NORTHERN ILLINOIS UNIVERSITY

Can A Virtual Choir for Dementia Improve Communication and Engagement?

A Capstone Submitted to the

University Honors Program

In Partial Fulfillment of the

Requirements of the Baccalaureate Degree

With Honors

Department Of

Allied Health and Communicative Disorders

By

Madelynn Parrott

DeKalb, Illinois

(May 2021)

<div align="center">

University Honors Program
Capstone Faculty Approval Page

</div>

Capstone Title (print or type)
　　　"Can A Virtual Choir for Dementia Improve Communication and Engagement?"

Student Name (print or type) _____Madelynn Parrott_____

Faculty Supervisor (print or type) _____Jamie Mayer_____

Faculty Approval Signature ____*Jamie Mayer*_____

Department of (print or type) ____Allied Health and Communicative Disorders_____
Date of Approval (print or type) _____April 1, 2021_____

Date and Venue of Presentation ____April 19, 2021 NIU CURE_____

Check if any of the following apply, and please tell us where and how it was published:

　　　Capstone has been published (Journal/Outlet):

　　　_____

　　　Capstone has been submitted for publication (Journal/Outlet):

　　　_____

Completed Honors Capstone projects may be used for student reference purposes, both electronically and in the Honors Capstone Library (CLB 110).

If you would like to opt out and not have this student's completed capstone used for reference purposes, please initial here: _____ (Faculty Supervisor)

HONORS CAPSTONE ABSTRACT

Guidelines

Your abstract should begin with a definitive statement of the problem of project. Its purpose, scope and limit should be clearly delineated. Then, as concisely as possible, describe research methods and design, major findings, including the significance of the work, if appropriate, and conclusions.

Students whose thesis involves "creative" work (original, fine art, music, writing, theatre or film production, dance, etc.) should describe process and production. Indicating the forms of documentation on file as "thesis" materials.

Please have your advisor review your abstract for organization, content, grammar and spelling before submission.

Purpose
This capstone is a case series examining the effects of a virtual choir specifically designed for individuals with dementia on engagement (i.e., attention, affect) and language/communication. This is especially critical in the current healthcare climate given the known isolation and vulnerability of such individuals in the era of COVID-19. We hypothesized that even in virtual form, active choir participation would stimulate engagement and communication (i.e., CIUs) for individuals with mild-moderate dementia. After data collection and analysis, we cannot determine the impact of virtual choir and reminiscence therapy on CIUs.

Method
The choir consisted of 8-12 individuals functioning with different levels of dementia. Three participants with mild, mild-moderate, and moderate-severe dementia were chosen from the choir to be a part of this study. The three participants received music therapy in the form of a virtual (Zoom) choir, once per week for 30 minutes, led by a trained speech-language pathologist and music teacher. Following current COVID-19 safety procedures, each participant sang individually in his or her room using an iPad to view the Zoom meeting with activities staff on stand-by for assistance. After choir, the three study participants were paired with student volunteers in individual Zoom break-out rooms for language sample collection. The language of each participant was measured in Correct Information Units (CIUs), and the Menorah Park Engagement Scale (MPES) was used to measure the engagement of each participant during treatment.

Results
We found that individuals with mild to moderate dementia were able to stay engaged constructively during choir, but our participant with a more severe profile (P3) was unable to stay engaged without additional in-person, tactile support. P2 was the only participant whose number of CIUs increased after baseline measurements were taken. P1 and P2 had a slightly lower number of CIUs after participating in virtual choir rehearsal and reminiscence therapy.

Conclusion
We found that our participants highly anticipated getting to interact with one another during choir rehearsals and conversing with someone during reminiscence therapy afterwards. Overall, participation in a virtual choir paired with reminiscence therapy did not lead to significantly increased communication for individuals with mild to moderate dementia compared to baseline (reminiscence without choir rehearsals); however, we found that our participants were able to demonstrate active engagement during virtual choir and reminiscence settings, supporting the ability of technology to effectively assist in alleviating social isolation imposed by COVID-19.

"Can A Virtual Choir for Dementia Improve Communication and Engagement?"

Introduction

Dementia is a neurodegenerative disease impacting the cognitive functioning of the brain and creating neuropsychiatric effects such as fear, anxiety, and aggression. Over 35 million people have dementia, and there is currently not a medical cure (Fang, Ye, Huangfu, & Calimag, 2017). In addition to neuropsychiatric effects, dementia also limits daily living activities such as eating, communicating, and bathing. With an increasing aging population, dementia is deemed "one of the greatest health challenges of the century for humanity" (Fang et al., 2017). Language deficits are one of the cognitive disfunctions created from dementia, including problems with verbal fluency, naming, and conversational speech (Dassa & Amir, 2014). The language deterioration caused by dementia leaves the language of affected individuals filled with phrases that do not have meaning: i.e., "empty speech" (Dassa & Amir, 2014).

Dementia's deleterious effects on functional language skills and cognition can cause and exacerbate social isolation; leading to a cycle of worsening neuropsychiatric, cognitive, and language effects (Dassa & Amir, 2014). Since no cure for dementia currently exists, researchers have focused on increasing the quality of life of those affected; e.g., through various forms of stimulation. One such form is music. Music has been shown to have a special effect in dementia due to its ability to stimulate relatively preserved brain areas, even in moderate-severe dementia stages (Fang et al., 2017). Music has been shown to, at least temporarily, allow the person with dementia to regulate emotion, relieve stress, perceive memory, and control speech which may increase quality of life (Osman, Tischler, & Schneider, 2016).

Unfortunately, COVID-19 has put people with dementia, especially those living in long-term care facilities, in a more isolated position than ever. This lack of stimulation and social interaction compound the effects of dementia; putting individuals at risk for a spiraling loss of more cognitive ability. In an attempt to counter this effect while following contactless COVID-19 restrictions, we created a virtual (Zoom) dementia choir, in which individuals with dementia residing in a local long-term care facility could participate from their own private rooms. We hypothesized that active, virtual choir participation would increase the engagement and language of our participants with mild to moderate dementia.

Method

Participants

Our virtual choir consisted of 8-12 regular participants; of these individuals, three people with dementia were selected to participate in this study as part of a larger research project examining virtual activity participation. The first participant (P1) was a 75-year-old white male with a bachelor's degree in mechanical engineering. P1 was diagnosed with moderate vascular dementia and Parkinson's disease. Participant 2 was a 67-year-old white female that had

previous work experience in the food service industry and had education up to grammar school. P2 was diagnosed with unspecified dementia and had a past opioid addiction. Participant 3 was a 63-year-old white female with a high school diploma and had past work experience as a clerk and librarian. P3 was diagnosed with early-onset Alzheimer's disease; she also had been diagnosed with sleep apnea which may limit oxygen to the brain, causing increased fatigue.

Treatment Protocol

The three participants received music therapy in the form of a virtual (Zoom) choir, once per week for 30 minutes, led by a trained speech-language pathologist and music teacher. Following current COVID-19 safety procedures, each participant sang individually in his or her room using an iPad to view the Zoom meeting with activities staff on stand-by for assistance. Each rehearsal began with a brief vocal warm-up and unison singing consisting of a rotation of 5 holiday songs. Cognitive supports included showing the lyrics of each song on the screen line by line the first time through; then the song was repeated without the lyrics so the residents could see and interact with one another. After choir, the three study participants were paired with student volunteers in individual Zoom break-out rooms for language sample collection.

Study Design

We chose a single subject across subjects, AB study design to examine both language and engagement prior to, during, and following virtual choir participation. We collected 3 baseline language sample measures from each participant prior to the first choir rehearsal. Language samples were then collected immediately following each choir rehearsal from the three participants. The engagement of each participant was also measured by viewing the recorded rehearsals.

Outcome Measures

Each language sample consisted of a 3-5-minute conversation between the participant and a student volunteer. Conversation topics were facilitated by a "reminiscence" visual (power point) that was developed and piloted with healthy adults age-matched to study participants to ensure relatively equal interest and elicitation of language. The reminiscence topics consisted of broad, open-ended questions with follow-up closed questions about health, friends, entertainment, food, family, church, winter holidays, music, childhood homes, toys and games, and shopping; pictures pertaining to each of these topics were presented on individual slides which were shared on the participants' screens during their language sampling.

CIUs: The language of each participant was measured in Correct Information Units (CIUs). CIUs are a measurement that determines the topic maintenance and relevance of each unit of language (Leaman & Edmonds, 2019). The qualifications for determining the appropriateness of a unit of

language have been modified from the original Leaman & Edmonds 2019 and are found in Table 1.

CIU RULES:

Do not count	
B.2 Imperatives, comments, or questions to partner not related to topic, which interrupt progress of the conversation; often used when the PWA wants to use an alternative modality	Example 1: Partner: What's your favorite football team? PWA: Hang[W] on[W]. {PWA reaches for paper to write response} Example 2: PWA: Do[W] you[W] have[W] a[W] pen[W]?
B.3 Verbatim repetition of partner if it occurs within 3 turns (not counting single-word yes/no responses within the 3 turns)	Example: Partner: It was so funny. PWA: It[W] was[W] so[W] funny[W].
E.1 Words later to determined to be semantic paraphasias E.2 Yeah, yes when not used meaningfully (see NB, Rules 1.24 and 2.19) In conversation partners often encourage the speaker to keep talking through use of alignments such as yeah, yes, and ok.	Example: PWA: We[W][CIU] go[W][CIU] skiing[W] every[W][CIU] year[W][CIU]. Partner: We love to go every winter! PWA: Winter[W][CIU]? PWA: Oh[W] I[W] meant[W] sailing[W][CIU] Skiing is not counted as a CIU, because it becomes clear that this was a semantic paraphasia. Example: Partner: I was really mad. PWA: Yeah[W]. Partner: So I didn't follow up right away. PWA: Ok[W]. Partner: I called back a week later.
Do Count	
B.4 Proper nouns if known to partner (as determined by partner response/behavior)	Example: PWA: I[W][CIU] saw[W][CIU] Charlotte[W][CIU] when[W][CIU] I[W][CIU] was[W][CIU] in[W][CIU] Boston[W][CIU]. Partner: Oh, how was she?

B.5 Verbatim repetition, if used to respond to the partner's explicit question or request for more information/ clarification or partner request for repetition	Example: PWA: Lots[W][CIU] of[W][CIU] golf [W][CIU] clubs [W][CIU] in [W][CIU] Georgia[W][CIU]. Partner: There are a lot of golf clubs there? PWA: Yes [W][CIU]. PWA: Lots[W][CIU] of[W][CIU] golf[W][CIU] clubs [W][CIU] in[W][CIU] Georgia![W][CIU].
B.6 Vague language if acceptable in informal conversation	Example 1: Partner: Do you want to go out to the movies or dinner? PWA: Whatever [W][CIU]. Example 2: PWA: We[W][CIU] could[W][CIU] get[W][CIU] sushi[W][CIU] or[W][CIU] pizza[W][CIU]or[W][CIU] whatever[W][CIU].
D.3 First- and second-person pronouns can be assumed from context (i.e., I, me, we, us, you)	Example: PWA: You[W][CIU] like[W][CIU] to[W][CIU] hike[W][CIU]?
E.3 Yeah, yes, uhhuh, ok, no, and so forth, when used meaningfully	Example: Partner: Do you live around here? PWA: Yes[W][CIU].
E.4 Repetition and intensifiers used informatively and meaningfully to display emphasis, interest, opinion, and evaluation of what is being said	Example: PWA: It[W][CIU] was[W][CIU] scary[W][CIU] when[W][CIU] the[W][CIU] car[W][CIU] crashed[W][CIU]. PWA: It[W][CIU] was[W][CIU] so[W][CIU] scary[W][CIU]!
E.5 Meaningful information in partial utterances. In conversations speakers often revise mid-utterance, leaving an incomplete utterance.	Example: PWA: I[W][CIU] want[W][CIU] to[W][CIU] stop[W][CIU] at[W][CIU] the[W][CIU] {stops speaking, revises utterance} PWA: Can[W][CIU] we[W][CIU] go[W][CIU] to[W][CIU] the[W][CIU] store[W][CIU] on[W][CIU] the[W][CIU] way[W][CIU] home[W][CIU]?

Table 1. **modified from original Leaman & Edmonds 2019

Engagement: The Menorah Park Engagement Scale (MPES) was used to measure the engagement of each participant during treatment. The MPES classifies and differentiates the levels of engagement and pleasure during a 3-5-minute window during virtual choir rehearsals.

We modified the MPES from the original scale to reflect the goals of this study (Items 4, 5, 6, and 8 (Camp & Skrajner, 2004). The rules and modifications can be found in Table 2.

RULES:

1. Only ONE item from 4-6 can be rated "2" per session – e.g., if Item 4 is a "2" then the others must be 1 or 0.
2. All behaviors EXCEPT constructive engagement must occur for 3 sec to be coded. E.g., if participant is fiddling with her shirt – but for less than 3 seconds – it's not an instance of "other/self" engagement. Item 4 is counted for ANY instance of active engagement even if less than 3 seconds.
3. Each level trumps the level below. E.g., if participant is actively engaged (conversing) AND fiddling with her shirt, it is still coded as constructive engagement.

Item 4: Constructive Engagement	Did and/or commented on the target activity: Using materials related to the activity, speaking or gesturing in response to the activity,	0= never 1 = Up to half the observation 2= More than half of the observation
Item 5: Passive engagement	Listened to or watched target activity: Generally alert, looking in the direction of the activity, holding onto but not using materials for the target activity**	
Item 6: Other/Self-engagement	Did or attended to things other than the target activity – e.g., fumbling with clothing, holding materials NOT related to the target activity, looking at something other than the target activity (e.g., a television)	
Item 8: Pleasure	Laughing, smiling, verbalizing pleasure – only document observable behavior/overt signs, do not make assumptions.	

Table 2 **modified from original MPES

Data Analysis

Due to the small number of subjects and inconsistencies due to COVID-19 restrictions, data were analyzed through visual inspection only.

Results

Language:

As shown in Figure 1, P2 was the only participant whose number of CIUs increased after baseline measurements were taken. P1 and P2 had a slightly lower number of CIUs after participating in virtual choir rehearsal and reminiscence therapy. The lower scores could be due to the participants' lack of experience with the new technology and program. P1 was hesitant to converse during baseline measures and did not fully participate to his ability until there was a sense of familiarity established with the program and the technology.
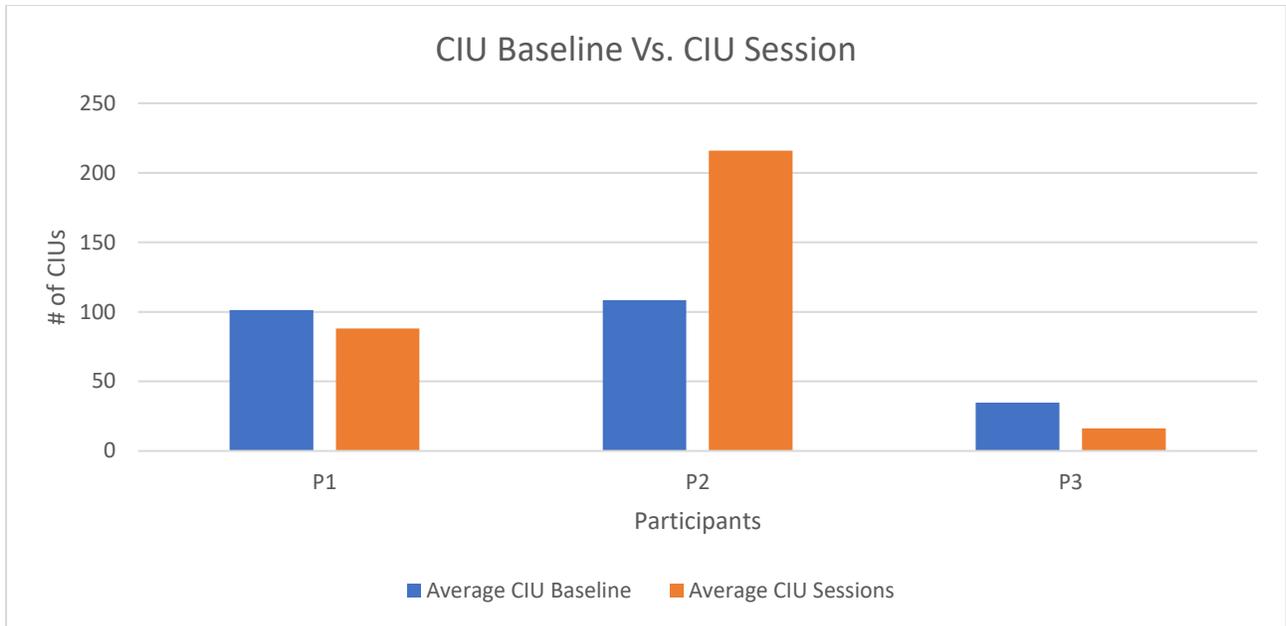
Figure 1

Engagement:

As shown in Figures 2-4, we found that participants with mild to moderate dementia, P1 and P2, displayed high constructive engagement during choir and P3 who has moderate-severe dementia, displayed no pattern of constructive engagement during virtual choir rehearsal. Because of the severity of P3's dementia, one-on-one tactile stimulation was given to P3 after data collection and engagement increased during virtual choir rehearsal.
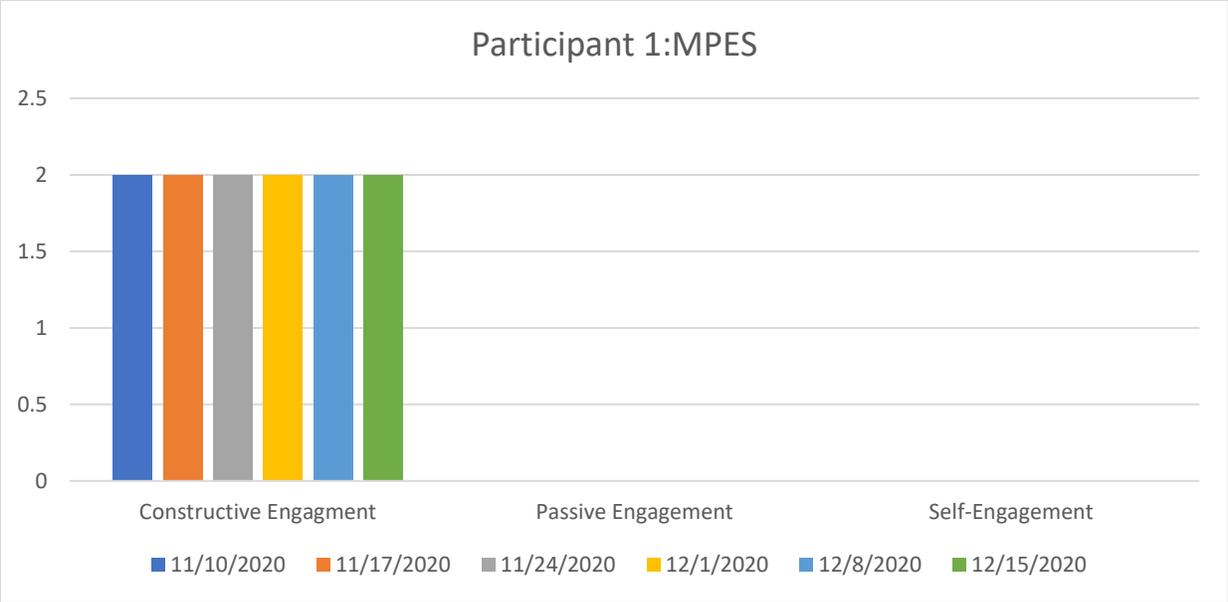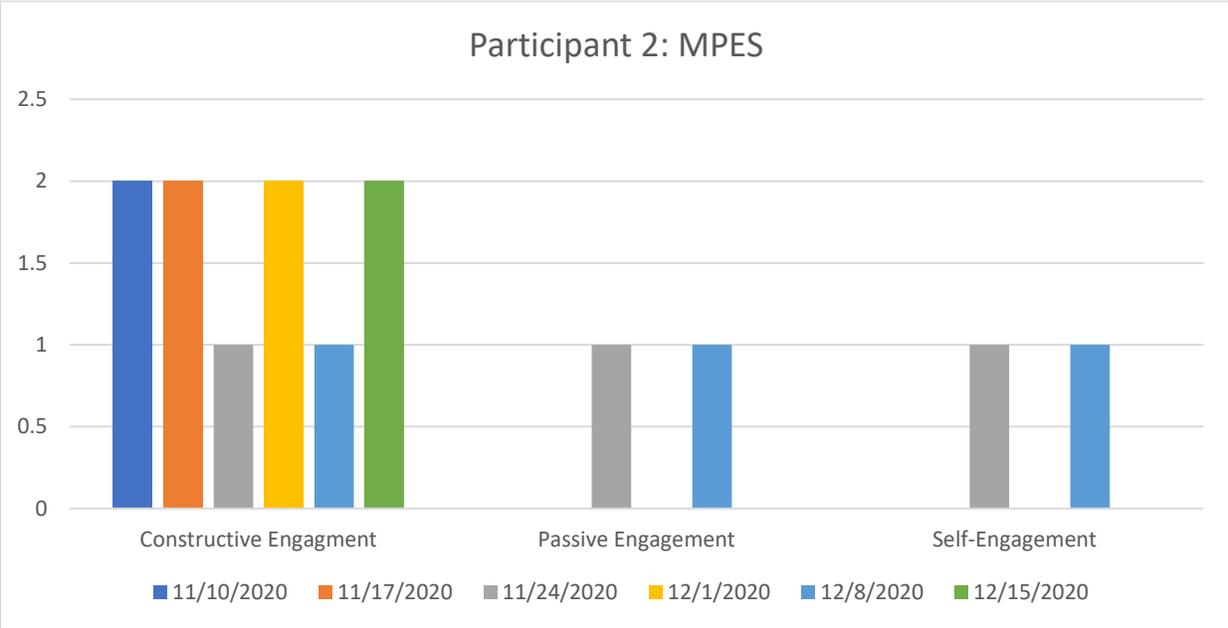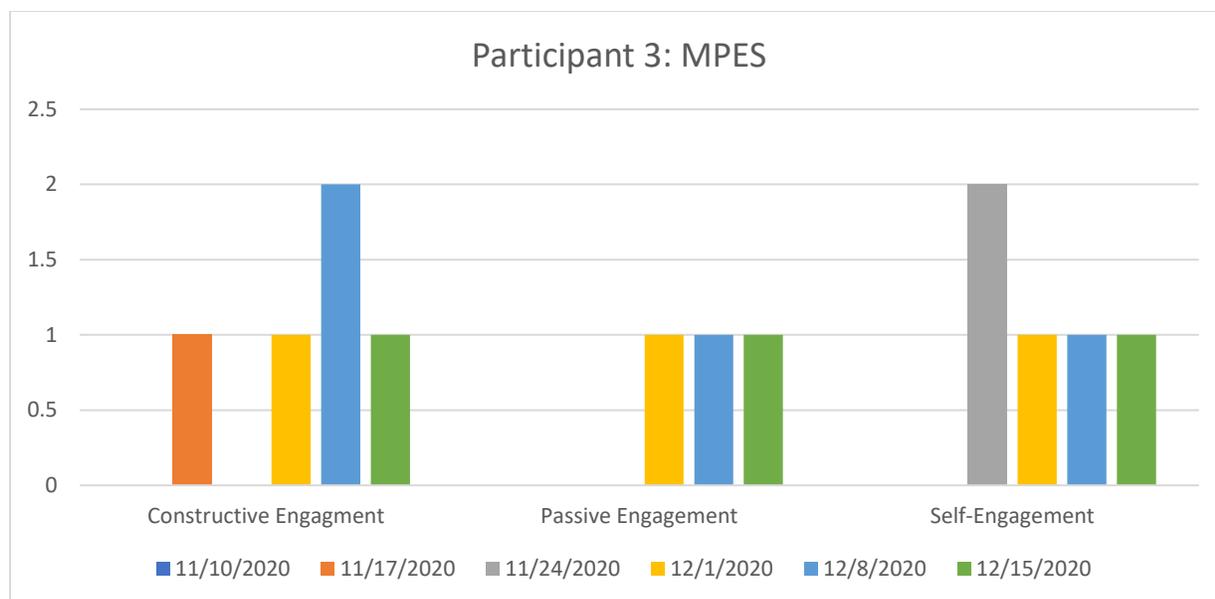
Figure 2

Figure 3

Figure 4

Discussion

We hypothesized that even in virtual form, active choir participation would stimulate engagement and communication (i.e., CIUs) for individuals with mild-moderate dementia. After data collection and analysis, we cannot determine the impact of virtual choir and reminiscence therapy on CIUs. We found that individuals with mild to moderate dementia were able to stay engaged constructively during choir, but our participant with a more severe profile (P3) was unable to stay engaged without in-person, tactile unless support. It is important to note that baseline measures were collected from the participants during a brief respite between COVID-19 lockdowns at their residential facility; unfortunately, a second lockdown and isolation occurred during the experimental phase. This change in lifestyle and environment likely impacted the results of this study.

As found in previous studies, procedural memory is a strength for people with dementia and is the longest lasting memory for them. We know from previous literature that repeating physical activities with individuals with dementia helps strengthen their procedural memory and makes activities like using an iPad to access choir more accessible and thus, easier for them. The results of this study support the utility of teaching a new skill (i.e., use of technology for interpersonal communication) to individuals with dementia. The participants continuously became more adjusted to the virtual aspect of choir and reminiscence therapy, and engagement levels and technology savviness increased over time. After data collection, P1 was able to independently access choir using the technology (iPad) and was overall more adept at participating without assistance. We did not predict or address the technology learning curve in our hypothesis for this study. Future studies should consider designating a period of time prior to data collection for participants to become familiar with the technology and activities so that the participants'

abilities can be best reflected in the study. Additionally, social isolation could have been an influence in this study as all residents were in lock down on and off for 6 months at the initiation of data collection. Future studies in this situation should also consider addressing the effects of isolation on engagement, and communication for people with dementia. We found that participants highly anticipated getting to interact with one another during choir rehearsals and getting to converse with someone during reminiscence therapy after choir rehearsal. Overall, participation in a virtual choir paired with reminiscence therapy did not lead to significantly increased communication for individuals with mild to moderate dementia; however, we found that our participants were able to demonstrate active engagement during virtual choir and reminiscence settings, supporting the ability of technology to effectively assist in alleviating social isolation imposed by COVID-19.

References

Camp, C. J., & Skrajner, M. J. (2004). Resident-Assisted Montessori Programming (RAMP): Training persons with dementia to serve as group activity leaders . *The Gerontologist, 44 (3),* 426–431

Camp, C. J., Skrajner, M. J., & Gorzelle, G. J. (2015). Engagement in dementia. In: L. Volicer & A. Hurley (Eds.), Assessment Scales for Advanced Dementia. Baltimore: Health Professions Press.

Dassa, A., & Amir, D. (2014). The Role of Singing Familiar Songs in Encouraging Conversation Among People with Middle to Late Stage Alzheimer's Disease. *Journal of Music Therapy, 51*(2), 131-153. doi:10.1093/jmt/thu007

Fang, R., Ye, S., Huangfu, J., & Calimag, D. P. (2017). Music therapy is a potential intervention for cognition of Alzheimer's Disease: A mini-review. *Translational Neurodegeneration, 6*(1). doi:10.1186/s40035-017-0073-9

Leaman, M. C., & Edmonds, L. A. (2019). Revisiting the correct information unit: Measuring informativeness in unstructured conversations in people with aphasia. *American Journal of Speech-Language Pathology, 28*(3), 1099-1114. doi:10.1044/2019_ajslp-18-0268

Osman, S. E., Tischler, V., & Schneider, J. (2016). 'Singing for the Brain': A qualitative study exploring the health and well-being benefits of singing for people with dementia and their carers. *Dementia, 15*(6), 1326-1339. doi:10.1177/1471301214556291