

The Effect of Choral Music Towards Alzheimer's Disease

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1. Introduction

Music has often been referenced as salubrious — nurturing medicine for the ailing soul. Outside of this metaphorical and idealistic context however, music has proven to reveal psychological and sociological benefits (via the stimulation and use of the brain). Recently, there has been interest in how music can affect a brain that is in the process of deterioration: such being the case of one suffering from Alzheimer's disease. This neurological degenerative disease erodes the patient's memory, yet strikingly the aptitude and perception of music remains well into the later stages of this disease. Therefore, I sought out a musical experience with which to analyze the therapeutic properties of music in real-time — an experience immersive of both the psychological and sociological benefits: this being the case of choral singing. Choirs within both Ottawa and the GTA region have used choral singing as a catalyst for which to improve the overall quality of life for Alzheimer's disease patients, thus revealing that choral singing is a developing therapeutic practice.

This of course poses questions about the music-making practice as a whole, as well as the benefits inherent to choral singing (juxtaposed against say instrumental performance, or sparsely accompanied solo singing). Through two distinct forms of inquiry (quantitative study and qualitative study) numerous questions are posed that deserve investigation. First, how many musical elements within choral music are there that actively (and positively) affect an Alzheimer's patient's episodic memory (or potentially another form), and how do they accomplish this during

the course of a regular choir rehearsal? Second, does choral singing improve the quality of life of Alzheimer's disease patients via the psychological effect of music alone, or is the positive social environment a significant factor? Both of these inquiries I feel deserve due attention, with a means of interrogation as to what allows choral singing to create the ideal environment for the improvement of the quality of life for Alzheimer's disease patients. Before undertaking such an investigation, it is important to acknowledge and understand the breadth of information available in understanding the correlation between Alzheimer's disease and choral singing.

This literature review is broken down to best represent the information available from salubrious, philosophical/theoretical, and sociological perspectives respectively; these include qualitative, and quantitative studies, as well as articles written from professionals in the world of choral singing. Vocal art practice is outlined and examined, both from a pedagogical perspective of performance, and as a social medium. Following, Alzheimer's disease is presented via a neurological inquiry, and how the human brain functions when in the process of music-making. Once both parties of questioning are understood (choral music and Alzheimer's disease) the therapeutic aspects of music are examined through the lens of the relationship between these two parties. It is to be noted that the literature in this review will be presented in chronological-order, to best represent the evolution of thinking towards the subject matter of music (specifically choral) and Alzheimer's disease.

2. Choral and Vocal Music Pedagogy

2.1. Vocal Blend and Voice Consideration

Andrew Cottle's "A Choral Manifesto" (1988) is written through the lens of how it has been entitled: a manifesto, and thus presents a consideration of vocal technique intended to flourish throughout the choral community. To accomplish this, he outlines the "purpose" of a choral ensemble, and how the intrinsic musical benefits outweigh the salubrious and social consideration often taken in the choral community today.

There are teachers who build their entire philosophy on an incorrect assumption. That assumption being that the experience students receive in their schools will be probably be the last and best active musical experience in most of their students' lives. This assumption becomes a self-fulfilling prophecy as these teachers give these students experiences rather than skills. (Cottle, 1988, p.11)

As Cottle (1988) directly points out, his belief is that choirs should provide its members with the skills and ability in order to continue and thrive through their music education through the rest of their lives — a single choral experience shouldn't be the be all and end all. It is through this development of skill however that one can then reap the additional benefits of the choral setting: such being the social and philosophical well-being from music-making. In Cottle's (1988) consideration, the "art song" is the most beneficial stylistic choice of repertoire due to the vocal benefits towards technique. In terms of repertoire, he strongly cautions and discourages the use of popular music selection: "Pop styles are not appropriate to art music even as school clothes are to appropriate at prom" (Cottle, 1988, p.14). Thus, Cottle strictly outlines the apparatus that may be used when approaching a social-based qualitative study.

The article by R.T. Sataloff (2000) takes an approach that far more concerns the individual, and less the concern over the larger vocal ensemble. While the article is written through the lens of older choir members, and the attention they require medically speaking, it creates a discourse necessary for understanding the individual voices present. While Cottle (1988) addressed

the need for choir members to apply similar vocal technique, he didn't consider the in advert, and consequential vocal qualities members may bring — something that Sataloff (2000) addresses quickly: "...hearing impaired-patients over age sixty use a significantly greater vocal intensity level than age-matched controls with normal hearing" (Sataloff, 2000, p.58). While each case of a singer's needs is different, there are common threads. Similarly addressed, are the physical incapacibilities of many choir members, including (but not limited to) the abdominal support required for extensive use of "proper" vocal technique. While Cottle's (1988) article had addressed mainly students, Sataloff (2000) corrects the idea that technique may carry-on throughout life-long musical experience; time changes everyone differently, and the choral director must account for each and every member before considering the whole. Between considering both articles, and the times in which they were written, Sataloff's (2000) approach towards vocal technique has remained the prevailing thought — continued through the article by Naseth (2012) written in the same publication.

Andrew Naseth's (2012) consideration of vocal pedagogy, is presented as an ideal blend of choral conservatism, and being conscious of a choir as a communal gathering of individuals. To accomplish this, elements integral to proper technique are outlined — particularly regarding posture and breathing. Rather than writing about both posture and breathing through an instruction manual or "manifesto" approach, both are analyzed via qualitative considerations by numerous vocal instructors, in order to reach a generality in the field (Naseth, 2012). What this creates is a commonality for which the choral instructor may approach the members, as well as topics that are not variable regarding age and ability. The posture and breathing of a singer is a universal ideal that all strive to reach for, regardless of how close they get to such an ideal. "Regardless

of the source, any influence potentially beneficial to voice teaching should be explored, but only if that influence meets standards of physiological efficiency” (Naseth, 2012, p.44). The culmination of vocal pedagogy consideration from these studies show that there is a common thread of technique to be found; however the evolution has culminated due to the changing of view towards a choir — as a mass of individuals that seek to create a greater sound than a singular unit. Once a standard of technique can be agreed upon, the question arises of maximizing the emotional impact and delivery of the vocal ensemble while continuing this individual consideration.

2.2 “Maximizing” Emotional Impact and Delivery

Brad Richmond’s “Sing is Strong Medicine” (1994) continues the discourse regarding vocal pedagogy, regarding how the singer may branch out within the realm of vocal technique. “Audiences thrill to fine musical performance not only because of the emotional and intellectual value of well-presented music, but ... by the vibratory properties of sound” (Richmond, 1994, p. 27). While the singer can remain stagnant and solid in resolve to the “manifesto” of singing, Richmond (1994) offers the benefits of exploring the voice in order to achieve a desired effect. Avant-garde and world musics are referenced regarding their manipulation of upper vocal partials, and the effect this has; it is implied that western practitioners should be welcome to experiment the same way (Richmond, 1994). In the contemporary choral community this has become commonplace, as composers have experimented in their own right to maximize the impact of the instruments at their disposal (often the voices of choir members). Thus, focus must temporarily shift to those who regularly run vocal musical ensembles: the choral directors.

Butke's (2006) study into the individual experiences of choral directors addresses the importance of the director in encouraging positive delivery. Individual case-studies are examined, and compared in terms of experience, difficulty, and learning outcomes via shared discourse. This study is a qualitative research study as it calls for the subjective accounts of choral instructors, and is focused upon an experienced narrative rather than quantifiable variables; a reflective practice is adhered to. Qualitative data collection is accomplished via daily reflective journals, an autobiographical narrative, and reflective narrative exercises; these exercises are based upon Brookfield's Critical Incident Questionnaire (1995), and Smyth's three key questions (1992). A collective case study via cross-case analysis is used across the varied experiences, focused towards five subquestions in order to analyze the data collected: "How does engaging in a reflective process over time affect choral teachers?", "How does the notion of problematizing a person's practice affect each teacher?", "What are the unique factors that affect reflective process in a choral classroom?", "How does a teacher's life history, current phase of development, and specific teaching assignment affect the reflective process?", and "How are teachers empowered to act upon their reflections?" Kate Tyler, one of the choral directors studied, focused on keeping postures consistent, and energy up within the course of the rehearsal — not allowing essential elements (such as posture) to falter (Butke, 2006). The difficulty that arises, is in maintaining the delivery of a large group of individuals, and allowing a musical and emotional connection to persist over the course of numerous rehearsal with the same piece. Jacqueline O'Keefein, within the same study, uses humour and a strict sense of pacing to allow spirits to remain high, and to keep a consistent sense of delivery within a rehearsal (Butke, 2006). This study reveals that the concepts of impact and delivery are beyond the discourse of vocal pedagogy as Richmond ad-

dressed, and inevitably crosses into social consideration. Singers are people, and the voice is connected to the person; thus, one's demeanour directly influences a musical delivery.

Pierce (2012) approaches this concept of impact and delivery through the insight of well-being for the musician. While this topic will be explored further in this paper, it is important to note how the musician, and thus the musician's mindset, approaches this very question. Often, musicians "over-do" a performance, or rather delivery takes precedence over technique — a dangerous situation, and inconsiderate of the discourse over the building blocks of vocal pedagogy — considered by Richmond (1994), and Naseth (2012) respectively. Delivery and impact enforces one's technique, and should never diminish such.

While the integration of the concepts of "musicking" are important to music education as a whole, the training of professional musicians needs to go even further to provide a balanced education for the individual musician. As a composer, Pauline Oliveros has found listening and collaboration as important practices. (Pierce, 2012, p.160)

This concept provided by Pierce (2012) explores that the impact of vocal performance can be maximized through attention to collaboration — specifically choral blend and dynamic. The compositions of contemporary (and often experimental) vocal composers make use of space, and melodic interplay in order to achieve impact on the listener. Unlike the extended techniques implied by Richmond (1994), there are considerations of impact that can be explored within what is already readily available — in this case the voices of a typical choir. Thus, an "agreement" of sorts has been established between the conservative, and the liberal considerations for the vocal delivery of a choir.

Erin Heisel's "Empathy as a Tool for Embodiment Processes in Vocal Performance" (2015) singles out a singular concept through which the vocalist may deliver a per-

formance: the concept of empathy. Empathy for a vocalist involves creating a world, and embodying that world of the character — it is the imagining of the character that would be singing the lyrical content of a piece of music. This concept of empathizing with a song’s “character” takes a point of view previously not touched upon: that maximizing vocal delivery is for the listening audience more so than for the performer. “Audience members may engage fully in music through active listening, witnessing great virtuosity, or deeply empathizing with characters portrayed, or perhaps also with the singers tasked with the portrayal” (Heisel, 2015, p.106). This of course can raise many questions, and cause problems for the performance of a piece; if the lyrical content is controversial, or if there is a lack of connection between vocalist and perceived “character.” This idea of empathy works to create believability in a piece, and encourages escapism for the listening audience. Within the discourse of vocal pedagogy, empathy furthers the debate of emotional impact juxtaposed against technique, and the line to be walked between the two. In the article, imagination is reserved as the catalyst for developing empathy — as one must image the character to be singing as (Heisel, 2015). The individual again takes power. Within a choral setting, it is encouraged for all members to create characters within a similar mindset — however the imagination and creativity to reach the end result is left undetermined by the governing power (the choral director), and is left in the complete control of the vocalist.

The question of vocal pedagogy has surfaced numerous questions and trains of thought: the balance of technique and emotion, the individual or the collective, and how to approach the human/natural instrument integral to the music. Through the previously referenced articles, it becomes clear that vocal pedagogy has evolved to incorporate other schools of thought — distancing itself from musical considerations similar to instrumental orchestrations. Due to the in-

struments of a choir being the vocalists themselves, the social aspect of choral music is integral and must be addressed.

3. Choral Singing as a Catalyst for Positive Social Conditions: The Ideal Combination of Music-Making and Socialization

Cottle's (1988) approach to choral singing in a social context is via a concept of lifelong experience. To approach music-making in a choral setting, is to develop the skills integral to experiences one will have throughout their lifetime: "choral music is valuable because it provides us a means of making contact with others through a productive communal activity" (Cottle, 1988, p.11). However, in his approach towards the "lifelong endeavour" of choral music, Cottle (1988) enforces that the social and communal benefits are strictly secondary to technique and vocal development; it is after developing one's skill and ability that they may continue to thrive in choral experience. His qualitative writing informs not a singular study, but rather an impressionistic approach to vocal study — that the phenomenon of choral practice should be nurtured continuously for the ideal benefit.

Koga and Tims' "The Music Making and Wellness Project" (2001) addresses the use of music as a therapeutic tool within Fletcher Music Centres of Clearwater, Florida. This study is a qualitative research study as it is administered in order to assess the social and psychological improvement via the integration of music — this is heavily reliant upon the subjective accounts of its participants. This study used psychological survey tests (in particular The Profile of Mood States Depression and Dejection Tests'), as well as blood tests to affirm the observational accounts of this study. Such is reliant upon the cooperation of the participants — with the blood tests affirming psychological changes via chemical account. The results of the psychological

tests were measured using the Mental Health Inventory (at the beginning of each research period, after 10 weeks, and after 20 weeks of lessons), as well as blood test analysis to supplement such findings. As well, implications were made from documented non-participatory observation. Where this study differs from those previously mentioned, is that the timespan is increased exponentially (to 5 years), the music being taught is relatively popular for the residents (comprised of folk songs, and hymns), and there is no clear delineation in terms of age or mental health groupings ((Koga & Tims, 2001). Most strikingly, the social aspect of music-making is limited to group sessions, and is completely irrelevant when considering solo practice and lessons. Essentially, this study has the broadest scope — music’s effect upon the individual as a therapeutic tool.

Karen Salvador’s own literature review — “Inclusion of People with Special Needs in Choral Settings: A Review of Applicable Research and Professional Literature” (2013) — addresses this problem, and reveals an integral social nature of music. In regards to those with particular disabilities, a social setting (in this case a choral one) provides a positive environment of not only encouragement, but of reinforcement of both technique, and confidence; this would include pitch matching, rhythmic skills, and lyrical memory (Salvador, 2013). To lack a social context within music, in some ways causes a hinderance. It could then be argued that a choral setting provides the necessary musical therapeutic content, while also containing the social element needed for all musicians (at various levels, both healthy and ailing) to succeed. Unfortunately, Salvador’s (2013) own review points out that there is a glaring omission of literature on inclusion within choral settings — such being adapted from orchestral and social literature (Salvador, 2013). Thus, there is a glaring question as to whether choral music is merely a substitute for oth-

er forms of group music-making (as physical instruments aren't required), or if there's something to choral music that's unique; special in the grand scheme of music's therapeutic effects.

In the case of Harris and Caporella (2014), a choir was the exact method used to treat the social stigma of Alzheimer's disease within a multigenerational ensemble. This study is a phenomenological qualitative study as it seeks to create a choral setting, and to evoke a situation with the hope of transformative social power. This study, while capturing some statistical data, seeks to better the understanding of its participants, and understand (as well as ultimately remove) social stigma associated with AD. This choir ran for 8 weeks, each 90 minute rehearsal being considered an intervention in of itself. A pretest (T1), test halfway through (T2), and post-test (T3) were administered to the participating college students — questions included: “(1) What have you learned about AD, people with AD, and their family members so far from this experience? (2) What has surprised you the most from this experience? (3) Has this experience changed your ideas/images of people with AD and their family members? If so, how? If not, why? (4) Do you feel more comfortable around people with AD?”; and focus group were held for the AD patients and support members, with questions including: “(1) if they had concealed their diagnosis; ever felt discriminated due to the diagnosis, and the impact the diagnosis had on close relationships and (2) their experience of being in the choir and their interactions with the students.” Observations were made over the course of the 8 weeks, as regards attendance and the quality of their interactions with the students and other couples, that is “(1) Did they seem more comfortable with each other? (2) Did their conversations become more natural and animated? (3) Did they appear to look forward to seeing each other? (4) Did they come earlier to rehearsals or linger longer after rehearsals to talk with each other?”

The analysis for the college students included the separation of negative, neutral, and positive descriptors (collected from T1, T2, and T3), as well as the coded collection of common themes — having to have been mentioned 50% of the time. The focus group sessions were taped, and subsequently transcribed and analyzed through a 4-step process: “(1) the entire transcript was read in its entirety;(2) the transcript was reread to develop substantive codes for the narratives; (3) the codes were grouped into themes related to the AD stigma and their experience in the choir—in order to be considered a common theme, it had to have been mentioned by at least 50% of the focus group members, and (4) quotations were selected that captured the essence of that themes.” In the instance of this case-study, music was the secondary trait — as the understanding and knowledge of Alzheimer’s disease and ultimately the comfortability regarding such, took dominance. By the end of this particular study, the students taking part in the choir (undergraduate level college students) demonstrated a higher understanding of Alzheimer's disease; this relationship resulted in a higher comfort level for the Alzheimer's disease patients, and a general increase in their quality of life (Harris and Caporella, 2014). Thus, a choral setting was chosen not for its repertoire per se — or the unique music-making experience inherent of choral singing — but rather the ideal setting for multigenerational members to engage in an active, and creative social activity.

“The people with Alzheimer's disease and their family members through participation in the choir interacted in meaningful ways with the students. Through this social contact, they were able to show the students a different perspective about Alzheimer's disease and demonstrated that one can still live a meaningful life with enjoyable times, despite the challenges of the diagnosis. (Harris and Caporella, p.279)

The context of a choir provided the social context necessary for positive growth (and the exclusion of any mindset of competition sometimes present in instrumentalists). This positive growth is unique to choral participation socially.

Noice, Noice and Kramer (2014) wrote a scientific literature review analyzing how participatory arts affect older adults — these including visual art, music, and dance art forms respectively — drawing from a wide chronological-scope of studies: published between 1985-2012; the results coming to a similar conclusion of social benefit that has been previously discussed in this paper. What was found was an overall decrease in depression and anxiety, as well as the decrease in the need for medication (Noice, Noice & Kramer, 2014). However, the differentiation between instrumental and choral singing was found solely through a qualitative quality-of-life study. “Perceived enhanced social relations and personal development” were demonstrated in choral settings, rather than simple instrumental, or therapeutic musical settings (Noice, Noice & Kramer, 2014). Questions may be raised regarding the generality of “perceived” conditions; however, what cannot be disputed are the social conditions one experiences within a choral setting - through literal vocalization and communication — that cannot be mimicked in other musical settings. The benefits of socialization via music are unique to the choral experience. The vocal experience inherently creates a sense of empathy via character personification (as previously mentioned regarding vocal pedagogy) a social phenomenon of sorts regarding performing arts.

“Singers may find themselves aware of new depths of human emotion or understanding as they consider a character’s plight and may even find their perceptions of the present world changed through these experiences” (Heisel, 2015, p.105). Erin Heisel (2015) primarily addresses how lyrical content may affect the performer’s immediate connection to the music, however

this previously stated quote hints at the lingering effects of a musical background. To emote the views of a character forces one to connect in some way (even if feigned) with the ideological views of the lyrical content; to be given a different perspective changes how one perceives the world around them. Lyrical content and this connection are unique to vocal music, and the communal process of a choir creates a group of fluctuating viewpoints. This group-in-flux is a healthy environment to question, discuss, and understand during the process of music-making. The following article addresses how the social cohesion of a choir isn't always the side-effect, but is actually sought out as the primary reason to be involved in a choir.

Doreen Fryling (2015) in "Persistence in Choral Music" came across this discovery of Heisel's (2015) through initial qualitative study rather than after an experiment had been conducted. "It may be surprising, but several comprehensive studies investigating involvement in choruses listed social connectedness, as opposed to music-making, as the primary reason for singing in a choir" (Fryling, 2015, p.32). This article had cited that social connectedness provided the primary reason for singing in a choir, with consequential improvements in self-esteem, and confidence in one's ability. Depending on the level of the choir, sectionals as well as competitions only further the social setting, as well as provide additional pride via representation. Fryling (2015) addresses the sense of community, as well as the belonging and community of those with similar experience (or affliction) within a choir (Fryling, 2015). It cannot be underestimated the positive effects of a social setting amongst similar individuals; the power of empathy and understanding, and pride in accomplishment in the face of adversity.

"As we teachers we might ask ourselves if we are members of the health-care profession as well as the education profession" (Koga & Tims, 2001, p.22). Choral music, through this pa-

per thus far, has proven to provide varied degrees of musical stimulation, and positive social enhancement; however, it is a bold statement to consider music as health-care. Performing arts seek to express and entertain, thus to infer physiological betterment is surprising; music can only be heard, and still struggles to be understood within its own field of study: contemporary musicology, let alone health sciences. Yet perhaps there is merit to be found. Before analyzing the potential therapeutic effects of music, I will outline the disorder that is questioned within this article: Alzheimer's disease. Just as an understanding of vocal pedagogy was to be erected, so must a neurological understanding be formed and interrogated.

4. Alzheimer's Disease and a Neurological Visual of the Human Brain

"The Therapeutic Effects of Singing in Neurological Disorders" (2010) doesn't address music's affect on the case of Alzheimer's disease, however what is examined is how music can have physical and observable effect (in real-time) upon the human brain. The figures presented of arcuate fasciculus (AF) fibre bundles within healthy and not healthy brains affected by musical stimulus, reveal a direct correlation between music and healthy brain activity (Wan Rüber, Hohmann, & Schlaug, 2010). Presented as a quantitative study of the real-time neurological effect of music, this paper recognizes lyrical vocalization positively affecting linguistic hindrances due to neurological disorder. Much is revealed by the figures alone, and what this article provides is visuals. Healthy and unhealthy brains alike react similarly to music, and both strive for such positive stimulus — singing in particular providing a multifaceted stimulant to the brain in an active fashion. This of course caused me to consider how exactly music effects the brain, and the unique stimulant of lyrical singing.

What is stated by Cuddy et al. in the article “Memory for Melodies and Lyrics in Alzheimer's Disease” (2012), is the differentiation between *musical semantic memory*, and *musical episodic memory*; the difference between acquired musical information over time, and the link towards specific musical events within one’s memory (Cuddy et al., 2012). This study is an experimental study as it takes into account a control group of participants, and conducts its study within an isolated and controlled environment — a sound chamber at Queen’s University (Cuddy, 2012). This experiment is closely modelled after laboratory conditions, and thus seeks to have the most closely monitored and manufactured study. The independent variables are the controlled participants — their respective ages, genres, as well as severity of AD diagnosis — the environment itself, and the selection of songs to be played (variously distorted lyrically, and melodically). The dependent variable is the ability to recognize the songs within the independent variables’ lens of distortion. The data was analyzed through multiple tests: the familiarity decision Test, Familiar Lyrics Test, Distorted Tunes Test, Distorted Lyrics Test, Lyrics Prompt Test, and Proverbs Completion Test. Nonparametric statistics were conducted for the analysis (Cuddy, 2012). Variability within groups were presented (demographic characteristics, and age and AD), and a comparison provided between the control groups. The results of the analysis were presented via grouped frequency distribution, as well as comparative histograms (bar graphs) (Cuddy, 2012).

What is presented is a solidification of previous research that melodic content retains within one’s memory — and musical cognition persists well into the moderate stages of dementia. However, the effects of dementia were present at various stages of all of the six tests; this proposes a continuous extraneous variable during the course of all tests, that cannot be anticipat-

ed, only recognized as it is the purpose of the test itself (Cuddy, 2012). The presentation of melodic and lyrical persistence works in spite of the hinderance of AD as a persistent extraneous variable. What is emphasized is that mild cases of Alzheimer's associated dementia may still retain musical semantic memory, and may retain new musical information as it is perceived. Thus, the misconception of Alzheimer's disease being eased through music's link with specific life events, is not entirely the case. The use of musical cognition retains semantic understanding, and may further be enhanced via an episodic link. This concept of musical semantic memory is further enhanced, when taking into consideration the importance of melody, and *lyrical* vocalization.

“Music-based memory enhancement in Alzheimer's Disease: Promise and limitations” by Simmons-Stern, Nicholas, Deason, Brandler, Frustace, O'Connor, Ally, and Budson (2012) took the variable of *lyrical* singing, and chose to modify the active therapeutic affect accordingly. To create this variable, hit songs were performed with lyrics, and via a spoken-word fashion — with cues or without cues as an additional contingency. This is an experimental study as it seeks to evoke optimal laboratory conditions. The participants of the VA Boston Healthcare System and Boston University School of Medicine took part in the 1.5 hour individually, without outside stimuli (Simmons-Stern et al., 2012). The independent variables were the participants (including age, gender, and diagnosis of AD), the four-line excerpts from eighty unfamiliar children's songs, and the separation of such songs between sung and spoken versions (Simmons-Stern et al., 2012). Two forms of analysis were performed for this study: the effect of encoding condition on content memory test results, and the recognition accuracy measure Pr (Simmons-Stern et al.,

2012). As well, these forms of analysis were performed both by grouping healthy participants and AD patients respectively, and by attributing the analysis to each result individually.

The results were presented via individual and group frequency distribution, a modular model of musical processing (presented in figure 1 as a flow chart), and as a comparative histogram (Simmons-Stern et al., 2012). What was found was that lyrical content less-often stimulated the short-term memory of the brain when performed without the melody; cues as well not being required (Simmons-Stern et al.). As well, songs about daily tasks, and day-to-day procedures, were improved within the memory when linked with a particular melody or rhythm: the musical stimulus of the brain helped to aid in the memory of the mundane. However, in musicological study, it is difficult to understand how the brain reacts to music, beyond the poetic and theoretical. For the purposes of this article, it will aid to visualize the brain through the lens of health sciences.

To answer the question “Why musical memory can be preserved in advanced Alzheimer’s disease” (2015) it helps immensely to visualize how the brain reacts to music - both with and without the degeneration of Alzheimer’s disease. The article by Jacobson, Stelzer, Fritz, Chételat, La Joie, and Turner provides MRI scans regarding multivariate pattern analysis regarding long-known versus recently heard/known songs, as well as biomarker-regions of the brain — both for regions of the brain affected by Alzheimer’s disease, as well as regions used when actively listening to music (Jacobson et al., 2015). The regions of the brain that are stimulated by music are numerous, and thus draw from different bio-centres. What this provides is visual representation of how the brain reacts to music, and why music cognition may remain present in a deteriorating mind. The early stages of Alzheimer’s disease “creep” as it were through certain bio-centres of

the brain, however they do not do so from the (generalized) edge of the brain: it does not encompass the brain all at once. Thus, musical cognition remains intact far into the latter stages of the disease, taking sanctuary in the unaffected bio-centres.

This visualization of bio-centres is also reflected in the musical-neurological analysis of Clark and Warren — “Music, memory and mechanisms in Alzheimer’s disease” (2015). What is revealed in this article is that the cognitive regions of the brain for analyzing music (and having such being “familiar”) is due to these regions being “bi-hemispherically distributed” (Clark & Warren, 2015). Thus, multiple regions of the brain are used to respond to music — despite potential (and notably localized) brain deterioration. As well, because of music’s connection to both semantic, and procedural memory, episodic content may deteriorate within the early stages of Alzheimer’s disease (Clark & Warren, 2015); but this will not immediately affect one’s musical cognition — or their aesthetic pleasure of music. Essentially, there are musical “safeguards” within the human brain that protect one’s cognition against the loss of memory. It becomes ingrained within one’s self similar to the understanding of signs, signals, and language.

A second study conducted by Cuddy, Sikka, and Vanstone (2015) further developed upon the previously discussed concept of musical semantic memory, by incorporating a visualization of the deterioration caused by Alzheimer’s disease (Cuddy et al., 2015), and a test furthering the discourse of lyrical versus melodic comprehension (Cuddy et al., 2015). This study is presented as a quasi-experimental research design, as it is presented as a MusEq questionnaire (Cuddy, 2015) — thus, it cannot account for one’s approach to answering, nor does the study itself disclose where or when this questionnaire had been completed. As well, tests were performed to induce Music-evoked autobiographical memories (MEAMs) (Cuddy, 2015) — thus crossing into

a qualitative realm (while still being tested quantifiably). This continuation of the previous study takes experimental liberties due to furthering the discourse that has been presented. The independent variables are the questionnaire, the musical excerpts played for the MEAMs and the control group of individuals (including their age, gender, and diagnosis of AD). The dependent variables are the respective answers to such questions determined by the previously mentioned independent variables. As already stated in question 1, there is exponential risk of extraneous variables, due to the nature of a questionnaire, and lack of information regarding the control environment.

The results of the tests were analyzed as mean averages, as well as a content analysis of the MEAMs — based off of a proposition by Schlagman “for involuntary memories recorded as diary entries” (Cuddy, 2015, p.228). The results were presented via group frequency distribution, and a modular model of musical processing (presented in figure 3 as a flow chart) (Cuddy, 2015, pp,228-229). The notion is presented that musical memories are separated from AD, and that they dwell in other cognitive domains along with semantic memory. The use of music is thus encouraged to facilitate and encourage positive communication (Cuddy, 2015). What was found was a more drastic gap between lyrical and melodic comprehension than I would’ve considered. First, the melodic impact of “famous melodies” was more significant and recognizable when considered a song (a sung “tune”) than when an instrumental piece; as well, lyrical prompts (lyrics without melodic content) are less familiar than when a distorted version of the same song is presented — a melodic performance than isn’t completely accurate to the song’s original melody (Cuddy et al., 2015).

After gaining visual access to the human brain, and the previously mentioned stimulus of music, Alzheimer’s disease itself has entered the primary discourse — and has been shown to

have a clear correlation with (primarily vocal) music. In order to question choral music as an appropriate therapeutic tool, we must understand the use of music therapeutically itself, and the varied schools of thought regarding this.

5. The Therapeutic Effects of Music:

5.1 Salubrious

Brad Richmond's "Singing is Strong Medicine" (1994) is one such advocator for the salubrious power of music, and how a particular mindset and being attuned to own's own performance may make a world of a difference. "Good singing requires good energy. Good ensemble singing reflects the cooperative focus of disparate energies" (Richmond, 1994, p.27). This concept of one's energy, and the desire for uniquely guided voices to work towards a common goal: this is a remarkably idealistic viewpoint regarding choral music. Interestingly enough, the concept of "energy" is one that choral vocalists understand well — and is often used in the context of describing timbre-blending and dynamic movement. Thus, Richmond (1994) reinforces both the "physical as well as spiritual rewards" through salubrious terminology (Richmond, 1994). Yet such concepts remain firmly rooted in the elements of music (albeit predominant in choral music), once one hermeneutically addresses the concepts of positive energy. This concept within the realm of music addresses our own connection, and our reaction during the process of music-making — something that Bogdan (2010) addresses in her own research.

“The Shimmer-Shiver Factor” by Deanne Bogdan (2010) takes upon itself the task of distancing musical spirituality from any sort of doctrine — and certainly further removes itself from religious connotation (as problematic as such rhetoric can be regarding sung music) (Bogdan, 2010). Her research is broken up into two parts: the *shimmer*, and *shiver* factors; the pedagogical considerations, and aesthetic experience of music — from creator and consumer perspectives (Bogdan, 2010). While there is difficulty in separating the aesthetic the aesthetic sensation of music from pedagogical/academic consideration and through listening (for enjoyment), what can be gleaned is that music creates an auditory impact regardless of context; it is not however autonomous. Music is not a being in of itself, and thus its impact is limited to the reaction of a particular social consumption: music is only as impactful as its given cultural relevance. In my given research regarding choral music, the aesthetic impact will only be as great as the repertoire’s connection to the choir members, the setting of performance, and the social interaction that governs the music-making. This would include the decisive construct of vocal pedagogy (as has been previously stated in the Vocal Music section): the empathetic consideration of Heisel (2015).

Heisel’s (2015) empathy within vocal performance contains salubrious thinking behind the pedagogical framework. An example of this is within the notion of imagination for character construction: “I posit that singers should be in the habit of developing empathy for the characters they embody; in this way, they can begin the process of humanizing the characters in an honest way. One way into this is through the imagination” (Heisel, 2015, p.107). Just as salubrious thinking cannot be specified, nor illustrated — as neurological science could — the imagination of the vocalist involves expending a type of energy, and to create a notion of thinking beyond their own. This imaginative thinking runs in parallel with Richmond’s concept of a disparate

group of energies working towards a singular piece of music. What could easily be a cacophony of sound brings about common energy, and thus music. As Bogdan (2010) would state the *shimmer* and *shiver* factors of aesthetic response cause a group of vocalists to strive for a similar reaction. The effect can be seen as positively contagious within a choir. The salubrious consideration neatly blends into the next view of thinking towards music's therapeutic capabilities: the philosophical or theoretical.

5.2 Philosophical / Theoretical

Daniels' thesis dissertation "A Study of the Role of Music in Mental Health" (1960) is an early attempt to understand the therapeutic consideration of music; and the understanding of mental health lacks in of itself. Nonetheless, the study provides insight into how this particular school of thought has evolved over time, and become a school of study in of itself. It must be addressed that Daniels (1960) uses a very generalized conception of mental illness, at a time when the solutions available were either asylums or invasive/controversial physical therapy — Alzheimer's disease and forms of dementia were ruled-off as commonplace senility, and the consequence of old age. Thus, music had been turned to as a healthy and practical alternative. The "practical approach" for musical therapy again is generalized, however provides documentation of social gratification: "... the participants have the satisfaction of contributing to a group effort. The feeling of taking part is very intense and is never absent in activities of this kind" (Daniels, 1960). Unlike salubrious consideration, philosophical/theoretical discourse considers music as a therapeutic tool from observation, and account of its health benefits in real-time. The hindrance in this study however, is the very fact that it is early-phase: as the discourse has changed regard-

ing both musical therapy and mental illness (of varied degrees), such has significantly dated this research. Thus, we must jump forward to contemporary philosophical criticism.

“The Music Making and Wellness Project” by Koga and Tims (2001) took the practicality of musical therapy “into the field” as it were, with application through the Flecher Music Centres of Clearwater Florida. While this study had been analyzed via music-making and socialization, the philosophical implications had not been addressed — and yet are remarkably simple. Koga and Tims (2001) study reveals music as a unique stimulant, than can become readily available for use as a therapeutic tool (economically, and spatially speaking). The incorporation of such doesn’t take away from the daily lives of the patients in question, but rather enhances a particular aspect that has always existed: the aesthetic consumption of music for pleasure: “His family and close friends were deeply affected by the fact that this man was able to participate in music and enjoy living through his strong spirit and love for music until the last days of his life” (Koga and Tims, 2001, p.19). Theoretically, music responds best as a therapeutic catalyst because it has often been previously present within one’s life, and it is the conscious effort of music-making that makes the most of this sensory experience.

5.3 Sociological

The social understanding of music therapeutically begins quite early in what may be considered pedagogical research for music. Edward Podolsky’s “Music and Mental Health” (1953) took note of music’s character outside of a performance context, and how it could be best served in the context of therapy and rehabilitation. Important to consider regarding this article is the early stage in which it was written — and the development of musical therapy since. This being

said, the self-fulfillment of musical performance, as well as the aesthetic pleasure of listening, is noted: “Those who participated in these performances were given an emotional outlet for their repressed feelings and at the same time were encouraged in an art of self-expression” (Podolsky, 1953, p.68). As well, the importance of music-making as a group process is noted and encouraged: “...group singing is important in any musical program, as patients who will not talk will frequently sing with a group” (Podolsky, 1953, p.69). There may be a lack of diversification provided, but the effect of music in a social setting still holds weight since this publication. What such acted as (in theoretical hindsight) is a spark, for the later investigation and interrogation of social-musical thought.

The article by Lancioni, O’reilly, Singh, Sigafos, Grumo, Pinto, Stasolla, Signorino, and Groeneweg — “Assessing the impact and social perception of self-regulated music stimulation with patients with Alzheimer’s disease” (2013) takes into account the differentiation between active and passive musical stimulation for Alzheimer’s patients. The importance of this study lies in whether the music-making process is unique due to immersion into music’s aesthetic process — in simple terms, does music offer Alzheimer’s disease patients the same health benefits when on “in the background” or not currently observable during ones day-to-day behaviour. Through the method of a qualitative survey, it was found that the patients were able to understand the “purpose”/“story” of the music when actively engaging with it, rather than passively absorbing the information: “Given the aforementioned considerations on the raters’ judgment, it seems highly relevant that they found the active stimulation condition preferable to the passive condition on all items of the social validation questionnaire” (Lancioni et al., 2013, pp.143-145). What this proves is that Alzheimer’s disease patients respond in both *episodic* and *semantic* memory

(Cuddy et al., 2012) when actively involved in the music presented. Thus, it may be gleaned that the process of communicating this narrative of information oneself better maintains this musical stimulus.

Salvador (2013) provides a different focus, but within the same discourse of sociological inclusion and learning. “Inclusion of People with Special Needs in Choral Settings: A Review of Applicable Research and Professional Literature” deals with the inclusivity of children with disabilities within musical ensembles — the difficulties and challenges, but as well the importance of musical-social immersion. When applied to those suffering from Alzheimer’s disease, a few concepts still ring true, including: appropriate placement, appropriate accommodations, and an open-minded teacher or ensemble leader (Salvador, 2013). These seemingly straightforward ideas dispel the notions of (foremost) considering repertoire or pedagogical considerations, in favour of reinforcing a positive environment. An inclusive environment provides what is necessary for all members to succeed — Pierce (2012) illustrating what can happen when the music-making environment becomes a necessity instead of an aesthetic pleasure. The following article by Harris and Caporella (2014) is a successful experiment through the lens of social-musical therapy — rather than say musical-social.

Previously stated in section two: “Choral Singing as a Catalyst for Positive Social Conditions: The Ideal Combination of Music-Making and Socialization”, the multigenerational ensemble of Harris and Caporella (2014) provided primarily the social situation in which Alzheimer's disease patients could flourish, and younger members to dispel any misconceptions that might exist regarding their fellow members.

The conceptual framework on which this study is based is inter-group contact theory. It was first proposed by Allport in his seminal work on the nature of prejudice. The main concepts of the theory are that contact between different groups under optimal conditions could reduce intergroup prejudice. (Harris & Caporella, 2014, p.271)

It is without saying that the purpose of choral music within therapeutic circumstances is to better the quality of life of the individuals present. Therefore, the social interactions and personal achievement via the aesthetic enjoyment of music-making provide the “healing” properties, and not the repertoire in of itself.

Crucial to the structure of the choir and social interaction, all choir members were treated as equals and called by their first names, regardless of the age difference. In addition, the setting of the tone for the choir was introduced during the first rehearsal; it was that of acceptance, being nonjudgmental, working as a team (“we are all in this together”), and having fun. Humorous ice-breaking techniques were used during the socialization period of the first rehearsal for everyone to get to know each other. (Harris & Caporella, 2014, p.273)

Due to the personal nature of the instruments being used (human voices), the emphasis on socialization techniques (rather than say pedagogical inquiry) is a necessity.

The study conducted by Fryling (2015) had been previously referenced due to the social factors intrinsic in choral music. To understand the therapeutic nature of music however, Fryling (2015) provides the focuses of social-musical understanding. Concepts of social connectedness, and peer understanding and group formation were previously investigated (in section two: “Choral Singing as a Catalyst for Positive Social Conditions: The Ideal Combination of Music-Making and Socialization”) but the social-musical lens must take into consideration the concept of extra-curricular interest, and through long-term practice, tradition (Fryling, 2015). Not only do choir members seek to provide their voices to a singular musical creation, but they do so to expend their effort to a common interest/goal — the creation of new episodic content to the memory. In the case of Alzheimer’s disease patients, the social context of a choir stimulates the seman-

tic understanding of music, but flourishes in the creation of new episodic connections for existing understanding: putting the vast and “protected” knowledge to use.

The understanding of the sociological use/process of music is the underpinning of a successful choral ensemble, regardless of its particular function or mission-statement. Due to this environment, the individuals that take part are thrust into a positive environment that encourages enjoyment, and the use of all skill available — resulting in self-fulfillment, and the elevation of one’s self-esteem.

6. Conclusion

The use of music for therapeutic purposes depends upon an exact knowledge of the musical elements, rhythm, harmony, melody, tone colour, dynamics, etc., and upon a full understanding of the ways in which these elements in their aggregate effect reaction upon the listener. (Daniels, p.43)

At the beginning of this literature review, two questions were posed to investigate the correlation between Alzheimer’s disease and choral music. First, how many musical elements within choral music are there that actively (and positively) affect and Alzheimer’s patient’s episodic memory, and how do they accomplish this during the course of a regular choir rehearsal? Second, does choral singing improve the quality of life of Alzheimer’s disease patients via the psychological effect of music alone, or is the positive social environment a significant factor? It has been revealed the different ways in which the brain process one’s musical cognition, and that there is a clear split between both the episodic and semantic memory. The human brain has been visualized neurologically, as well as through musical-intrigue. Most significantly, the social aspect of a choir often trumps the musical underpinnings in terms of both initial interest, and continuing impact on its members; in some ways, a choir represents a social club rather

than a musical ensemble — the musical quality being a positive byproduct of the group's purpose. Perhaps what makes a choir or vocal ensemble unique, is the camaraderie. The act of using the most personal and mimicked of instruments — the human voice — to create music larger than the individual. This, along with the lyrical and musical combination, have made choral music a perfect storm against the neurodegenerative effects of Alzheimer's disease.

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