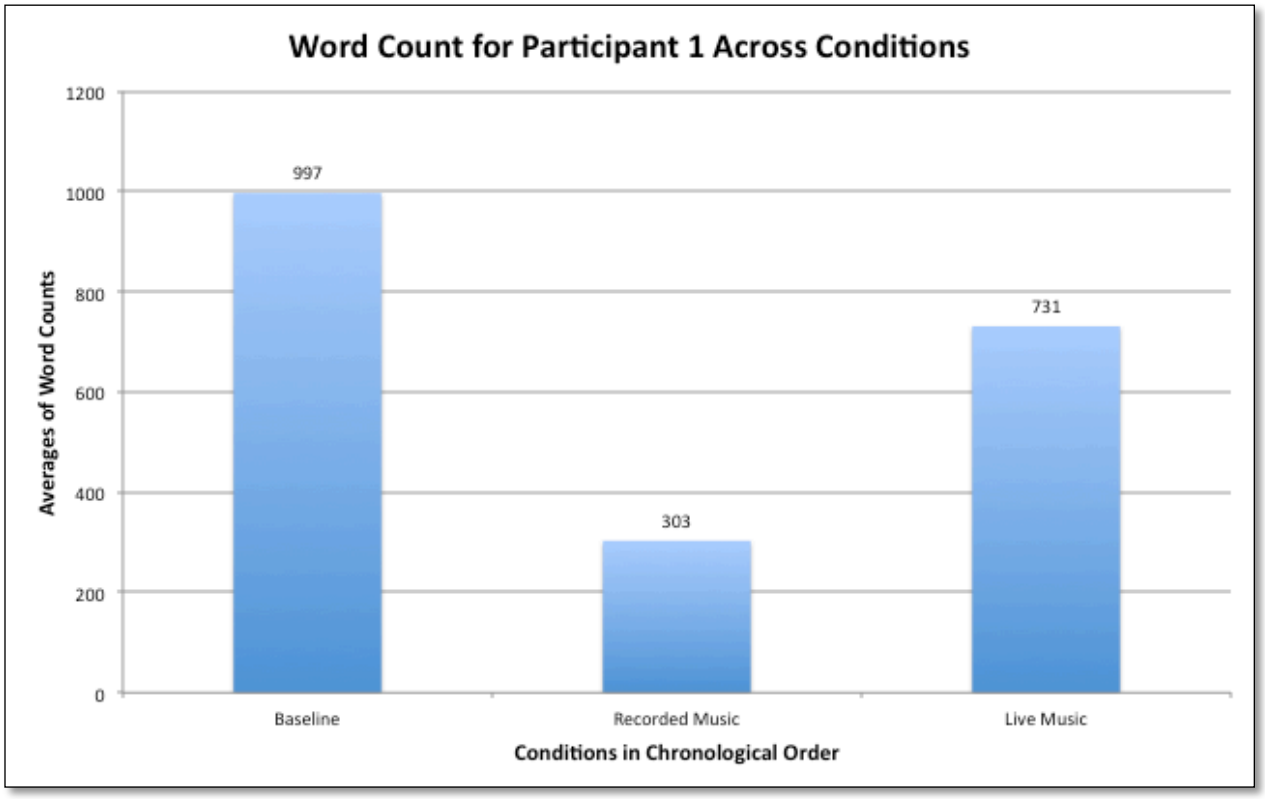
0.24%), and *religious concerns* (*M* = 0.18%). The non-musical intervention produced the most percentage of words elicited for *work concerns* (1.19%), *religious concerns* (0.30%), and *death concerns* (0.44%). The recorded music intervention elicited the most percentages of words for *leisure concerns* (3.45%), *home concerns* (1.39%) and *money concern* (0.35%). Overall, the live music condition produced the least amount of personal concerns across all six variables. Although not statistically significant, it should be noted that the recorded music condition did not produce any words pertaining to *death concerns* for all four participants.

Participant 1

Participant 1 is a female born in 1944. She received the non-musical baseline condition first, followed by the original artist recorded condition, and lastly the live therapist delivered musical condition. *Figure 2* represents participant 1's average word count. Participant 1 reminisced 997 words during baseline, the 303 words during original artist recorded music condition, and finally 731 words during the live therapist delivered music condition. Table 5 outlines participant 1's variable percentages across all three conditions.

Figure 2

Word Count for Participant 1 Across Conditions



With regard to summary variables, the participant expressed more narrative and informal speech patterns across all conditions, which can be seen under the *analytical thinking* variable. In relation to *clout*, Participant 1 appeared to show greater confidence in her statements during the recorded music condition (65.43%) and the live music condition (54.37%) compared to the baseline condition (28.73%). In contrast, the participant's responses appeared to be more *authentic* during the baseline condition (72.98%) and recorded music condition (53.24%) compared to the live music condition (28.52%). Across all three conditions, the participant expressed more *positive emotions* than *negative emotions* for *emotional tone*. Within the emotional variable category, *positive emotions* had a higher percentage across conditions (5.77%,

2.81%, and 4.45%) when compared to *negative emotions* (0.28%, 0.83%, and 0%) for baseline, recorded music, and live music respectively.

Within parts of speech, participant 1 verbalized *pronouns* an average of 22.98% across all conditions and expressed *adjectives* an average of 4.84%. The participant referenced *social words* the least during the baseline condition with 13.70% of all words, and an average of 16.32% between the recorded (16%) and live music (16.64%) conditions. The participant's responses reflected the most *past focus* verbalizations in the baseline condition with 20.51% of all words relating to the past. The *past focus* responses in the baseline condition was the highest percentage of all *past focus*, *present focus*, and *future focus* variables across all three conditions. Participant 1 reminisced about *work concerns* the most (2.11%) out of the six personal concern variables during the baseline condition. In addition, the participant stated the most words pertaining to *leisure concerns* during the recorded music condition (3.14%) and the live music condition (1.51%).

Table 5

Percentage of Words Spoken per Linguistic Inquiry and Word Count Software Variable within Each Condition for Participant 1

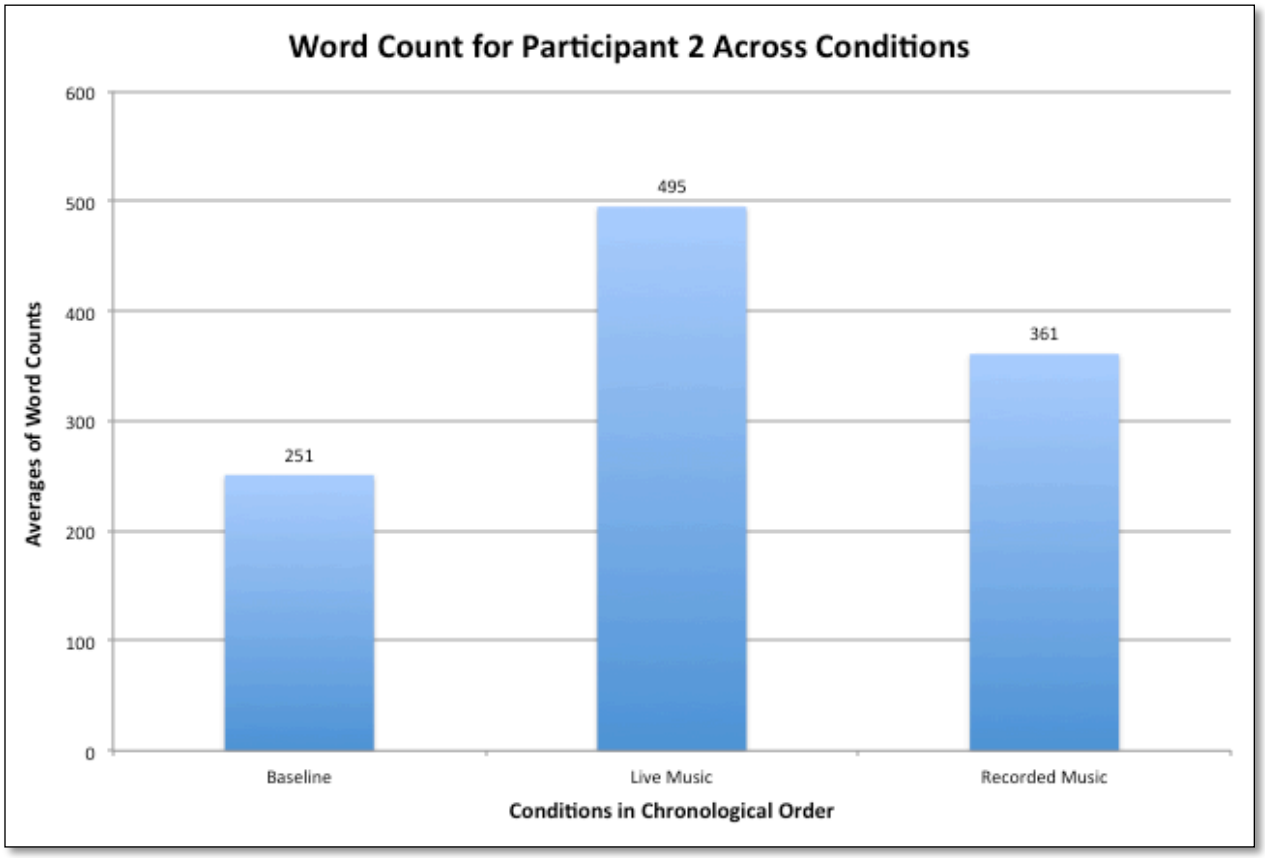
Variables	*Baseline % Out of 997 Words*	*Recorded Music % Out of 303 Words*	*Live Music % Out of 731 Words*
Analytical Thinking	7.63%	18.32%	7.69%
Clout	28.73%	65.43%	54.37%
Authenticity	72.98%	53.24%	28.52%
Emotional Tone	97.74%	62.69%	94.21%
Pronouns	22.52%	21.49%	24.92%
Social Words	13.70%	16.00%	16.64%
Adjectives	5.07%	5.00%	4.45%
Positive Emotions	5.77%	2.81%	4.45%
Negative Emotions	0.28%	0.83%	0.00%
Past Focus	20.51%	10.74%	14.04%
Present Focus	8.58%	9.59%	5.14%
Future Focus	1.25%	0.50%	0.41%
Work Concerns	2.11%	0.67%	0.89%
Leisure Concerns	0.40%	3.14%	1.51%
Home Concerns	0.71%	1.00%	1.30%
Money Concerns	0.40%	1.00%	0.55%
Religious Concerns	0.00%	0.00%	0.00%
Death Concerns	1.41%	0.00%	0.68%

Participant 2

Participant 2 is a female born in 1932. She received the non-musical baseline condition first, followed by the live therapist delivered musical condition, and lastly the original artist recorded musical condition. *Figure 3* represents participant 2's average word count. Participant 2 reminisced 251 words during baseline, 495 words for the live therapist delivered music condition, and lastly 361 words during the original artist recorded music condition. Table 6 outlines participant 2's variable percentages across all three conditions.

Figure 3

Word Count for Participant 2 Across Conditions



Similar to participant 1, participant 2 exhibited more informal and personal speech patterns in regard to *analytical thinking* across all conditions. In addition, she expressed varied percentages for the *clout* variable, with the least amount of clout during the recorded condition (22.70%), the next greatest amount for non-musical baseline (42.09%), and the most clout for live music (60.33%). Participant 2 remained steady throughout the *authentic* variable with an average of 96.88% words pertaining to *authenticity* throughout the study. Although not statistically significant, the participant appeared to have a greater reaction toward the baseline condition (93.66%) and the live music condition (97.28%) than the recorded music condition (51.59%). When comparing *positive emotions* to *negative emotions*, participant 2 had a higher

percentage of words associated with *positive emotions* than *negative emotions* across all three interventions.

The participant had little variance between the percentages within each of the parts of speech. Participant 2 spoke an average of 26.12% pronouns, 5.13% adjectives, and 13.44% social words across conditions. The participant also showed consistency within the time orientation variables, with averages of 6.16% of words relating to *past focus*, 14% of words relating to *present focus*, and 1.2% of words relating to *future focus*. Finally, participant 2 expressed the most amount of words relating to *work concerns* (1.11%), *money concerns* (0.42%), and *religious concerns* (0.28%) during the recorded music condition. In addition, the participant elicited the most amount of words pertaining to *leisure concerns* (1.45%) and *death concerns* (0.20%) during the live therapist delivered condition, as well as the most amount of words pertaining to *home concerns* (0.73%) during the non-musical condition.

Table 6

Percentage of Words Spoken per Linguistic Inquiry and Word Count Software Variable within Each Condition for Participant 2

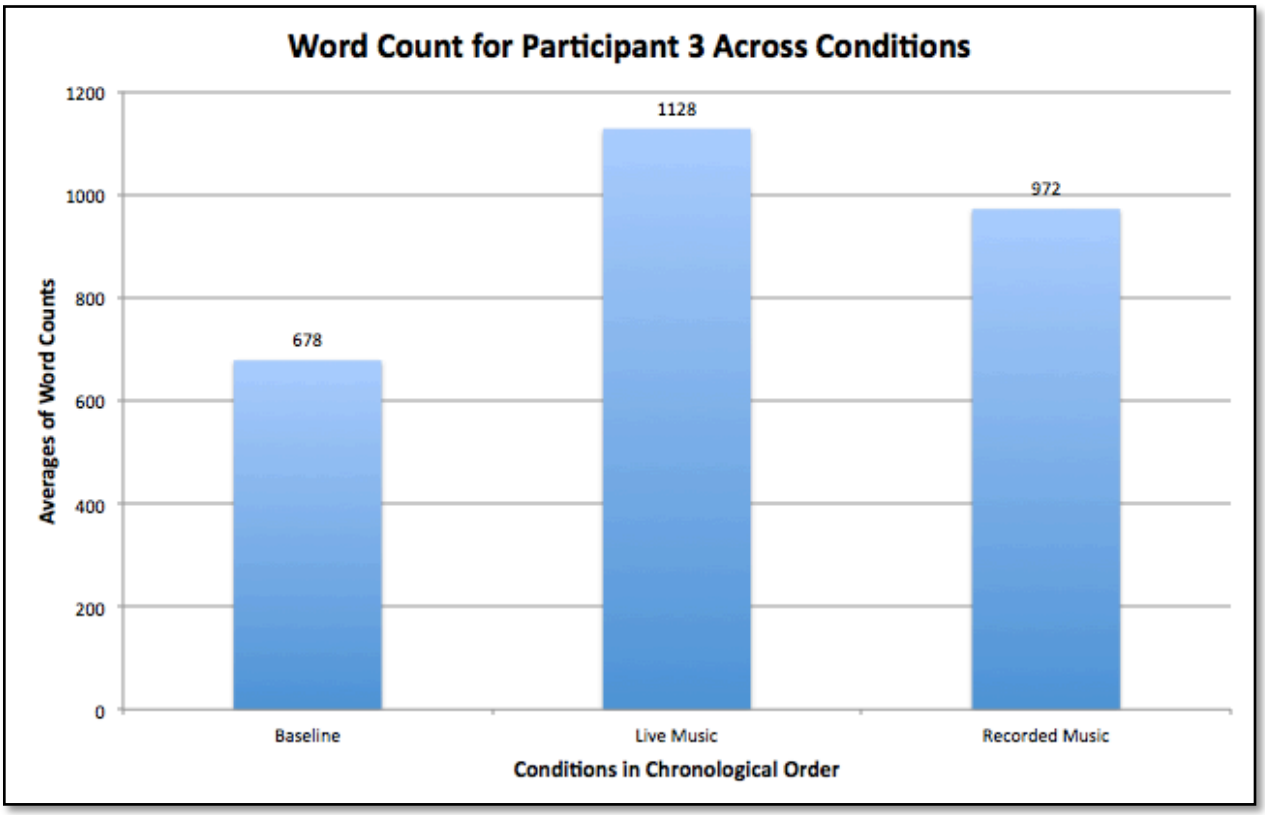
Variables	*Baseline % Out of 251 Words*	*Recorded Music % Out of 295 Words*	*Live Music % Out of 361 Words*
Analytical Thinking	25.85%	5.83%	6.43%
Clout	42.09%	60.33%	22.70%
Authenticity	98.25%	94.91%	97.49%
Emotional Tone	93.66%	97.28%	51.59%
Pronouns	25.22%	24.98%	28.16%
Social Words	12.89%	16.18%	11.24%
Adjectives	5.81%	5.97%	3.61%
Positive Emotions	5.45%	5.36%	4.02%
Negative Emotions	1.09%	0.20%	2.64%
Past Focus	5.45%	7.08%	5.96%
Present Focus	13.79%	14.76%	13.46%
Future Focus	0.73%	0.91%	1.95%
Work Concerns	1.09%	0.91%	1.11%
Leisure Concerns	1.45%	1.62%	0.42%
Home Concerns	0.73%	0.20%	0.14%
Money Concerns	0.18%	0.00%	0.42%
Religious Concerns	0.18%	0.00%	0.28%
Death Concerns	0.00%	0.20%	0.00%

Participant 3

Participant 3 is a female born in 1932. She received the non-musical baseline condition first, followed by the live therapist delivered musical condition second, and then the original artist recorded musical condition. *Figure 4* represents participant 3's average word count. Participant 3 reminisced 678 words for baseline, 1,128 words during the live therapist delivered music condition, and lastly 972 words during the original artist recorded music condition. Table 7 outlines participant 3's variable percentages across all three conditions.

Figure 4

Word Count for Participant 3 Across Conditions



The participant expressed the highest percentage (12.15%) of words pertaining to *analytical thinking* during the recorded music condition, however during the baseline condition she elicited the highest percentage (79.22%) of words related to *authenticity*, and during the live music condition she expressed the highest percentages of words for the variables *clout* (67.27%) and *emotional tone* (96.05%) during the live music condition. The participant maintained an average of 4.85% of words reflecting *positive emotions* and 0.40% reflecting *negative emotions* across conditions.

Participant 3 produced more pronouns during the original artist recorded music intervention (44.10%) compared to both the non-musical baseline and live therapist delivered music interventions. The participant expressed similar speech outcomes for adjectives (*M* =

5.52%) and social words (*M* = 11.90%) across conditions. In relation to time orientation, participant 3 was similar to participant 2. Participant 3 communicated the most *present focus* words across all conditions when compared to both *past focus* and *future focus* variables. Within the personal concerns variables, participant 2 elicited the most responses for *work concerns* (0.67%), *leisure concerns* (6.43%), *home concerns* (2.05%), and *religious concerns* (0.52%) during the recorded music treatment. Live music produced the most words pertaining to *money concerns* (0.62%) and *death concerns* (0.18%). Although not statistically significant, participant 3 expressed the least amount of concerns when verbalizing personal concerns across all three conditions.

Table 7

Percentage of Words Spoken per Linguistic Inquiry and Word Count Software Variable within Each Condition for Participant 3

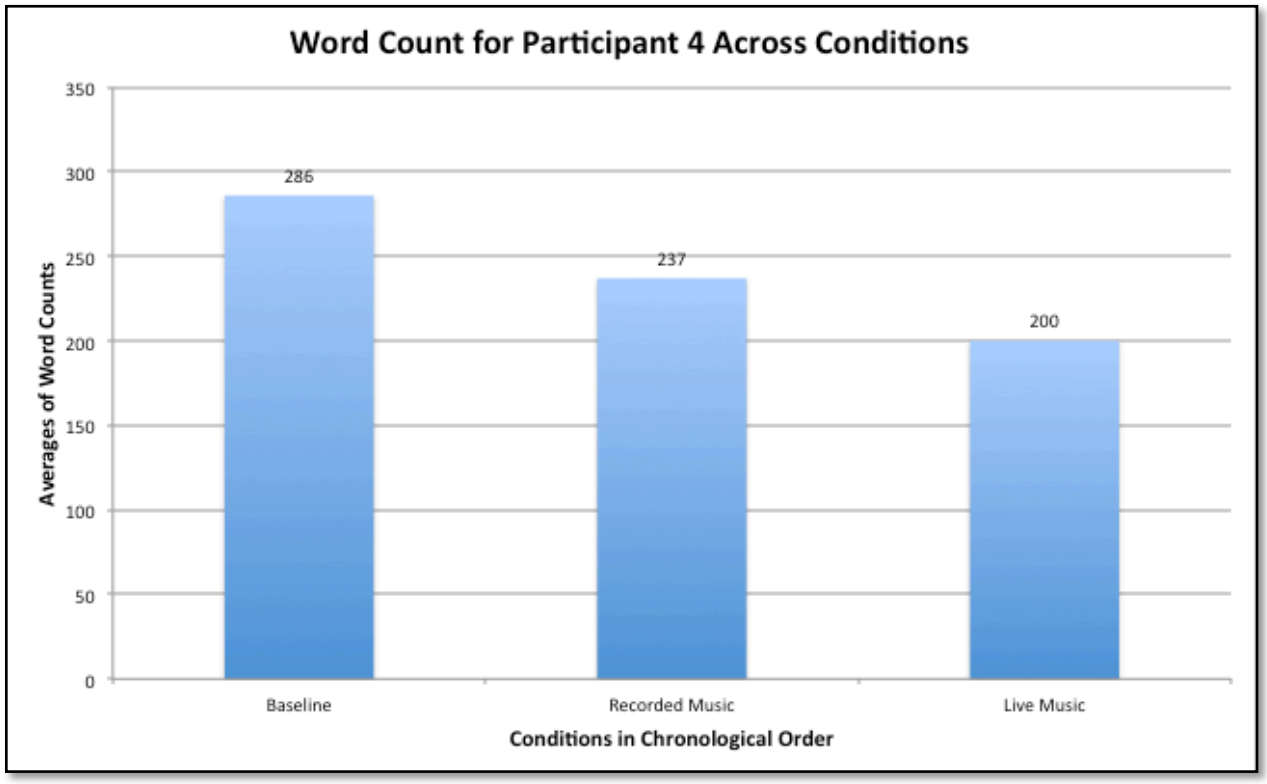
Variables	*Baseline* *% Out of 678 Words*	*Recorded Music* *% Out of 1,128 Words*	*Live Music* *% Out of 972 Words*
Analytical Thinking	7.41%	4.29%	12.15%
Clout	60.75%	67.27%	55.26%
Authenticity	79.22%	61.64%	69.90%
Emotional Tone	91.42%	96.05%	94.38%
Pronouns	21.61%	25.98%	44.10%
Social Words	12.17%	11.35%	12.18%
Adjectives	6.28%	5.01%	5.26%
Positive Emotions	4.35%	5.05%	5.15%
Negative Emotions	0.30%	0.23%	0.67%
Past Focus	8.41%	9.58%	7.87%
Present Focus	11.21%	13.04%	12.18%
Future Focus	0.89%	0.58%	0.57%
Work Concerns	0.52%	0.62%	0.67%
Leisure Concerns	1.99%	4.30%	6.43%
Home Concerns	1.55%	0.93%	2.05%
Money Concerns	0.08%	0.62%	0.00%
Religious Concerns	1.03%	0.18%	0.52%
Death Concerns	0.00%	0.18%	0.00%

Participant 4

Participant 4 is a female born in 1946. She received the non-musical baseline condition first, followed by the original artist recorded condition, and last of all the live therapist delivered musical condition. *Figure 5* represents participant 4's average word count. Participant 4 reminisced 286 words during baseline, 237 words during the original artist recorded music condition, and finally 200 words during the live therapist delivered music condition. Table 8 outlines participant 4's variable percentages across all three conditions.

Figure 5

Word Count for Participant 4 Across Conditions



Participant 4's speech patterns reflected personal and informal responses in relation to *analytical thinking* the most (15.39%) during the recorded music treatment, as well as responded

the highest in *authenticity* (78.87%) and *emotional tone* (97.61%). *Clout* was the only variable out of the summary variables that produced the most percentage of words during the baseline condition. As with participants 1, 2 and 3, participant 4 expressed more words reflecting *positive emotions* than *negative emotions* across sessions.

Table 8

Percentage of Words Spoken per Linguistic Inquiry and Word Count Software Variable within Each Condition for Participant 4

Variables	*Baseline % Out of 286 Words*	*Recorded Music % Out of 237 Words*	*Live Music % Out of 200 Words*
Analytical Thinking	4.98%	15.39%	3.74%
Clout	78.87%	64.00%	53.91%
Authenticity	24.16%	76.42%	63.05%
Emotional Tone	96.94%	97.61%	96.34%
Pronouns	22.90%	21.31%	27.15%
Social Words	16.43%	14.78%	17.50%
Adjectives	4.02%	3.38%	6.75%
Positive Emotions	5.77%	5.27%	5.00%
Negative Emotions	0.70%	0.00%	0.00%
Past Focus	10.67%	12.03%	9.75%
Present Focus	9.27%	5.70%	7.50%
Future Focus	0.00%	1.27%	1.00%
Work Concerns	1.05%	1.27%	1.00%
Leisure Concerns	3.15%	3.80%	3.00%
Home Concerns	1.40%	2.53%	1.75%
Money Concerns	0.00%	0.00%	0.00%
Religious Concerns	0.00%	0.00%	0.00%
Death Concerns	0.35%	0.00%	0.00%

Within parts of speech, participant 4 responded with the most pronouns (27.15%), adjectives (6.75%), and social words during the live music condition. Similar to participant 1, participant 4 produced more words pertaining to *past focus* than *present focus* and *future focus*. The recorded music condition elicited the most responses for *past focus* (12.03%) and *future*

focus (1.27%) variables, while baseline elicited the most responses for *present focus* (9.27%). In relation to personal concerns, the participant verbalized the most words for *work concerns* (1.27%), *leisure concerns* (3.80%), and *home concerns* (2.53%) during the recorded music intervention. The participant only elicited words pertaining to *death concerns* during the non-musical baseline condition. In addition, the participant did not verbalize any words relating to *money concerns* and *religious concerns* during all three conditions.

CHAPTER V: DISCUSSION AND CONCLUSIONS

Discussion of Results

Nineteen variables were analyzed to determine the effectiveness of live therapist delivered music compared to original artist recorded music on older adults with Alzheimer's disease. Based on the general word count elicited from reminiscing responses, live therapist delivered music produced the most overall words across conditions, followed by the non-musical baseline condition, and finally the original artist recorded musical condition. These results coincide with the research hypothesis that live music produces a higher quantitative outcome when compared to the recorded musical condition, though live music did not elicit the most overall qualitative responses when compared to the recorded music condition.

Original artist recorded music produced the most words elicited in the following eight categories: *analytical thinking, authenticity, pronouns, negative emotions, future focus, leisure concerns, home concerns,* and *money concerns.* The original artist recorded musical condition can be summarized as producing reminiscent responses that are genuine in content and personalized to the participants. Participants referenced themselves and others in their lives more frequently than any other condition, as well as spoke more extensively on their leisure activities, home life, and financial stability.

The non-musical baseline condition, comprising primarily of verbal conversation, produced the most words elicited in the following six categories: *positive emotions, past focus, present focus, work concerns, religious concerns,* and *death concerns*. On average, participants responded with more positive associations during the baseline condition. This could have been attributed to the purely physical aspect of having another individual with which to communicate. For example, the 2012 research study conducted by Tu, Lai, Shin, Chang, and Li concluded

elderly adults living in long-term care facilities experienced an increase in positive moods when engaging in social companionship situations. The non-musical baseline condition can be summarized as producing more *past focus* and *present focus* percentage of words, in addition to eliciting more comments with regard to past working conditions, religious views, and references to persons in the participants' lives that have died.

Live therapist delivered music produced the most words relating to the following four variables, not including the total word count variable: *clout, emotional tone, adjectives,* and *social words*. On average, participants felt more confident in their responses during this condition, as well as expressed more positive emotions. Furthermore, participants on average generated more adjectives and social words. Although the live music condition produced 1.07% more words related to emotional tone than baseline, the baseline condition produced 6.93% more words pertaining to positive emotions than live music.

Other studies within music therapy have concluded the usage of music to increase positive emotional states for individuals diagnosed with Alzheimer's (Dassa & Amir, 2014; Solé, Mercadal-Brotons, Galati, & De Castro, 2014). As a result, future studies utilizing the LIWC software system should compare the differences between utilizing the *emotional tone* variable and the *positive emotions* and *negative emotions* variables.

Limitations of the Study

Sample size was a limitation in this study, with only four total. Because of the small number of participants, calculating variance for more conclusive results was not applicable, except by using a t-distribution test. In addition to the sample size, all participants were female, which could skew the amount of verbal responses. For future studies, representation of both

males and females should be taken into account when finding participants, as well as increasing the sample size.

The setting for this study occurred at the end of a hallway where staff members and other residents roamed the hallway freely. The presence of other individuals could have effect the results of this study due to visual and verbal interruptions and distractions. Although the setting allowed for naturally occurring events, future studies are advised to meet with participants individually in an area that is more conducive to minimizing distractions.

This study did not incorporate a tool to assess specific recall rates of the participants' memories. Although the activities director selected participants based on the inclusion criteria for the study and possessed extensive knowledge of each participants' cognition level, an additional tool to measure their memories would have been beneficial. It is advised for future studies to incorporate the Mini-Mental Status Examination (MMSE) to more accurately assess participants' memories.

The song selections for the musical conditions were based off of the participants' birth years, as well as their younger adult years. Each participant received the same songs in the same order for all conditions. Although the songs were standardized to reduce variance between conditions, future studies are recommended to incorporate participant-specific songs that were prevalent during their childhood and younger adult years. The majority of the participants responded to the pre-selected songs, however not all the participants were familiar with each song. Furthermore, future studies could incorporate a randomized-assignment of songs as a part of the research design, or customize the song list to each individual participant.

In order to reduce the amount of confounding variables that could influence the results of this study between conditions, as well as comply with the university institutional review board,

the amount of in-person interaction was limited to the script outlined for all three conditions. The student music therapist conducting the interventions kept personal interaction to a minimum. No additional instruments were utilized in this study. The student music therapist only deviated from the script when necessary. For instance, if a participate asked the student music therapist about their musical ability or made a comment on an event happening around the participant, the student music therapist would respond to the participant and then redirect the conversation back to the study. Future studies are recommended to conduct the sessions with a variety of stimulatory instruments and conversation, as is typical within most standard music therapy sessions. Additional instrumentation and conversational prompts were not utilized in this study in order to standardize the procedure.

This study evaluated nineteen variables to determine if there was a qualitative and quantitative difference on reminiscent responses in the participants. Although these nineteen variables all contributed to the outcomes of this study, future studies are recommended to narrow in on variable categories, such as summary variables, parts of speech, emotions, time orientation, and personal concerns with a larger number of participants to more accurately determine the effects music has on older adults with middle-stage Alzheimer's.

The purpose of this study was to deduce if there was a major effect between live and recorded music on participants' reminiscing responses. The study was partially successful in comparing quantitative and qualitative aspects of reminiscing responses between the two conditions, though future research is required to further strengthen the case between live versus recorded music. Although recorded music produced more percentages of words across all 19 variables, recorded music was only found to be significant when analytical thinking and pronouns were assessed ($p \leq 0.05$).

Clinical Implications

Music therapists working with older adults diagnosed with middle-stage Alzheimer's working on eliciting reminiscing responses should consider the medium in which they are delivering their music to their patients. Although more research is needed to support using live therapist delivered music compared to original artist recorded music, it is important for therapists to recognize the purpose for which they are prompting their patients for reminiscing responses. Based on the preliminary data, original artist recorded music may be more beneficial when prompting patients to share more personalized accounts, work on recognizing themselves and others in their past, as well as discuss personal concerns. In contrast, live therapist delivered music may be more beneficial when working on eliciting reminiscing responses to improve mood and provide the patient with feeling more confident with their statements. Other factors when selecting an appropriate method for delivering music should include the patients' hearing abilities, the number of patients working with the therapist at one time, and the quality of music in which the therapist can provide both through acoustic musical delivery and electronic delivery.

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APPENDIX A: LETTER OF INFORMED CONSENT

You are being asked to sign on behalf of your dependent to participate in a research study conducted by graduate student Rajahna Desiree Schneekloth, under the supervision of Principle Investigator Dr. Andrea Crimmins of the School of Music in Music Therapy at Illinois State University. The purpose of this study is to compare the effects of live music to recorded music on the long-term memory of adults diagnosed with middle-stage Alzheimer's disease. This study will analyze both the quantitative and qualitative components of the reminiscent responses from each musical condition.

Why are you being asked?

You have been asked to sign on behalf of your dependent to participate because the dependent has met the eligibility criteria: born between 1930 to 1950, diagnosed with middle-stage Alzheimer's as specified by Sugar Creek Alzheimer's Care Center program director Patricia Brady, and does not possess hearing or verbal communication impairments that would prevent them from engaging with the student music therapist.

Your dependent's participation in this study is voluntary. They will not be penalized if they choose to skip parts of the study, not participate, or withdraw from the study at any time. This study is independent of the services provided by Sugar Creek Alzheimer's Care Center. The care and services received by your dependent from Sugar Creek Alzheimer's Care Center will not be effected if they choose to skip parts of the study, not participate, or withdraw from the study at any time.

What would you do?

If you choose to sign on behalf of your dependent to participate in this study, your dependent will be asked five questions designed to elicit reminiscent responses. Questions will center on significant persons or events in the participant's life while growing up. During the live and recorded musical conditions, the participant will be invited to join the student music therapist in singing along to the four predetermined songs for the study. In total, your dependent's involvement in this study will last approximately 30 minutes for three separate sessions: non-musical baseline conversation condition, live therapist delivered music condition, and original artist recorded music condition.

Are any risks expected?

We do not anticipate any risks beyond those that would occur in everyday life, however potential risks could include emotional discomfort from topics discussed during reminiscence by the participant, as well as a possible risk of reputation from the audio recording component. To reduce risks, staff members and the program director, Patricia Brady, will be notified immediately if the participant experiences any emotional discomfort. In addition, identifiable data (such as the participant's voice and significant persons' names) will be stripped from the typed transcription. All audio recordings will be destroyed after 1 week to 6 months after the recordings were taken.

Will your information be protected?
We will use all reasonable efforts to keep any provided personal information confidential. Audio recordings of responses will be kept on a password-protected computer. Authorized personnel for the audio recordings will be limited to the researcher and a principal investigator-approved transcriptionist. All audio recordings will be destroyed after 1 week to 6 months after the recordings were taken. Typed transcriptions will be stripped of any identifiable information. Information that may identify the dependent or potentially lead to re-identification will not be released to individuals that are not on the research team. The results of this research may be presented at public symposiums, published in journals, and placed on ISU's research website. However, when required by law or university policy, identifying information (including your signed consent form) may be seen or copied by authorized individuals.

Could your responses be used for other research?
We will not use any identifiable information from your dependent in future research, but your dependent's de-identified information could be used for future research without additional consent from you.

Who will benefit from this study?
This research will benefit the participant by receiving free music therapy services to provide life-review and emotional support through music.

Whom do you contact if you have any questions?
If you have any questions about the research or wish to have your dependent withdrawn from the study, contact Rajahna Desiree Scheenkloth at (320) 217-4990 or rschne2@ilstu.edu, or contact the Principal Investigator Dr. Andrea Crimmins at (309) 438-8198 or amcrimm@ilstu.edu.

If you have any questions about your dependent's rights as a participant, or if you feel your dependent has been placed at risk, contact the Illinois State University Research Ethics & Compliance Office at (309) 438-5527 or IRB@ilstu.edu.

Documentation of Consent
Sign below if you are 18 or older and signing on behalf of your dependent to participate in this study and be audio recorded.

Signature _____ Date _____

You will be given a copy of this form for your records.

APPENDIX B: BASELINE CONDITION QUESTIONS

Question 1: “How was music apart of your life when you were growing up?”

Question 2: “What was your home life like growing up?”

Question 3: What were some places your traveled to when you were younger?”

Question 4: “Was there someone you cared about when you were growing up?”

Question 5: “Was there a person in your life that you loved very much?”

APPENDIX C: MUSICAL CONDITION SCRIPT AND QUESTIONS

Question 1: "How was music apart of your life when you were growing up?"

Song # 1 Introduction: "The first song I have for you today is *Edelweiss*. This song was popular in the film *The Sound of Music*. Please sing with me."

Song 1: *Edelweiss* (1959) Bill Lee

Question 2: "*Edelweiss* says "bless my homeland forever" during the song. What was your home like growing up?"

Song # 2 Introduction: "This next song talks a lot of different places in the United States. It's called *This Land is Your Land* by Woody Guthrie. Please sing with me."

Song 2: *This Land is Your Land* (1967) Woody Guthrie

Question 3: "What were some places you traveled to when you were younger?"

Song # 3 Introduction: "This next song may be a song your parents sang to you when you were younger, or a song you have sung to your children. It is a folk song called *You Are My Sunshine* by Gene Autry. Please sing with me."

Song 3: *You Are My Sunshine* (1941) Gene Autry

Question 4: "*You Are My Sunshine* talks about someone you might care about a lot. Was there someone you cared about when you were growing up?"

Song # 4 Introduction: "Our final song that I have for you today is *Ring of Fire* by Johnny Cash. Please sing with me."

Song 4: *Ring of Fire* (1963) Johnny Cash

Question 5: "Was there a person in your life that you loved very much?"

APPENDIX D: WITHIN SUBJECTS PAIRWISE COMPARISON CHART

Within Subjects Pairwise Comparisons for Recorded to Live Music

Variables	*Mean Difference*	*P-value*
Analytical Thinking	0.077	0.54
Clout	-0.074	0.563
Authenticity	0.123	0.079
Emotional Tone	-0.194	0.189