

The Perceived Benefits of Participation in Community Drum Circles

Sean Cudd

St. Catherine University

A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Arts in Occupational Therapy

December 2020

Thesis Advisor: Kristine Haertl, Ph.D., OTR/L, FAOTA

Thesis Readers: Brenda Frie, EdD, OTR/L, CHT and Lisa Haverly, MA, OTR/L

St. Catherine University

Master of Arts in Occupational Therapy

Certification of Successful Thesis Defense

We, the undersigned, certify that

Sean Andrew Cudd

Has successfully defended the thesis titled

The Perceived Benefits of Participation in Community Drum Circles

Kristine Haertl, Ph.D., OTR/L, FAOTA

12/2/2020

Thesis Advisor: Kristine Haertl, Ph.D., OTR/L, FAOTA

Date

Brenda Frie, EdD, OTR/L, CHT

12/2/2020

Thesis Reader: Brenda Frie, EdD, OTR/L, CHT

Date

Lisa Haverly, MA, OTR/L

12/2/2020

Thesis Reader: Lisa Haverly, MA, OTR/L

Date

Certification of Approval for Final Copy of Thesis

I, the undersigned, approve the final copy of the thesis by

Sean Andrew Cudd

Kristine Haertl, Ph.D., OTR/L, FAOTA

12/13/2020 Thesis

Advisor: Kristine Haertl, Ph.D., OTR/L, FAOTA

Date

Dedication

To

My Wife

Children

Family

Mentors

Teachers

and

Past

Present

and

Future

Drummers

Acknowledgements

I am deeply grateful to my thesis advisor, Dr. Haertl, for her support and guidance during this process of learning about, planning, and implementing phenomenological research. Her mentorship allowed me to pursue this area of great and significant personal interest which resulted in such a meaningful learning experience during my time at St Catherine University. Because of Dr. Haertl I feel confident in my ability to transition into practice as well as contribute to additional research in the future. In addition, I have sincere gratitude to my thesis readers, Dr. Frie and Lisa Haverly, for their time, support, and expertise with my thesis.

I would also like to thank my wife and children for their support and patience allowing me the opportunity to pursue my dreams.

Abstract

The purpose of this study was to explore the perspectives of adults who participate in community drum circles. The act of striking a vibrating membrane or drum surface to produce a sound with a group of people comprises a drum circle. Drumming has been utilized for many different reasons for a large portion of human history. A phenomenological study was conducted to

examine perceived benefits of participation in a drum circle. Six participants from two different drum circles were interviewed and data was coded inductively and deductively. Interview questions gathered data related to participants' perception of the benefits and meaning of drum circle participation, social components, and how they were initially introduced to drumming. Findings related to interview questions were used to organize deductive findings. Further data analysis revealed the following inductive themes. Participants experienced many positive physiological and emotional responses in anticipation, during, and after participation in drum circles. Participants experienced an increased connectedness to the group and the present moment. Differences were revealed in participants' path to drum circle participation. Other differences include how the context of drumming influenced participant expectations. Despite differences, all participants were open to new learning and experiences, possessed a desire to share drumming with others, and experienced drumming as a valued and meaningful activity. The use of drumming in the context of drum circles may be useful as a therapeutic tool to promote, maintain, and restore engagement in meaningful occupations with beneficial outcomes related to physical and mental health.

Key words: drum circles, drumming, occupational therapy, occupational science, physical health, mental health, social participation

Table of Contents

Certification of approval.....	i
Dedication.....	ii

Acknowledgements.....	iii
Abstract.....	iv
Table of contents	v
Introduction.....	1
Literature Review.....	3
Drums.....	3
History of Drums.....	4
Rhythm.....	5
The Occupation of Drumming.....	8
Drum Circles.....	9
Drumming as Therapeutic Tool.....	1
Social Participation	4
Sensory Input	5
Entrainment and Synchronization.....	1
Entrainment and Movement	6
	2
	0

Potential Physiological Responses to Drumming	2
	1
Methods.....	2
	3
Purpose.....	2
	3
Recruitment.....	2
	3
Participants and Procedures.....	2
	4
Data Analysis.....	2
	5
Results.....	2
	7
Deductive Findings.....	2
	7
Introduction to Drumming	2
	7
The Perceived Benefits.....	2
	8
Social Aspects of Participating in Drum Circles.....	2
	9
The Meaning of Drumming.....	3
	1

Inductive Findings.....	3
	2
The Power of Participation.....	3
	2
Connectedness.....	3
	4
The Path to drumming	3
	7
Discussion.....	4
	0
Implications.....	4
	8
Limitations.....	5
	0
Suggestion for further Research.....	5
	0
Conclusion.....	5
	2
References	5
	4
Appendix A: Interview Guide Questions.....	7
	0
Appendix B: Phenomenology.....	7
	1

Appendix C: Electroencephalogram (EEG) Brainwave Frequency Bands	7 3
Appendix D: Recruitment Flyer.....	7 4
Appendix E: Information and Consent Form.....	7 5
Appendix F: Recruitment Script.....	7 8

The Perceived Benefits of Participation in Community Drum Circles

Introduction

The occupation of drumming, striking a membrane to create a sound from the resulting vibration, has been utilized throughout much of recorded human history from antiquity to modern times (Dean, 2012; Kunda, 1979; Redmond, 1997). Variations of drums are and have been utilized within most cultures worldwide (Kunda, 1979; Mason, 1974). Drums have been used for many purposes, including spiritual ceremonies, celebrations, communication, recreation, to support dance and music, and as a form of employment (Amegago, 2014; Dean, 2012; Waring, 2007). Current use of drumming occurs as an individual or group activity in private and community environments (Hull, 1998; Kalani, 2004; Núñez, 2016). Drums can be used in drum circles in combination with other percussion instruments or to accompany other musical instruments (Hull,

1998; Kalani, 2004). Drumming includes benefits to physical and mental health in the form of stress reduction, social interaction, physical activity, and learning or expanding upon musical skills (Amegago, 2014; Friedman, 2000; Kalani, 2004).

This qualitative research study seeks to explore the perspectives of adults who participate in community drum circles. After receiving IRB approval in June of 2019, six interviews were conducted in August of 2019, and January and March of 2020 with individuals from two different drum circles. A phenomenological approach was utilized to gather and analyze data, and to explore and gain a better understanding of the reasons for drum circle participation and participants' perception of benefits related to their participation in community drum circles.

The following literature review will examine the factors involved in the occupation of drumming by exploring origins and types of drums and rhythms as well as how drums are used in drum circles. Processes involving sensory input, entrainment, and the regulation of the autonomic nervous system will also be explored to understand the potential beneficial effect of participating in the act of drumming with others and how identifiable changes equate with participants' perspective and perception of the occupation of drumming. The methods section will further describe the purpose, population, and procedures involved in data collection and analysis. The results section will include the outcomes of the deductive and inductive analysis. The discussion will examine how the identified themes and findings fit with the information identified in the literature review as well as identifying any areas related to drumming not previously examined. The discussion will also expound upon the implications of findings for occupational therapy, limitations, and future research. The knowledge gained from this study will increase our understanding of the occupation of drumming as a meaningful activity.

Literature Review

Drums

The drum is the predominant instrument played at drum circles and is a member of the percussion family of musical instruments. Percussion instruments are musical instruments that produce sound by striking, shaking, or scraping the playing surface (Percussion instruments, n.d.). According to Merriam-Webster (n.d.), a drum is defined as an instrument, “consisting of a hollow shell or cylinder with a drumhead stretched over one or both ends that is beaten with the hands or with some implement...” (Entry 1 of 3). Drums are categorized as membranophones, which are a division of musical instruments that produces sound as a result of a vibrating stretched membrane (Amegago, 2014; Kunda, 1979; Lotha, Lewis, Young, Gorlinski, & Ray, 2017).

Depending on the style, drums are played with a combination of one or two hands, one drumstick and one hand, or one or two drumsticks also referred to as mallets or beaters (Dean, 2012; Kunda, 1979). Drumsticks are made of wood, bone, antler, or synthetic material with optional brushes, cloth, or hide attached to the striking end to influence the sound produced (Mason, 1974). The drumhead is a membrane consisting of animal rawhide, wood, metal, or synthetic material, which produces a vibration resulting in the sound of the drum (Dean, 2012; Mason, 1979). The drumhead is stretched across a resonance chamber constructed of wood, clay, or metal (Kunda, 1979; Drum, n.d.; Kalani, 2004; Lotha et al., 2017). The resonance chamber’s

primary role is to resonate with the vibration of the drumhead (Kunda, 1979; The structure of the drum, n.d.; Waring, 2007). The type of materials used and the amount of tension placed upon the drumhead influences the sound which ranges from high tones (small diameter, thinner drum head material, shorter depth of the resonance chamber, and/or greater tension) to low tones (larger diameter, thicker drumhead material, longer depth of the resonance chamber, and/or lower tension), (Kunda, 1979; The structure of the drum, n.d.).

The shape of the resonance chamber can be used to understand the broad classification of drum types. A drum with a drumhead wider than the height of its resonance chamber is categorized as a frame drum, and examples would include drums used by shamans throughout the world (Dean, 2012; Kunda, 1979; Waring, 2007). In comparison, a resonance chamber that is longer than the width of the drumhead is categorized within the tubular (barrel or goblet shape) family of drums, and examples include African djembes and congas (Amegago, 2014; Durojaye, 2017; Lotha et al., 2017). The third type of drums are kettle or pot shaped drums that originate from Asia and Europe and developed into the modern timpani (Kunda, 1979; Waring, 2007).

History of Drums

There exists no remaining record of the first drums produced or the origins of the use of rhythm by early humans. Drums created from animal hide and wood are not easily preserved, although speculation based upon cave paintings dating between 11,000-17,000 years ago depict dancers accompanied by musical instruments (Dean, 2012; Kunda, 1979; Nett, 1956; Redmond, 1997). From this image, anthropologists suggest that some form of early percussion instrument accompanied this depiction of music and dance (Dean, 2012; Waring, 1974). Another example of early African music and dance is found in Algerian rock paintings dating between 6000 to

4000 BCE (Dean, 2012). Examples of the presence of drums have been documented in Egypt from 4000 BCE and in Sumer and Mesopotamian from 3000 BCE (giant frame drums and small cylindrical drums) (Kunda, 1979; Lotha et al., 2017; Nett, 1956; Redmond, 1997). The presence of early drums has been recorded throughout Africa, Asia, Europe, North America, and South America (Kunda, 1979; Lotha et al., 2017; Nett, 1956). There is speculation that the rituals of early religions evolved around the frame drum (Kunda, 1979; Redmond, 1997). Origins of frame drums are based on the spread of Islamic culture throughout the Middle East and Europe, and by a secondary source as frame drums were spread by shamans as they migrated through Central Asia into Arctic regions and eventually into North and South America (Dean, 2012; Kunda, 1979; Lotha et al., 2017; Redmond, 1997).

Rhythm

The purpose of drumming is to produce a sound which is then repeated in a sequence or series to create a rhythm. Merriam-Webster defines rhythm as “an ordered recurrent alternation of strong and weak elements in the flow of sound and silence...” (Rhythm, n.d., entry 1). Rhythms are composed of the sound produced by the drum, referred to as a beat, movement, or pulse and the accompanying periods of silence between the beats referred to as rests (Crossley-Holland, 2017; Nett, 1956). Rhythms are created by varying the sequence and length of the beats and rests, and the speed of the rhythm called the tempo (Crossley-Holland, 2017; Nett, 1956). Drum rhythms support music and dance by maintaining a steady beat (Dean, 2012; Lotha et al., 2017).

The word rhythm is derived from the Greek terms, *rheîn*, meaning to flow, and *rhythmos*, meaning any regular recurring motion (Rhythm History, n.d.). The use of rhythm and instrumental music that Fitch (2006) describes as, “the use of the limbs or other body parts to

produce structured, communicative, sound, possibly using additional objects,” (p. 183) is rarely observed outside of human behavior. Examples of the exception can be observed in the non-tonal percussion of woodpeckers (Fitch 2006). There is speculation that the use of purposeful rhythm among early humans may have developed out of other examples of rhythm behavior observed in our nearest relatives, chimpanzees, bonobos, and gorillas (Arcadi & Mugurusi, 2004; Merker, Madison, & Eckerdal, 2009; Schaller, 1963). During displays of aggression and play, gorillas drum on their bodies and other objects (Schaller, 1963). Chimpanzees drum on the buttresses of trees and other resonate structures as a display of dominance, and during an occasional group frenzy called “carnival display” or “carnival calling” in response to locating ripe fruit trees, or when two separated subgroups are reunited (Arcadi & Mugurusi, 2004; Merker, Madison, & Eckerdal, 2009). Speculation suggests that the synchronization of a common beat served the purpose of amplifying and broadcasting sound to more distant areas, possibly attracting females from neighboring groups and as a potential warning or defense call against rival males (Merker, 1999). Despite these examples, humans are the only species capable of synchronizing complex rhythm patterns as group behavior during singing, drumming, and dancing (Brown & Jordania, 2013; Fitch, 2006; Kirschner & Tomasello, 2009). This unique behavior of synchronizing complex rhythm patterns as a group emerges early in childhood and is present across all cultures (Brown & Jordania, 2013; Fitch, 2006; Kirschner & Tomasello, 2009). The ability to engage in music-making group activities forms and strengthens social bonds and may be the basis for human’s ability to organize socially by increasing cooperation and reducing tension (Dunbar, Kaskatis, MacDonald, & Barra, 2012; Janata & Grafton, 2003; Phillips-Silver & Keller, 2012).

Endogenous rhythms are present in many forms among humans, from biological rhythms to coordinated motor movements that can be viewed as inherently rhythmic (Will & Turow, 2011). Within the human body, naturally occurring rhythms serve many purposes by assisting in maintaining homeostasis and the balance, release, or secretion of neurotransmitters and hormones (Bittman, Stevens, & Bruhn, 2017; Jones, 1976; Will & Turow, 2011). Rhythms are present in the electrical activity of the brain in the form of brainwaves (See Appendix C for Electroencephalogram (EEG) Brainwave Frequency Bands).

Other internal rhythms are produced by central pattern generators (Marder & Bucher, 2001). Central pattern generators are neuronal circuits that produce rhythmic movement when activated, and examples include heartbeat, respiration, and ambulation (Jones, 1976; Marder & Bucher, 2001; Whelan, 2009; Will & Turow, 2011). Other endogenous rhythms include gross and fine motor movements, eye blinking, and menstrual cycles (Jones, 1976; Will & Turow, 2011). Rhythm is an integral component in the production of speech (Merker, Madison, & Eckerdal, 2009). Other rhythms have a slower tempo and coincide with the rotation of the earth and moon within the external environment, which are manifested as circadian rhythms in sleep-wake cycles (NIGMS, 2017).

In the external environment, music and rhythm have been used as forms of communication between distant regions, in religious ceremonies, rites of passage, courtship, battle, and as a means to support social bonding (Amegago, 2014; Dean, 2012; the secret language of drumming, 2018). In addition to the preceding, Amegago (2014) identifies the following uses of rhythm within African culture; storytelling and preserving history, politics, festivals, healing/therapeutic functions, and to support dance and music. An important use of rhythm and drumming is as a

means for social integration and social bonding by bringing people together to participate in community activities (Amegago, 2014; Dunbar, Kaskatis, MacDonald, & Barra, 2012).

The Occupation of Drumming

From the context of the Occupational Therapy Practice Framework, drumming can fit within seven of the eight areas of occupation, and as an intervention approach to establish, to restore, to maintain skills, or as a modified activity (AOTA, 2017). Occupations are defined as, “various kinds of life activities in which individuals, groups, or population engage, including activities of daily living (ADLs), instrumental activities of daily living (IADLs), rest and sleep, education, work, play, leisure, and social participation” (AOTA, 2017, p. S19). Instrumental activities of daily living support daily life and take place within the home or the community and include activities such as health management and maintenance, and religious and spiritual activities and expression (AOTA, 2017; Ochoa, 2013; Ochoa, n.d.). As an instrumental activity of daily living (IADL), drum circle participation can be used as a health management and maintenance occupation as part of a routine to support self-regulation and as a coping tool, or as a form of exercise to improve strength, coordination, activity tolerance, and motor planning (Ochoa, 2013; Ochoa, n.d.). Drumming can also be used during religious or spiritual expression which the AOTA also classifies as a subcategory under IADLs (AOTA, 2017; Winkelman, 2003). Drumming can be used as a calming tool to support meditation or mindfulness activities to support health management or as a tool to use during sleep preparation, which would include drumming under the area of occupation of sleep and rest (AOTA, 2017; Ragg, Soulliere, & Turner, 2019).

Drumming occurs within the occupation of education in K-12 and community education settings. Drumming can be an occupation of work when employed as a performer, a teacher, a drum circle facilitator, a drum manufacturer, a salesman, or a therapist (Burns, 1986). Retirement preparation and adjustment can include drumming when transitioning from a career to a leisure occupation (AOTA, 2017). In a study by Creech, Hallam, Mcqueen, and Varvarigou (2013), active music-making was, “found to provide a source of enhanced social cohesion, enjoyment, personal development, and empowerment, and to contribute to recovery from depression and maintenance of personal well-being throughout these latter stages of adult life” (p. 87). Drumming can occur as a leisure occupation, but more importantly, drumming can provide a rare opportunity for adults to be able to engage in the occupation of play outside of childhood (Leeuwen, & Westwood, 2008). Finally, drumming can occur within the occupation of socialization when completed with friends, family, and community members or as a part of a drum circle.

Drum Circles

A drum circle can take many forms, but it is essentially a social gathering of individuals sitting in a circle who are all playing some type of drum or percussion instrument (Clare, 2008; Kalani, 2004). Types of drums present can vary greatly, ranging from tubular-shaped drums to frame drums (Claire, 2008; Hull, 1998; Kalani, 2004). Drum circles provide opportunities to gather in a community or private setting to share in the experience of music-making with others. Because most drums are easily transported, drumming occurs indoors and outdoors (Hull, 1998; Kalani, 2004). There are several formats and variations in the types of drum circles (Hull, 1998; Kalani, 2004). Drum circles are categorized as recreational drum circles or health promotion drum circles (Kalani, 2004; Núñez, 2016). The level of structure can also range from a set structure of rhythms to no expectations or order seen in freestyle drum circles (Hull, 1998; Kalani, 2004;

Núñez, 2016). There also exists a great deal of variation in experience levels as well as the reasons for participating in each type of drum circle (Hull, 1998; Kalani, 2004; Núñez, 2016)

Recreational drum circles can be further broken down into subgroups, including recreational community, educational, training and development, and culture-specific (Hull, 1998; Kalani, 2004, Núñez, 2016). Expected benefits from participating in recreational community drum circles include opportunities for socialization, an outlet for creativity and music-making, opportunities for music-making for people who would not otherwise play an instrument, and as a setting for spiritual practice and growth (Kalani, 2004). Educational drum circles occur within learning environments and provide students opportunities to participate at their level of ability while supporting confidence through positive experiences (Kalani, 2004). Teachers act as coaches allowing alternative ways to interact with and support student learning. Training and development drum circles occur within professional settings as team building opportunities to strengthen relationships, illustrate the benefits of diversity, and improve cooperation (Bittman, Stevens, & Bruhn, 2017; Kalani, 2004). Culture-specific drums circles explore traditions handed down for generations from teacher to student in the form of rhythms (Hull, 1998). Typically, culture-specific drum circles consist of a chorus of tuned drums playing specific parts and, in some cases, an accompanying dance (Hull, 1998). Some African examples include djembe and djun-djun drumming from West Africa, Congolese drumming, and stick drumming from the Ewe culture of Ghana (Amegago, 2014; Hull, 1998). Another culturally specific type of drumming from the Caribbean area includes Haitian drumming and Calypso drumming from the Trinidad/Tobago Islands (Hull, 1998). Recreational drum circles vary in the amount of structure and leadership provided. Educational and culture-specific drums circles have a guided structure and leadership, while freestyle drum circles, in contrast, have very little structure. Rules within

freestyle drum circles are limited to; there is no leader, and everyone is free to play the rhythm of their choice (Hull, 1998).

Health promotion drum circles can be further broken down into subcategories, including health and wellness, therapeutic, and ceremonial/medicinal drum circles (Kalani, 2004, Núñez, 2016). Health and wellness drum circles are used to promote healthy physical activity and socialization (Kalani, 2004). Health and wellness drum circles provide supportive environments for expression, opportunities for communication without words, and are supportive of physical, emotional, and mental health (Kalani, 2004). Drum circles as a therapeutic intervention are used by occupational, physical, music, and speech therapists to address physical and mental health goals including quality of movement, strength, range of motion, endurance, coordination, coping skills, calming, arousal, attention, impulse control, planning, organization, speech production, and social skills (Carolan, 2016; Cottrell & Gallant, 2003; Ekins & Owens, 2018; Plastow et al., 2018).

Ceremonial or medicinal drum circles are based upon spiritual traditions to create altered states of consciousness in which participants seek to gain expanded awareness, restoration of balance, and communication with spirits (Jovanov & Maxfield, 2011; Núñez, 2016).

Ceremonial/medicinal drum circles are facilitated by an experienced leader who provides specific structure based upon the unique participants using a combination of different rhythms, plants, songs, stories, and symbolism (Núñez, 2016). Examples of ceremonial/ medicinal drumming have been used by the Yoruba people of Nigeria (Orisha), the Aztecs of Mexico, and the Congolese people in their Zebola ceremony (James, 2018; Nachimuthu, Bhuvaneshwari, & Mahendran, 2006; Núñez, 2016; Vinesett, Price, & Wilson, 2015). Despite the differences in

types of drum circles, the many different expected benefits from participation in the act of drumming provide a physically and mentally interactive and stimulating experience.

Drumming as a Therapeutic Tool

In addition to drumming being used within drum circles for recreation or health promotion purposes, drumming is often utilized as a therapeutic tool. The benefits of drumming on physical and physiological health, as well as the psychoneuroimmunological effects, have been the subject of several studies. Drumming is an effective form of physical exercise. Ekins and Owens (2018) examined the physical benefits of drumming using the Drums Alive Intervention and documented “cognitive, physical, and behavioral improvements for the majority of participants” (p. 23). Drumming has been documented to improve cardiovascular health, muscular strength, endurance, respiration rates, and reduce blood pressure and cortisol levels, support improved immunity and overall physical wellbeing (Smith, Viljoen, & McGeachie, 2014; Ekins & Owens, 2018; Fancourt, Ockelford, & Belavia, 2014; Fancourt et al., 2016). Drumming has been used to reduce the neurological symptoms resulting from Parkinson’s disease (Carolan, 2016). After participating in four drumming sessions, participants reported a decrease in tremors and improved upper body coordination (Carolan, 2016). Participants also reported enjoying participation in a group of people having fun and “not a group of people with an illness” (Carolan, 2016, p.182). Other physiological benefits include when Fancourt et al. (2016) recorded shifts “away from a pro-inflammatory towards an anti-inflammatory immune profile,” (p. 1) in response to 10 weeks of group drumming for participants. Dunbar, Kaskatis,

MacDonald, and Barra (2012) recorded an increase of endorphin release and an increase in positive affect for participants in response to singing, dancing, and drumming.

Drumming has been used within various settings including acute and long-term care mental health, older adults, children with disabilities, and within correctional facilities (Cottrell & Gallant, 2003; Faulkner, Ivery, Wood, & Donovan, 2010; Litchke and Bracken, 2018; Long, Linette, & Manosalvas, 2018; Martin, Wood, Tasker, & Coletsis, 2014; Plastow et al., 2018; Whiton, 2018). Within mental health practice, drumming has been used to reduce symptoms of anxiety, depression, and PTSD (Bensimon, Amir, & Wolf, 2008; Deraney et al., 2017; Fancourt et al., 2016; Ragg, Soulliere, & Turner, 2019). Drumming has also been used with individuals with drug and alcohol addiction to promote relaxation and improve emotional intelligence to support emotional regulation and enhance coping strategies (Hill, Hains, & Ricketts, 2017; Mikenas, 1999; Winkelman, 2003). By using drumming as a culturally based activity for Native Americans in the treatment of substance abuse, traditional beliefs and shamanistic ideas have been used to successfully support the recovery process (Dickerson, 2014; Winkelman, 2003).

Litchke and Bracken (2018) used drumming with children with autism to promote creative self-expression and opportunities for emotional regulation. van Rensburg et al. (2016) used drumming interventions with adolescent girls with conduct disorder. Their findings suggest group drumming can be successful at reducing aggression (van Rensburg et al., 2016). Wood, Ivery, Donovan, and Lambin (2013), during ten weekly sessions, used the Drumbeat program and recorded increased self-esteem and decreased reported behavior incidents with at-risk adolescents. Group drumming provides youth a safe environment for the development of skills such as sharing, listening, problem-solving, and accepting diversity to support emotional and social competencies (Kalani, 2004).

Occupational therapy interventions using drumming as a meaningful occupation to increase participants' quality of life have been used in settings ranging from inpatient to outpatient (Cottrell & Gallant, 2003; Müllersdorf & Ivarsson, 2012; Plastow et al., 2018). Drumming, as an occupational therapy intervention, has been used with individuals with mood disorders. In a study conducted by Plastow et al. (2018), individuals with anxiety and depression reported benefitting the most from group drumming interventions out of a sample group of individuals with mood disorders. Another occupational therapy intervention study called "The Elder Drum Project" was completed by Cottrell and Gallant (2003). In the Elder Drum Project, participants engaged in purposeful activities such as singing, drumming, drum making, and creative arts in a group setting, and results indicated a positive impact on participants' quality of life (Cottrell & Gallant, 2003). Current research has demonstrated the many beneficial outcomes related to utilizing group drumming as a therapeutic tool and with closer examination of the individual components of drumming and resulting effects, the influences of participation in group drumming can be more thoroughly understood.

Social Participation

The first apparent component to drum circles is that participants are playing with other people and not in isolation. Drum circles provide positive opportunities for social participation and have been found to be supportive of emotional health and self-regulation (Fancourt et al., 2016; Jacobson, 2019; Wood, Ivery, Donovan, & Lambin, 2013). Group drumming supports improved group participation partially due to findings that suggest group members are less self-absorbed, more receptive, experience improved affect and pleasure, and are more focused on the present moment during and after participation in group drumming (Ivanov, Kvasovets, Ushakov, & Bubeev, 2013; Winkelman, 2013). Other benefits of group drumming include increased social

openness, and interpersonal competence among group members (Fancourt et al., 2016; Winkelman, 2013). Kokal, Engel, Kirschner, and Keysers (2011) recorded increased prosocial behavior from participants after engaging in in-synchrony repetitive drumming. Improved interpersonal outcomes develop out of group members adjusting their drumming to integrate with the other group members (Endedijk et al., 2015; Kokal, Engel, Kirschner, & Keysers, 2011). Group drumming as a form of social participation has been used as a therapeutic intervention to increase self-esteem, for team building, and developing leadership skills (Mikenas, 2003; Friedman, 2000).

The Polyvagal Theory developed by Dr. Stephen Porges is useful in understanding how the previous examples of group drumming are supportive of emotional health and self-regulation (Porges, 2011). The Polyvagal Theory examines how the autonomic nervous system is regulated by the vagus nerve and that social interaction when viewed as occurring within a safe context is supportive of autonomic nervous system regulation and decreased fight, fright, flight behaviors and responses (Porges, 2011). Group drumming provides opportunities for individuals to come together and engage in social participation within a safe space to support increased vagal tone and autonomic nervous system regulation (Jacobson, 2019; Porges, 2011). The Polyvagal Theory has supported the use of drumming and rhythm by clinicians to effectively reduce stress and tension as well as fight, fright, flight responses by improving communication between the body and the brain (Geller, 2018; Gray, 2018). The benefits of group drumming result from more than just the act of playing a drum, but as indicated from the previous examples, from the opportunity for social participation.

Sensory Input

The next most noticeable component of drum circles is the sensory experience related to participation. The effect of drumming on the senses may initially appear to be a predominantly auditory experience, but when considered under a closer lens, drumming is a multi-sensory experience (Ayres & Robbins, 2005; Bundy, Lane, & Murray, 2002; Núñez, 2016). Many forms of sensory input are reaching sensory receptors as sound waves stimulate receptors within the inner ear (Breedlove & Watson, 2017; Petralia & Wenthold, 2009). The nearby vestibular processing receptors are stimulated by the sounds entering the ears, especially the low frequencies (Breedlove & Watson, 2017; Bundy, Lane, & Murray, 2002; Welgampola, Rosengren, Halmagyi, & Colebatch, 2003). As the drummer strikes the surface of the drum, proprioceptive and tactile input is being transmitted from the hand striking the drum, or from the input received from the hand grasping the drumstick to corresponding brain regions (Ayres & Robbins, 2005; Breedlove & Watson, 2017). Proprioceptive input is also generated by the compression of the joints, and the lengthening and shortening of the muscles of the arms and upper body as the drumhead is contacted (Ayres & Robbins, 2005; Breedlove & Watson, 2017; Chang et al., 2009). Depending on the type of drum, the body is also receiving proprioceptive input from the body parts that are stabilizing the drum, for example, the non-dominant hand holding the bottom rim or handle of a frame drum, or as the participant's legs adduct around a tubular-shaped drum (Ayres & Robbins, 2005). Stimulated touch receptors transmit tactile input to the brain as sound waves pass over the entire body (Amegago, 2014; Breedlove & Watson, 2017; Dean, 2012). The physiological outcomes related to the sensory input experienced during drumming will be included later in this literature review.

Entrainment and Synchronization

Less noticeable components of drum circle participation occur in the form of entrainment processes that are initiated by the related movement and sensory input of playing a drum. Rhythmic sensory input can facilitate entrainment of sensorimotor movements and brain wave frequencies (David, Kilner, & Friston, 2006). The principle of entrainment was initially discovered by the Dutch physicist Christian Huygens when he observed pendulum clocks mounted on the same wall, becoming synchronized to each other (Thaut, McIntosh, & Hoemberg, 2015). The process of entrainment involves two objects moving with different amounts of energy (Norris, 2018). As the two objects move, they begin transferring energy between each other until the difference in the amount of energy is decreased to zero, and each object is moving in synchrony with the other (Thaut, McIntosh, & Hoemberg, 2015). Typically, the object moving with the least amount of force or frequency is drawn into synchrony with the stronger oscillator (Thaut, McIntosh, & Hoemberg, 2015). If both objects are moving with somewhat similar amounts of energy, the faster object will slow as the slower object speeds up (Thaut, McIntosh, & Hoemberg, 2015). Several studies related to entrainment within humans in the mid-1900s demonstrated an external visual stimulus of flashing lights evoking electroencephalogram (EEG) rhythms similar to stimulus frequency in a process referred to as the photic driving response (Adrian & Matthews, 1934; Walter, 1953; Will & Turow, 2011). Namerow, Sclabassi, and Enns (1974) recorded entrainment to repetitive tactile stimuli in humans. The preceding studies demonstrate examples of entrainment within humans to different forms of sensory stimuli.

The entrainment process can be understood within human behavior and physiology by returning to the previous discussion of how drumming activates all the senses through exposure to sound wave vibrations and movements required to position and play a drum. The process of

entrainment occurs during drumming as sensory stimuli activate afferent neurons and interact with body tissues (Shier, Butler, & Lewis, 2013). The firing pattern of neurons is controlled by either internal structurally induced activation or sensory input from the external environment (Buzsaki, 2006; David, Kilner, & Friston, 2006; Ross & Balasubramaniam, 2014). The external stimulus involved in auditory entrainment associated with drumming is in the form of the rhythmic relationship between the peaks and valleys of the soundwaves (Norris, 2018). Water is a great conduit for sound waves (Nunez, 2016). The human body and brain are inherently susceptible to sound vibrations being composed of approximately 75 percent water (Forbes, 1953; Nunez, 2016). Examples of sound wave facilitated entrainment have been documented in the increased synchronization of the cerebral hemispheres, although the underlying mechanisms are not completely understood at this time (Friedman, 2000; Neher, 1962; Nunez, 2106; Tierney & Kraus, 2015).

Current knowledge related to the benefit of drumming is related to the process of rhythmic sensory input producing similar vibrations to brainwave frequencies (theta and alpha) linked with cognition and perception (Chen et al., 2012; Strong, 1995 & 2015). Theta frequency activity is usually associated with periods just before waking or sleeping, including drowsy, near unconscious states, and during meditation (Buzsaki, 2006; Jovanov & Maxfield, 2011). Alpha frequency activity is associated with states of increased relaxation, calm, alert, and supportive of learning as well as an increased focus on the present moment (Buzsaki, 2006; Jovanov & Maxfield, 2011). In the study conducted by Choi et al., entrainment to alpha waves indicated profound improvements in executive functioning, controlling and regulating emotions, and the reduction of symptoms related to depression (Choi et al., 2011).

The effect of rhythmic drumming on the entrainment of brainwaves towards increased alpha and theta brainwave frequencies results in outcomes related to stress reduction and increased calm (Amegago, 2014; Friedman, 2000; James, 2018; Jovanov & Maxfield, 2011). An example of entrainment was recorded in results from Maxfield's (1990) study titled *Effects of repetitive rhythmic music on EEG and subjective experience* (Jovanov & Maxfield, 2011). Findings from this study indicate the correlation between drumbeats (beats per second BPS) and temporary changes in brainwave frequencies "provided the drumming patterns are sustained for at least 13-15 minutes" (Jovanov & Maxfield, 2011, p. 42). Within this study, researchers measured participants' EEG changes and responses to three types of drumming: shamanic drumming (4-4.5 BPS), I Ching drumming (3-4 BPS), and free drumming (no sustained patterns) (Jovanov & Maxfield, 2011). The first group, shamanic drumming, produced the greatest change in theta and alpha brainwave frequencies (Jovanov & Maxfield, 2011). The second group, I Ching drumming, produced less significant changes in brainwaves while the third group, free drumming, produced no significant changes in brainwaves (Jovanov & Maxfield, 2011). It is important to note that participants listened to tape recordings of the different types of drumming within a module with eyes closed to reduce additional sensory input. Because participants did not actually engage in the act of drumming, most of the proprioceptive input and aerobic exercise involved in playing drums was absent during this study. Despite the lack of sensory input, the findings are significant because the shamanic drumming which occurred at 4-4.5 beats per second (BPS) had the greatest influence on shifts toward theta. This is worth noting because theta brainwave frequencies are from 4-8 hz and the shamanic drumming which occurred within the frequency of the theta range demonstrated that the speed of the rhythm potentially entrained the brain wave frequencies to the speed of the drumming (Jovanov & Maxfield, 2011).

Other examples of the utilization of rhythm and entrainment of brainwave frequencies to rhythm include Rogers (1981) study which confirmed by an EEG study that entrainment to alpha frequency auditory stimulation in participant groups who listened to a complex rhythm. Groups that listened to a Mozart symphony and repetitive rhythm in the form of chanting experienced increased entrainment to alpha frequency while groups that were exposed to silence or white noise did not experience shifts toward alpha brainwave frequencies (Rogers, 1981). An additional study by Friedman (2000) also reported increased feelings of wellbeing and euphoria associated with increases in alpha brainwaves resulting from participation in drumming. Examples of entrainment are present among the spiritual practices of the previously mentioned Orisha and in the Vedic traditions in the form of rhythmic chanting and mantras (Amegago, 2014; James, 2018). In addition, Strong (1995 & 2015), using auditory entrainment in his Rhythmic Entrainment Intervention program (REI), used the speed of drumming rhythms to entrain neural activity of listeners to alpha and theta ranges to support increased calm and attention, improved sleep, and improved sensory processing in cases of individuals with anxiety, ADHD, and autism. The importance of the previous examples demonstrates the influence of external rhythms on shifting brainwaves to promote states of increased relaxation associated with brainwave frequencies.

Entrainment and Movement

In addition to the sensory input of group drumming influencing neural activity and the neurochemistry of the brain, rhythmic entrainment influences mechanisms for timekeeping and motor ability (Norris, 2018). As previously discussed, entrainment is possible with any sensory modality, including auditory, visual, tactile, or vestibular, but entrainment to sound is more precise and accurate (Ross & Balasubramaniam, 2014). The auditory and motor systems have

many connections at cortical, subcortical, and spinal levels and provide a rationale for the connection between rhythm, an auditory stimulus, and a motor response such as drumming, dancing, or foot tapping (Norris, 2018; Thaut & Abiru, 2010). Due to the relationship between the auditory and motor systems, rhythmic interventions have been used to produce a functional change in motor abilities of individuals who have experienced a stroke, Parkinson's disease, and traumatic brain injuries (Thaut & Abiru, 2010). An example of this auditory sensorimotor response is referred to as beat induction and occurs in the form of motor responses exhibited as foot tapping or head bobbing to a rhythm (Norris, 2018; Will, & Turow, 2011). Patel (2006) suggested that the mechanism of beat induction is also involved in speech production. Beat induction occurs as a combination of being able to "find the beat" (bottom-up process) and "feel the beat" (top-down process) (Bouwer, & Honing, 2012; Norris, 2018). These two processes allow for the perception of the external sensory information of the rhythm (finding) and the internal processes involved in long term memory, working memory, and pattern recognition to anticipate, predict, or feel the beat (Bouwer & Honing, 2012). Kirschner and Tomaselli (2009) found in a study that children as young as preschool were able to synchronize their movements to an external acoustic beat.

Potential Physiological Responses to Drumming

In addition to initiating forms of entrainment, group drumming is also involved in other physiological changes in the body. Changes in the availability of neurotransmitters and hormonal levels as a result of participating in group drumming influence participants' state of arousal (Bittman et al., 2001; Kirschbaum & Hellhammer, 1989; Cruess, Antoni, Kumar, & Schneiderman, 2000). Physiological responses occur due to changes in hemispheric synchronization, which enhances the feeling of wellbeing by stimulating the release of serotonin

and decreasing cortisol levels (Bittman et al., 2001; Núñez, 2016). Gingras, Pohler, and Fitch (2014) documented a similar reduction in cortisol levels after participants listened to repetitive drumming and instrumental music. Increases in cortisol levels are directly related to the human body's stress response related to physical, psychological, and emotional stress (Kirschbaum & Hellhammer, 1989). Reduction in cortisol levels is associated with increased relaxation states and an overall improvement in mood (Cruess, Antoni, Kumar, & Schneiderman, 2000). In addition, as the pleasure reward center of the brain is stimulated during drumming, dopamine is released, promoting an increased sense of wellbeing (Elkins & Owens, 2018; Diamond, Krech, & Rosenzweig, 1964; Shier, Butler, & Lewis, 2013).

As previously discussed, participation in drumming creates a multi-sensory experience for participants and this exposure to sensory input is involved in the physiological changes discussed in the previous section. The beneficial outcomes related to tactile and proprioceptive input have been recorded in several studies to decrease cortisol levels, improve immune functioning, and increase serotonin and dopamine levels (Field et al., 1997; Field, Hernandez-Reif, Diego, Schanberg, & Kuhn, 2005; Hernandez-Reif, Dieter, & Field, 1998; Hernandez-Reif et al., 2004). Changes in serotonin and dopamine levels resulting from proprioceptive input include improvement in mood and decreased symptoms of anxiety and depression (Field et al., 1997). Two studies completed by Bittman et al. (2001) and Bittman et al. (2004) also indicate improved immune functioning, improved mood, and stress reduction after participating in group drumming.

Within the reviewed literature, there was a greater focus on the use of drumming as a therapeutic tool to support areas related to physical and mental health (Smith, Viljoen, & McGeachie, 2014; Elkins & Owens, 2018; Fancourt, Ockelford, & Belavia, 2014; Fancourt et al., 2016). There is a

need to increase our knowledge of what drumming is to the participants who choose to engage in this occupation. Individual narrative perspectives of the occupation of drumming will contribute to this discussion and the potential use of this occupation as a health promotion and maintenance tool as well as an opportunity to engage in play, leisure, education, work, and social participation.

Methods

Purpose

The purpose of this study was to explore the perspectives of adults who participate in community drum circles. The student researcher had previously utilized drumming as an intervention in practice as a certified occupational therapist assistant and was interested in more thoroughly exploring the occupation of drumming by examining participants' perspectives, perceptions, and their reasons for choosing to participate in community drum circles. The student researcher was also interested in conducting a more in-depth examination of the literature related to the potential benefits of drumming and community engagement in order to examine how identified benefits of drumming compared to participants' perceptions of drumming.

This study used a phenomenological, interview-based approach to explore the primary research question: What are the perceived benefits of drumming for adults who participate in community drum circles? Additional sub-questions examined: (a) how do participants get introduced to drumming, (b) what is the perceived meaning of drumming for the participant, (c) what are the

social aspects of participating in a drum circle, and (d) what are other important factors related to drumming not already discussed (See Appendix A).

Recruitment

The student researcher distributed recruitment flyers (See Appendix D) and consent forms (See Appendix E) at the completion of the drum circle to participants at two locations (Hudson, WI in January 2020 and St. Croix Falls, WI in August 2019) and read a script describing the research study (See Appendix F). In addition, the recruitment flyer was posted on a Facebook page associated with one of the drum circles. Interested individuals contacted the student researcher through email. Consent form information was reviewed and discussed, and interviewees were provided with an opportunity to address any questions or concerns. Upon signing consent forms interview dates were scheduled.

Participants and Procedures

In June 2019, the Institutional Review Board (IRB) reviewed and approved this study. This study utilized a phenomenological research approach (See Appendix B). To be eligible, participants were required to meet the following inclusion criteria: (a) 18+ year old adults, and (b) must have participated in 3-4 drum circles in the past year. Exclusion criteria included individuals less than 18 years old, participation in less than 3 drum circles in the previous year, or non-vulnerable adults (any individuals with a guardian or conservator). Participant selection was based on a convenience sample of individuals willing to participate in an interview. IRB approved data collection from five to seven individuals. Actual sample size was six and interviews were conducted in August 2019, and January and March 2020. Interviews lasted between 20 minutes to 45 minutes, and were audio recorded. Three interviews were conducted

in a semiprivate conference room in two different public libraries and the remaining three interviews were conducted in a conference room within the building where one of the drum circles was held. Four women and two men participated. All participants were of European American ancestry. Ages of participants ranged from middle age to older adults. Four individuals were retired. Three individuals had completed college degrees. One participant was located through the Facebook posting and the other participants were recruited after the distribution of flyers at the end of the two different drum circles. A seventh interview was scheduled but cancelled due to precautions related to the COVID-19 pandemic.

There was no cost and facilitators received no compensation for their time or use of drums at both drum circles from which participants were recruited. There were slight differences in the formats and structure of the two drum circles included in this study. The first drum circle I will refer to as drum circle A. Drum circle A can be defined as a recreational community drum circle with specific leadership and structure that included occasional instruction in culture specific rhythms and lasted approximately 2.5 hours. Drums played at this drum circle are predominantly tubular shaped drums (djembes). There was repetition and expansion of rhythm from one session to the next, and participants were aware of the core rhythms they would experience during each session. The second drum circle, which I will refer to as drum circle B, can be categorized as a combination of a recreational community drum circle and a health and wellness drum circle and lasted about 45 minutes. Drums played at this drum circle were predominantly frame drums. The routine of the second drum circle included group introductions and rhythm sharing, exposure to healing sound, and participation in a 25-minute unstructured freestyle drumming session. This drum circle was concluded by all participants joining to play a unity

drum. Three participants from the first drum circle and three participants from the second drum circle participated in this study.

Data Analysis

The interviews were transcribed verbatim by this researcher. Each transcription was compared to the master document and analyzed multiple times. Inductive and deductive analyses were used to analyze the data. Deductive analysis seeks to aid in the confirmation of generalized findings by framing the analysis of the specific data with previously established constructs (Patton, 2002). Deductive analysis was used to initially color-code the data according to the previously listed sub-question constructs. The data corresponding to the primary sub-questions were compiled into one master copy of data for each question. Inductive analysis seeks to identify conceptualized patterns through the evaluation of the specific pieces of data (Patton, 2002). Inductively, each transcription was read multiple times by the faculty advisor and the student researcher. By gathering detailed descriptions of participant experiences in the real-world contexts, this study seeks to convey a sense of the “lived experience” of the research participants in relation to drum circles (Price et al., 2017). Major themes were identified from within the data and inductive codes were formulated independently by the student researcher and faculty advisor. Then the study utilized investigator triangulation by identifying similar thematic inductive codes to conceptualize common patterns. Results of this study are presented in the following section.

Results

The results were analyzed both deductively and inductively. Deductive analysis was used to directly answer the research questions. The inductive section reviewed the general themes that were discovered through the analysis and are supported by descriptions of participant responses and direct quotes.

Deductive Findings

Introduction to Drumming

Participants' initial experiences with drumming varied greatly, but most participants had some type of influential initial experience with drumming. Two participants were exposed to drumming in childhood and played in multiple bands during adolescence and young adulthood. One of these individuals was influenced by a performance he observed. He stated, "*I watched as (individual's name) played the snare drum and the grace by which he moved his hands and got a result. He instantly became my mentor...*" The other participant discussed how he was exposed to drumming through lessons provided by a family member and stated, "*Now, I did not realize at that point, that I had started down a path that I was still going to be on... you know... 55 years later.*" Both individuals went on to have careers in other fields but returned to drumming in retirement by becoming participants and facilitators of drum circles.

Another participant was a music educator. She had exposure to and had experience with many instruments during her career and continuing education, but it was not until retirement that she attended a local drum circle. Two other participants also initially experienced drumming through adult learning opportunities. One participant learned about the benefits of drumming while attending a workshop on shamanism which complimented and fit well with many of her other interests. She then proceeded to utilize drumming during practice as a healthcare professional as

well as becoming a participant and facilitator of drum circles. The other participant initially experienced drumming while working at a grief and trauma group. She described her initial experience as, “... *it felt like it almost got brighter in there as the vibration lifted. I don't know it just... I remember thinking... wow... this is something... really something.*” Another participant reported always feeling drawn to drumming throughout her life, but after attending an outdoor performance with the opportunity to trial the drums began regularly attending drum circles. The participants' initial experiences with drumming and drum circles led to their engagement in drum circles as participants and facilitators.

The Perceived Benefits for Adults Participating in Community Drum Circles

The participants engaged in community drum circles because they enjoy both the act of playing drums and the social interaction involved in drum circle participation. All participants reported many positive outcomes from attending drum circles. Participants reported emotional responses including feeling excited, satisfied, gratitude, and peaceful in anticipation, during, and after participating in drum circles. This sentiment was expressed by one participant who stated, “... *it makes me so happy and joyful.*” Many participants also noted that participation in community drum circles was an opportunity for fun. All participants broke into laughter at some point during the interview process while discussing drum circle participation and their related experience.

Some participants noted they enjoyed opportunities to learn to play instruments and rhythms to improve their coordination and musical skills. In addition, most participants reported enjoyment from learning about the historical and cultural backgrounds as well as the application of the rhythms. One participant with a career in music, who was used to having to lead music related

activities, looked forward to not being the facilitator and engaging in drum circles as “*an equal participant.*”

Drum circle participants reported feeling calm and more focused. Others reported that drumming made them feel less stressed and worried. One participant reported, “*I think what I get out of drumming is (a) stress reduction coping mechanism.*” This participant went on to elaborate on how he uses rhythms to tap out beats with his fingers during stressful periods of his life outside of drum circles. Another participant reported that drumming benefits our overall health by reducing stress chemistry and supporting us “*... on a physical level, emotional level, and spiritual level.*”

Participants reported a range of responses from being more aware or present in the moment to being in the “*zone*” or being more drawn into their “*own little world.*” This experience was reported by some participants as deepening their sense of a spiritual connection as well as deepening their connection to the group. Feeling more connected to the present moment during drumming promoted positive social participation. The social aspects of drum circles will be examined more in-depth in the following section of the deductive analysis.

Social Aspects of Drum Circle Participation

All participants reported that the atmosphere of community drum circles supports positive social interaction. The predictable routines allowed participants to know what to expect and added to the feeling of a safe space to gather with others “*where you know you are not going to be criticized if you can't play something...*” Another participant described drum circles as a “*welcoming setting*” and appreciated that the groups were intergenerational with the ability to adapt to the skill level of the participants.

Participants reported through participation they “*feel a sense of community,*” which is created by the friendly accepting atmosphere and their ability to engage in meaningful activity with other individuals. Drum circles bring people together and one participant reported enjoying meeting new people, getting to know them, and then looking forward to seeing the same participants at future drum circles. In addition to meeting new people, participants were also eager to share the experience of drum circles with family and friends. All participants reported either telling or bringing family and friends with them to drum circles or facilitating drum circles to be able to share the experience with others.

Participants noted that drum circles allowed participation through non-verbal communication making the experience more enjoyable. Another participant noted

What it is to me now is it is just enough socialization... I am more of a hermit than a socializer. I would much rather stay home or close to home than travel or be in public, but there is some need for that socialization. And this is to me, it is a very safe way of doing it.

Another participant commented that drum circles are a comfortable sized group and noted “*It seems that I tend toward smaller groups.*” Despite some participants occasionally feeling introverted, they reported drum circles create a comfortable environment and that they typically preferred to play drums with others. The individuals with music experience reported some individual drumming outside of drum circles but reported playing drums predominately with others while other participants did not play drums by themselves.

The Meaning of Drumming

The specific meaning of drumming for each individual was slightly different for the participants. The two individuals with drumming experience viewed drumming as a way of gaining social acceptance among peers. One participant noted, "... *drumming has opened a lot of doors for me.*" Both participants considered the occupation of drumming to be part of their identity and meaningful life activity. One participant viewed drumming as a tactile experience that allows for an "*immediate response*" and "*immediate outcome.*" Drumming was viewed as a developed skill that involves the physical act of producing sound through coordinated and planned movements. One participant described that with practice and patience the skill of drumming can be mastered, but also needs to be maintained. One participant reported a felt sense of accomplishment when mastery of an idea or challenging rhythm was achieved. The other participant discussed how he was in a way trying to recreate that first experience when he observed someone drumming.

The other participants not identifying as drummers also viewed drum circles as meaningful. These individuals viewed drumming as one of many leisure activities that they participated in within their daily lives. These individuals felt that drumming was something that could be enjoyed without a lot of prior knowledge or skill. Participants attended drum circles, because participation is inexpensive, and drumming is a simple and portable activity. Some participants noted that drumming created a special moment in which participants felt more focused either internally within themselves or externally on their environment. Others felt a greater spiritual connection as noted by one participant who said, "*But for me it is more of a spiritual thing for*

me. Yeah, definitely more spiritual.” Several participants felt that participation in drum circles was supportive of their physiological and emotional health.

To all participants drumming was an occupation that in some form actively challenged their minds and bodies. Some viewed drumming as a good way to stay productive while connecting with others. Drumming to several participants was a way to include novelty in their lives to support health and prevent cognitive decline during retirement. Drumming provided opportunities for participants to combine multiple interests while learning about music, rhythms, cultures, religion, shamanism, and mythology. In addition, drumming allowed individuals the opportunity to try to recreate that special moment that was either observed or felt when first participating in or witnessing drumming.

Inductive Findings

The student researcher and the faculty advisor analyzed the data for inductive themes. Cross checks of coding and interpretation were conducted to assure accuracy. Through inductive analysis and investigator triangulation, the following themes related to drum circle participation were identified. The findings contribute to our understanding of the perceived benefits of the occupation of drumming and relate to the research questions.

The Power of Participation

Drum circle participants reported major benefits of drumming being a combination of physical, physiological, and emotional responses. Some participants engaged in drumming to stay active and maintain or increase strength and coordination. Many participants reflected on the sensory experience of drumming and how their bodies experienced the vibrations produced. One

participant noted, *“I just like how my body feels and I love the sound. I like the deep sound better.”* Another participant stated, *“I just felt it all the way through... every part of my being.”* Some participants commented on experiencing improved group synchronization to each other and the rhythms and how the *“lower sound frequencies make us want to move our bodies.”* Other participants felt that drumming supported health by setting the body up for *“optimal functioning”* through improving self-regulation and attention with an increased feeling of calm. One participant commented on health-related benefits of drumming discussing physiological changes in the form of decreased stress chemistry resulting in improved blood pressure while many participants disclosed that they had little knowledge of specific health benefits related to drum circle participation.

Regardless of participants' awareness of the physiological influences drumming has on the human body, all participants reported drumming was supportive of mental health and resulted in positive emotional responses. All participants engaged in drumming to either maintain or to influence their current emotional state. Terms used to describe the emotional responses of participants include *“you just feel warm and happy,”* love, joyful, and relaxed. The positive emotional response to drumming of one participant has been observed by others and she revealed, *“When I talk about it (drumming) people can just tell that I get happy.”* Other participants reported improved self-regulation and feeling increased calm and decreased stress and worry during drumming. Several other participants reported feeling satisfied, accomplished, accepted, peaceful, and *“incredible gratitude.”* One participant reported experiencing improved *“insight and intuition.”* Other participants discussed how drumming could influence their current emotional state by providing a coping mechanism. One participant noted, *“... at the end of a week on a Friday after a long week of work and stress, it (in reference to drum circle*

participation) *is a release of many things.*” Another participant reported his experience in which he would, “... *go in the basement where it’s cool on an August day and beat your frustrations away.*” In addition, responses noted by all participants included an increased feeling of connectedness which has been separated into a separate theme and will be discussed in the following section.

Connectedness

Drum circle participants reported experiencing several forms of connectedness or the feeling of being connected to either the community and others, the present moment, a spiritual experience, or past cultures, rhythms, and drummers. A commonality of participants was how the atmosphere of the drum circle created the perception of a “*safe space*” to interact with others. Factors involved in drum circles that support this safe space include the circular shape and predictable routines which allow participants knowledge of what to expect from the experience. Participants reported feeling accepted and included without fear of being criticized or being exposed to a competitive environment. Some participants reported initially feeling nervous about attending drum circles, but their concerns quickly dissipated upon participation. Participants identifying as being more introverted reported that drum circles provided a comfortable amount of social interaction. Other participants felt that the safe space within drum circles was created by the relative simplicity of the act of drumming and that “*it is just people gathering.*” Some participants felt that the inclusiveness of drum circles which allowed for participation despite background, experience, or age allowed for the creation of a comfortable atmosphere.

Because of this comfortable space, participants reported feeling welcomed and a sense of belonging to a group and community where they could meet people to establish and maintain

friendships. All participants reported social benefits as a reason motivating participation in drum circles, although there were different levels of awareness and self-reflection of this benefit. One participant discussed the feeling that there is a decreased sense of community in our culture and that drumming can help restore our connection by supporting physiological responses that result in feeling more calm which allows *“you to connect more with somebody other than yourself.”* Another participant reported observing drum circle participation connecting the group while working with youth. She reported a lack of interest in planned activities before drumming and how through drumming *“it pulled everyone together and we were this unified group to the beat.”* One participant described that she loved *“... how we get our drums together”* and felt the experience connected participants similar to *“a big beautiful spider web.”* Participants experienced an increased connection and sense of trust among the group after drumming together. Despite drumming being an activity that can be completed as a solitary activity, all participants reported drumming more with others.

Another observation of the participants related to increased connectedness with the group and community was expressed through participants' desire to share the experience of drumming with others. All of the participants made attempts and plans to share drumming with others. One participant reported, *“... see I keep bringing people in because it is almost like you are so excited about it you can't wait to share it with other people.”* Three participants were themselves drum circle facilitators which demonstrates their desire to share the drumming experience. Other participants who initially attended drum circles by themselves later returned with family and friends. Many participants utilized or discussed plans to share and organize drum circle experiences with their coworkers and clients across many different settings.

In addition to feeling more connected to the group, drum circle participants reported feeling more connected to the present moment. Participants' experience of the present moment varied between an increased internal to external awareness of the present moment. One participant described the increased connectedness of drumming as a type of mindfulness. Another described the experience of drumming as being more *“focused on the here and now in the moment.”* Another participant stated, *“you get kind of lost.”* She revealed that she was a *“constant planner”* and that drumming allowed her to be present while at the same time disconnecting from everyday worry and her *“to do list.”* One participant described the loss of worry during drumming in the following statement, *“Hang the consequences, like when you are there in the moment it doesn't matter... (or) anything else.”* Other participants described their experience as *“And there are those moments when you drift into a very small world,”* and *“... even though I'm with people it is more... it is hard to explain. Sometimes I feel like I'm kind of in my own little world,”* demonstrating increased internal awareness during the moment of drumming. Another participant discussed how awareness of the present moment, in turn, set participants up for improved social interaction in the following statement.

... one of the reasons that I think that happens is drumming really grounds you and opens your heart. And in this crazy chaotic world, I feel like it has the ability to center people, ground them with who they are, and then allow them to be present for each other in a different way.

As participants experienced an increased connectedness to the present moment, there were differences in their perception of drumming as a spiritual experience. Half of the participants either did not discuss a spiritual connection during their drumming experience or reported that drumming held no spiritual component or connection. While for others, drum circle participation

was viewed as a spiritual activity. Participants reported the use of drumming to “*set an intention*” and as a form of prayer or worship. One participant reported the belief that a spiritual experience was possible during drumming regardless of religious background. Another participant stated that the primary benefit she received from drumming was a spiritual experience. She described her experience as “... *the vibration just comes all the way through you and then it just releases the stress and tension and just replaces it with a good vibration... almost spiritual healing. It is powerful.*” Several participants also discussed how rhythm created connections with past cultures and drummers. The increased connectedness experienced during drum circle participation was experienced by all participants.

The Path to Drumming

Despite the differences in participants, individuals chose to attend and participate in adult community drum circles. Repeated attendance provides some indication that participants valued the experience of drumming with others and beneficial outcomes from participation. Motivation to participate in community drum circles varied between participants but was dependent upon how participants perceived these experiences.

The path that led participants to drum circle participation was in many cases influenced by some type of initial experience with drumming. One participant witnessed a drummer performing while in his youth and linked this performance to his motivation to learn to play drums. He commented, “*And it was worth pounding on the drum to get some fragment of that... flashback to that moment when I saw somebody drum.*” Other participants initially experienced drumming through participation in a drum circle. One participant remembered her initial experience with watching and then participating in a drum circle by stating, “*And at the end if you wanted to you*

could go up and sit in this half circle on the grass in your chair and grab a drum and play along with them. It was so amazing.” Another participant described feeling the vibrations of the drums as “*powerful.*” Other influential experiences related to drumming exposure through family members and continuing education opportunities.

Of the participants with either drumming or music experience, drum circle participation allowed for a meaningful leisure activity to connect to past interests. Drum circle participation allowed two participants with experience playing in bands a slightly different format to engage in the occupation of drumming during retirement. One individual stated,

And I went to a drum circle with the hand drums and found out that a great deal of what I had learned on the trap set and the snare drum was transferrable. It is just drumming. I'm not drumming country-western or rock and roll. I'm just drumming, and drumming was common to all those things.

Drum circles allowed this participant the opportunity to recapture participation in a meaningful activity from his past. The other individual quit playing in bands because he lost the enjoyment when playing music for his audiences that he did not like and that was not challenging. Learning about African hand drumming and experiencing drum circles allowed this participant to receive satisfaction once again from drumming but now in a different context. Drum circle participation allowed participants to reconnect to or supplement previous experiences while receiving the same benefits and enjoyment.

Although both of the previously mentioned individuals possessed multiple decades of drumming experience, they both discussed how through this familiar activity they could benefit from new experiences such as playing new rhythms by continuing to learn and challenge their minds and

bodies. Of the participants without drumming experience before attending drum circles, a similar commonality of openness to new experience was also observed. One participant noted that drum circles were one of many small groups she frequently attended and expressed an openness to new experience when she stated, *“I’m always looking. I love community ed and lifelong learning, so I’m continually doing that sort of thing.”* Another participant commented when asked why she attends drum circles, *“You know I just wanted to open myself up to new experiences.”* Regardless of experience related to the technical skills of drumming, all participants were open to new experiences and learning.

The drumming experience for participants new to drumming in adulthood expressed deeper levels of self-reflection of the benefits involved in drumming beyond the physical act of playing a drum. This difference can be observed between the difference in genders. Participants choosing to begin drumming as adults seemed more open to sharing outcomes related to their emotional experience during drumming and reported that their own personal drumming experience resulted in the positive responses and increased connectedness discussed during the previous two themes. Next, the discussion section will synthesize the results of this study with the literature.

Discussion

The research questions allowed for an exploration of participants' perceptions and experiences related to drumming. The participants in this study experienced many positive outcomes and responses as a result of participating in community drum circles including emotional and physiological responses and positive social interaction in which participants experienced an increased connection to the present moment and the group. Several layers of overlap were revealed through comparison of the deductive and inductive findings. The literature review was congruent with many of the topics discussed by participants but did not examine the spiritual components of drumming or how the concept of flow relates to drumming. For this reason, additional literature was examined to explore these two concepts. The following discussion will review the findings related to the research questions and compare them with existing literature.

Drum circle participation was viewed as a meaningful life activity for all study participants. Participants' use of drumming fits within several areas of occupation included in the Occupational Therapy Practice Framework (AOTA, 2020). Participants in this study all used drum circle participation as a leisure occupation and as an occupation for social participation. Several participants engaged in the occupation of drumming as a retirement activity and all the facilitators engaged in drumming as a volunteer activity. The Occupational Therapy Practice Framework: Domain and Process 4th edition (AOTA, 2020), which was not available when the literature review for this study was completed, now includes an additional occupation, Health Management. In the previous edition occupations involved in managing and maintaining health were included under instrumental activities of daily living (IADLs) (AOTA, 2017). According to the new edition of the OT Practice Framework, engaging in drumming as a health promotion tool

would no longer be considered an IADL (AOTA, 2020). The participants who engaged in drumming to support health and wellness and as a spiritual activity were engaging in the occupation of health management. No participants reported using drumming personally as an occupation to prepare for sleep or rest despite the calming influence noted by participants during and after drumming. One participant did report observing improvements in sleep and transition to bedtime when utilizing drumming with youth participants. In addition, drumming was not the primary employment of any of the participants although one individual was involved in the sale of drums. Drum circle participation met the criteria of several major life occupations (AOTA, 2020).

Returning to the information identified in the literature review corroborates several of the benefits of drumming reported by participants. Possible explanations for the positive responses experienced by participants can be understood by considering the interaction and influence of sensory input, exercise, and social interaction within a safe environment on human physiology. Proprioceptive, tactile, and auditory input experienced during drum circle participation initiates the release of neurotransmitters that influence emotional and physiological states. It can be assumed that some of the positive outcomes experienced by participants are the result of the release of endorphins recorded by Dunbar, Kaskatis, MacDonald, and Barra (2012) in response to singing, dancing, and drumming. Sensory input also initiates processes involved in entrainment to the sound of the rhythms and the movement required to produce the rhythms which was noted by one participant who commented how the experience of the deep sounds made her want to move her body. Another participant described his observation of entrainment in the following statement.

There is a lot to the altruism, trusting others you drum with you tend to entrain with them, synchronize with them and it's very evident that (interviewee 1) and I can have a drum circle and we won't play anything and people will start beating out rhythms. It doesn't take long before everybody is playing the same rhythm and it is nothing that we have introduced, but if we just sit back. It is pretty cool.

The sensory initiated changes in physiology and entrainment increase the participant's sense of overall comfort and connection during social interaction. Several studies corroborate the positive social interaction in which individuals experienced a decrease in self-absorbed behaviors and an increase in positive emotions and awareness of the present moment (Ivanov et. al., 2013; Fancourt et. al., 2016; Winkelman, 2003). In addition, participants' perception of the drum circle as a safe environment for social interaction allows for autonomic nervous system regulation described by Porges (2011) in *The Polyvagal Theory* which further supports positive emotion and increased feelings of calm. Porges suggests drumming as an example of a safe social activity to support improved vagal tone (Jacobson, 2019). When the preceding factors occur simultaneously, physiological changes occur in brainwave frequencies, neurotransmitters, and hormone levels. Despite participants' awareness of the physiological influence of drumming and the connection to positive responses experienced, changes in the body can be observed. As participants experienced increased joy, happiness, gratitude, satisfaction, excitement, and calm, they were more prepared to successfully engage in group activity with others. As a result of drumming, participants experienced enjoyment, perceived drum circles as a meaningful activity to engage with others and chose to repeat the experience by attending additional drum circles.

As discussed in the connectedness section of the inductive analysis, individuals not only experienced an increased connection to the group, but also experienced an increased connection

to the present moment. There were slight differences in the way participants experienced and described the moment of drumming. While some participants described the moment of drumming as the absence of worry or concerns for future plans, others equated the moment to a more spiritual experience. This experience may also be due to physiological changes in the body experienced during drum circle participation. Similar to findings from Maxfield's (1990) study which demonstrated shifts toward theta and alpha brainwave frequencies with 13-15 minutes of repetitive drumming, participants experienced changes in brainwave frequencies during drumming (Jovanov & Maxfield, 2011). Theta frequency activity is associated with periods just before waking or sleeping and during meditation, and alpha frequency activity is associated with states of increased relaxation, calm, alert, and an increased focus on the present moment (Buzsaki, 2006; Jovanov & Maxfield, 2011). If participants in the study did experience shifts in brainwave frequencies towards alpha or theta frequencies, this may explain positive emotional responses as well as the increased focus on the present moment.

Gingras, Pohler, and Fitch, (2014) recorded similar reductions in salivary cortisol level following 15 minutes exposure to repetitive drumming and meditation. If drumming and meditation result in similar effects on the body, this may be one explanation for how drumming is perceived as a spiritual experience. In addition, several articles not identified by the literature review were examined to further explore spiritual experiences. Sudsuang, Chentanez, and Veluvan, (1991) recorded similar indications of the calming effects on human physiology of individuals after Buddhist meditation with decreases in cortisol, blood pressure, and pulse rate. In addition, several studies have recorded changes in brain activity and cortisol levels with engagement in spiritual practice which further provides a link between drumming and spiritual experiences (Newberg, 2014; Sooksawat, Janwantanakul, Tencomnao, & Pensri, 2013). As noted in the

historical review, drumming has been utilized in many spiritual practices (Amegago, 2014; James, 2018). The similar changes in physiology in response to drumming and spiritual practice may be why drumming is perceived as a spiritual experience and why drumming has been incorporated into many spiritual practices around the world (Kunda, 1979; Redmond, 1997).

The Theory of Optimal Experience developed by Csikszentmihalyi and Csikszentmihalyi (1988) was also reviewed after data collection to explore how the participant's experience during drumming relates to the central concept of this theory, flow. Csikszentmihalyi and Nakamura (2018) describe the flow experience as

... the feeling of deep absorption in an activity when it is going well: of feeling that one is concentrating fully, yet effortlessly. Attention and action are unified; things lying outside of the interaction fade from awareness. Awareness of time, and of oneself, also fades away. There is a felt sense of being able to respond effectively to what is arising within the inter-action (104-105).

Flow can occur during the following example activities: sports, skiing, games, reading, playing music, dancing, or while at work (Csikszentmihalyi & Nakamura. 2018). Additional components of flow include losing one's self in the experience, a merging of action and awareness, a distortion of time, a sense of control, and an absence of anxiety (Brown, 2011; Csikszentmihalyi, 1997). The following participant statements reflect components of flow; being in the "zone," *"you get kind of lost," "you drift into a very small world... I'm kind of in my own little world,"* and I feel more *"focused on the here and now in the moment."* Other participants described the absence of worry during drumming by stating, *"I can get away from my to do list,"* and *"I don't think when you are drumming you can be worried."* Wilcock (1998)

described the state of consciousness during flow as when an individual is so engaged in the activity that nothing else matters. A similar statement was made by one of the participants who stated, “*Hang the consequences, like when you are there in the moment it doesn't matter... (or) anything else.*”

Other important components of flow include a match between the demands of the activity and the participants' abilities. If the activity demands are too high, there will be too much concentration on performance and flow will not occur, but if the activity demands are too low individuals will potentially go into autopilot losing conscious attention and flow will also fail to occur (Csikszentmihalyi, 1997; Csikszentmihalyi & Nakamura, 2018). Several participants commented on the facilitators' ability to grade and adapt the rhythms to match the activity demands to the participants' abilities in order to present conditions that support opportunities to experience flow. Despite years of experience and ability levels, several of the participants challenged themselves to play more complex rhythms to increase the activity demands of drumming thereby supporting opportunities to experience flow for even the more experienced drummers. Other factors present in drum circles that support flow included concentrating fully in the activity, having clearly defined goals or expectations, and receiving immediate feedback (Csikszentmihalyi & Nakamura, 2018). Participants commented on enjoying the predictability of drum circles while one participant even commented, “*I like doing things with my hands that have an immediate outcome... with the drums you get an immediate response to what you just did.*” Despite whether participants experienced flow, drum circle participation was intrinsically motivating, and a key component of their experience was an increased connection to the group and the present moment.

Other similarities noted among participants include that all participants had some type of initial experience with drumming that had an influential effect on their future behaviors. Initial experiences with drumming involved watching someone play a drum, actually playing a drum, or being mentored. Because of positive initial experiences individuals possessed a desire to repeat or expand on the drumming experience. All the participants expressed a desire or openness to new experiences and learning opportunities. Because participants experienced positive outcomes related to their participation in drum circles, they all expressed a desire to share the experience of drumming with other people by becoming drum circle facilitators or inviting along friends and family members. In addition, all participants, including self-identified introverts and extroverts, engaged in drum circles as a form of social participation. A final similarity was observed in the demographics of the two groups. Both drum circles were composed of a greater portion of females than males and age ranges of middle to older adults.

Several differences were noted among the drum circle participants and between the two drum circles. Participants that attended drum circle A all possessed either many years of music or drumming experience and were employed in a music related profession at some point in their life before attending drum circles. Participants at drum circle B all initially began drumming in the context of drum circles. Drum circle A was a recreational community drum circle with specific leadership and structure that included occasional instruction in culture specific rhythms and lasted approximately 2.5 hours (Hull, 1998; Kalani, 2004). There was repetition and expansion of rhythm from one session to the next, and participants were aware of the core rhythms they would experience during each session. Drum circle A possessed a more organized structure than drum circle B. Drum circle B was a combination of a recreational community drum circle and a health and wellness drum circle and lasted about 45 minutes (Hull, 1998; Kalani, 2004). Drums

played at drum circle B were predominantly frame drums. The routine of drum circle B included group introductions and rhythm sharing, exposure to healing sound, and participation in a 25-minute unstructured freestyle drumming session. Drum circle B was concluded by all participants joining to play a unity drum. Both drum circle A and B were conducted with chairs positioned in a circle. During drum circle A, participants remained seated because they played large heavy tubular shaped drums. Because participants at drum circle B played frame drums which were more portable, lighter, and held with one hand, they were allowed more freedom of movement during drumming. Participants frequently left their seats to move around the rooms to interact and blend their rhythms as they connected on more intimate terms with the other seated and standing participants.

Possible reasons for differences may be related to the specific facilitators' backgrounds. Drum circle A was facilitated by two individuals who began playing the drums as adolescents and possessed many years of experience and developed drum playing skills while playing in bands. Drum circle B was facilitated by an individual with a background in shamanism and energetic healing. The types of drums also supported the structure of the two drum circles. The frame drums at drum circle B were played with one stick and allowed repetitive patterns created by drum tone, hitting the edge, and rests. Drum circle A consisted of tubular shaped drums, mostly djembes and were played with two hands. Djembes produce three different sounding tones and allow for more complex patterns which possibly also influenced the increased organization and structure of drum circle A.

Another major difference among the participants was the influence of the specific drum circle context on perception, expectation, and the perceived benefits of drum circle participation. These differences may have also been related to the different facilitator backgrounds in the form of

different beliefs and intentions related to drum circles. All of the participants at drum circle B felt that drum circle participation involved a spiritual component. The participants at drum circle A either did not discuss drumming as a spiritual experience or stated they possessed no knowledge of drumming as a spiritual experience. This difference could also be related to the specific physical environments in which the two drum circles occurred. Drum circle A occurred in an outdoor public space while drum circle B occurred at a private space within a business with a focus on health and healing.

Implications for Occupational Therapy and Occupational Science

Previous studies have examined drumming as a tool to support physical and mental health within populations of individuals with chronic conditions utilizing approaches including restore, maintain, and modify (Cottrell & Gallant, 2003; Ekins & Owens, 2018; Fancourt et al., 2016; Faulkner, Ivery, Wood, & Donovan, 2010; Litchke & Bracken, 2018). In addition to the previous approaches, drum circle participation could be utilized as an approach to promote health and disability prevention with not only individuals with chronic disease or disabilities, but with a wide range of individuals from the general population (AOTA, 2020). Drum circle participation can provide many therapeutic benefits to promote mental and physical health, develop self-esteem, impulse control, support sensory processing, social participation, and trauma recovery. Participating in drum circles can promote healthy aging through physical activity, mentally stimulating activity, and social participation (Hertzog, Kramer, Wilson, & Lindenberger, 2008; Uchino, 2009).

The ideas related to flow provide examples of the importance of occupational therapy practitioners correctly matching activities to the clients skills so clients can find success in their

meaningful life occupations. As revealed in this study even during group activities, adjustments in activity demands (one hand versus two hands or the complexity of rhythms) can allow individuals of different abilities to find enjoyment and success in the same activity. The meaning of drumming for participants or interest in drumming was not actualized until participants observed a drumming performance or tried drumming for the first time. Increased exposure could open the way for identification of and increased participation in a meaningful life and leisure occupations that provide an opportunity for children and adults to engage in the occupation of play to support themselves and community on many different levels.

Traditional uses of drum circles can still serve their original purpose by improving community and unifying participants through sensory input and movement to synchronize participants' minds and bodies such as in examples of addiction recovery (Winkelman, 2003). Perhaps increased drumming exposure can allow for the beneficial properties to continue into the future and balance the increased demand of modern daily life dominated by structured routines and technology by providing moments of respite from the stress of daily life. Our communities, routines, roles, and daily occupations especially social participation have been greatly disrupted through our experiences related to a worldwide pandemic and violence related to systemic racism. In the aftermath of these changes and experiences, there is a great need for returning to a new normal through physical and mental healing and finding ways to again reconnect with others through social participation. Drum circles may be an appropriate format for some individuals to begin this process.

Limitations

Although this study provides useful insight and information to understand the perceived benefits more thoroughly for adults who participate in community drum circles, limitations exist. The first limitation is the relatively small convenience sample size (six participants). Caution must be taken in generalizing findings to the larger population. The collection of additional data would make the data more robust. The sample lacked diversity in the age, gender, and cultural background of participants. The current study was conducted in two distinct rural settings. Participants in the study were limited to individuals willing to be interviewed and discuss drum circle participation. Three of the participants were involved in facilitating the drum circles and may not be representative of typical drum circle participants. The interviewer did not have access to a comparison group of individuals who play drums but chose not to attend drum circles. Although researchers utilized the reduction bias and investigator triangulation, the data passed through the minds of the researchers and it is possible that some internal biases are present in the results (Moustakas, 1994).

Suggestion for further Research

It is important that more research be conducted on drum circles to improve our understanding of this activity and to strengthen the current findings. Future research would benefit from having a larger sample size with a wider age range. It is also important that future research examine a more culturally diverse sample from different geographical areas. This study was limited to individuals of European descent that adopted drumming as a leisure activity. Additional research exploring drumming with individuals involved in drumming as part of their culture such as Native Americans or individuals from Africa would expand our understanding of drumming

within a wider context. Other considerations could explore and attempt to identify who benefits from or responds positively to drum circle participation by possibly learning about common interests and sensory preferences of drum circle participants. To more fully understand the occupation of drumming it is important that future research consider the place of drum circles in our current world and society, and how the prevalence of drumming will be influenced by continued technological advancements and increased use and dependence on screens. Further research could explore how to combine drumming with technology and determine how virtual drumming compares to the benefits of in person drum circles and could possibly satisfy the human need and requirement for social participation to support health.

Conclusion

The occupation of drumming has existed for most of recorded human history. The great diversity among drums, types of drumming, and purposes of drumming equals that of the people who engage in this occupation. Active participation in drumming provides increased opportunities to experience the benefits of drumming when compared to passive listening and demonstrates the importance of engaging in meaningful activities. Rhythms are present within us and around us, and participation in drumming can provide a means to influence our internal rhythms depending on the duration, tempo, and patterns experienced. Current research has examined drumming as a beneficial occupation to support physical and mental health but has focused more on drumming as a restorative tool than a maintenance or health promotion tool.

Outcome measures for drumming have included surveys, questionnaires, specific assessments, and measurements of biological data, but have often not recorded narrative perspectives.

This study examined the perceived benefits of drum circle participation. A phenomenological approach was used to examine the perspectives of a sample group to explore the meaning of and perceived benefits of drumming. Findings identified positive social interaction and enjoyment of the experience as major factors contributing to participant participation. Participants all expressed positive emotional responses to participation and a desire to share the experience of drumming with others. In addition to drum circles providing engagement in social participation, they also provided participants with opportunities to engage in leisure, volunteer, retirement, and health management activities. Participants reported experiencing an increased connectedness to the group and the present moment which allowed them to temporarily leave the demands of day to day life behind for a brief moment. The experiences of participants can be equated to the concepts of flow as well as some participants reported a spiritual experience. All of the participants also expressed an openness to learning and new experiences. From this study it is important to note the influence context can have on the participants' perception and outcomes related to their drum circle experience.

The act of drumming, striking a surface to produce a tone with hands or a stick, appears to be a relatively simple activity. Examining the components involved in drumming such as social participation, sensory input, entrainment, and physiological changes, may not be able to capture the entirety of what drum circle participation means to the individuals who engage in this occupation. Drum Circle participation is a meaningful activity for participants and has the potential for many positive outcomes related to promoting, maintaining, and restoring social participation, and physical and mental health.

References

Adrian, E. D., & Matthews, B. H. C. (1934). The Berger rhythm: Potential changes from the occipital lobes in man. *Brain*, *57*, 355–385.

Amegago, M. (2014). *African drumming: The history and continuity of African drumming traditions*. Trenton, NJ: Africa World Press.

American Occupational Therapy Association (AOTA). (2017). Occupational therapy practice framework: domain and process (3rd ed.). *The American Journal of Occupational Therapy* *68*, S1-S48. doi:10.5014/ajot.2014.682006

American Occupational Therapy Association (AOTA). (2020). Occupational therapy practice framework: Domain and process (4th ed.). *American Journal of Occupational Therapy*, *74*(Suppl. 2), 7412410010. <https://doi.org/10.5014/ajot.2020.74S2001>

Arcadi, A. C., & Mugurusi, D. R. F. (2004). A comparison of buttress drumming by male chimpanzees from two populations. *Primates; Journal of Primatology*, *45*(2):135-139. doi:10.1007/s10329-003-0070-8

Ayres, A. J., Robbins, J., & Pediatric Therapy Network. (2005). *Sensory integration and the child: understanding hidden sensory challenges*. Los Angeles, CA: WPS.

Bensimon, M., Amir, D., & Wolf, Y. (2008). Drumming through trauma: Music therapy with post-traumatic soldiers. *The Arts in Psychotherapy*, 35(1), 34-48.

doi.org/10.1016/j.aip.2007.09.002

Bhattacharjee, A. (2012). *Social Science Research: Principles, Methods, and Practices*.

USF Open Access Collections, Scholar Commons, Creative Commons 3.0. Retrieved from <https://open.umn.edu/opentextbooks/BookDetail.aspx?bookId=79>

Bittman B., Berk L., Felten, D., Westengard, J., Simonton, O., ... Pappas, J. (2001).

Composite effects of group drumming music therapy on modulation of neuroendocrine-immune parameters in normal subjects. *Alternative Therapies in Health and Medicine*, 7(1), 38-47.

Bittman, B. B., Snyder, C., Bruhn, K. T., Liebfreid, F., Stevens, C. K., Westengar, J., & Umbach, P. O. (2004). Recreational music-making: An integrative group intervention for reducing burnout and improving mood states in first year associate degree nursing students: insights and economic impact. *International Journal of Nursing Education Scholarship*, 1(1), 29.

Bittman, B., Stevens, C., & Bruhn, K. (2017). *Health rhythms group empowerment drumming: facilitator training manual*. Valencia, CA: Remo.

Bouwer, F., & Honing, H. (2012). Rhythmic regularity revisited: Is beat induction indeed pre-attentive? *Proceedings of the 12th International Conference on Music Perception and Cognition* (pp. 122–127). Thessaloniki, Greece: Aristotle University of Thessaloniki.

Breedlove, S. M., & Watson, N. V. (2017). *Behavioral neuroscience*. Sunderland, MA: Sinauer Associates.

- Brown, C. (2011). Motivation. In Brown, C., & Stoffel, V. (Eds.). *Occupational therapy in mental health: A vision for participation* (pp.33-344). Philadelphia, PA: F.A. Davis.
- Brown, S., & Jordania, J. (2013). Universals in the world's musics. *Psychology of Music*, 41(2), 229–248. <https://doi.org/10.1177/0305735611425896>
- Bundy, A. C., Lane, S. J., & Murray, E. A. (2002). *Sensory integration: theory and practice*. Philadelphia, PA: F.A. Davis.
- Burgess, A. P., & Gruzelier, J. H. (1997). Short duration synchronization of human theta rhythm during recognition memory. *Neuroreport*, 8(4), 1039–1042.
- Burns, R. (1986). Careers in drumming. Retrieved from <https://www.moderndrummer.com/article/may-1986-careers-in-drumming/>
- Buzsaki, G. (2006). *Rhythms of the brain*. New York, NY: Oxford University Press.
- Carolan, K. (2016). Find your beat: Therapeutic drumming for Parkinson's disease. *Clinical Social Work Journal*, 44(2), 179–185. doi:10.1007/s10615-015-0552-3
- Clare, D. (2008). Building healthy communities through community drum circles. *Canadian Nurse*, 104(1), 8-9.
- Chang, M. C., Ahn, S. H., Cho, Y. W., Son, S. M., Kwon, Y. H., Lee, M. Y., ... Jang, S. H. (2009). The comparison of cortical activation patterns by active exercise, proprioceptive input, and touch stimulation in the human brain: a functional MRI study. *Neurorehabilitation*, 25(2), 87–92. doi:10.3233/NRE-2009-0502
- Chen, C., Kiebel, S., Kilner, J., Ward, N., Stephan, K., Wang, W., & Friston, K. (2012). A dynamic causal model for evoked and induced responses. *NeuroImage*, 59(1), 340-348. doi:10.1016/j.neuroimage.2011.07.066

- Choi, S. W., Chi, S. E., Chung, S. Y., Kim, J. W., Ahn, C. Y., & Kim, H. T. (2010). Is alpha wave neurofeedback effective with randomized clinical trials in depression? A pilot study. *Neuropsychobiology*, *63*(1), 43–51. doi:10.1159/000322290
- Cottrell, F. R. P., & Gallant, K. A. (2003). The elders drum project: Enhancing quality of life for long-term care residents. *Physical and Occupational Therapy in Geriatrics*, *22*(2), 57–79.
- Creech, A., Hallam, S., McQueen, H., & Varvarigou, M. (2013). The power of music in the lives of older adults. *Research Studies in Music Education*, *35*(1), 87–102.
- Crossley-Holland, P. (2017). Rhythm. In *Encyclopaedia Britannica*. Retrieved from www.britannica.com/art/rhythm-music
- Cruess, D. G., Antoni, M. H., Kumar, M., & Schneiderman, N. (2000). Reductions in salivary cortisol are associated with mood improvement during relaxation training among HIV-seropositive men. *Journal of Behavioral Medicine*, *23*(2), 107.
- Csikszentmihalyi, M. (1997). Finding flow. *Psychology Today*, *30*(4), 46.
- Csikszentmihalyi, M., & Csikszentmihalyi, I. S., (1988). *Optimal experience: Psychological studies in flow consciousness*. Cambridge, MA: Cambridge University Press.
- Csikszentmihalyi, M., & Nakamura, J. (2018). Flow, altered states of consciousness, and human evolution. *Journal of Consciousness Studies*, *25*(11–12), 102–114.
- Daniell, S. L. (2004). *Rhythm as an archetypal element of the psyche: A transpersonal perspective* (Master's thesis). University of Johannesburg DigiSpace database. Retrieved from <http://hdl.handle.net/10210/6306>

David, O., Kilner, J., & Friston, K. (2006). Mechanisms of evoked and induced responses in MEG/EEG. *Neuroimage*, *31*(4), 1580-1591. doi:10.1016/j.neuroimage.2006.02.034

Dean, M. (2012). *The Drum: A History*. Lanham, MD: Scarecrow Press.

Deraney, J., Davis, M., Evers, H. B., German, K., Hamill, J. C., Karas-Irwin, B. S., Mazzer, M. C., & Shaw, R. E. (2017). Drumming effect on anxiety. *Archives of Psychiatric Nursing*, *31*(5), 528–529. doi.org/10.1016/j.apnu.2017.05.001

Diamond, M. C., Krech, D., and Rosenzweig, M. R. (1964). The effects of an enriched environment on the histology of the rat cerebral cortex. *J. Comp. Neurol.*, *123*: 111-119. doi:10.1002/cne.901230110

Dickerson, D. L., Venner, K. L., Duran, B., Annon, J. J., Hale, B., & Funmaker, G. (2014). Drum-assisted recovery therapy for Native Americans (Dartna): Results from a pretest and focus groups. *American Indian & Alaska Native Mental Health Research: The Journal of the National Center*, *21*(1), 35–58.

Drum. (n.d.). In *Merriam-Webster's online dictionary*. Entry 1 of 3. Retrieved from <https://www.merriam-webster.com/dictionary/drum>

Dunbar, R., Kaskatis, K., MacDonald, I. F., & Barra, V. (2012). Performance of music elevates pain threshold and positive affect: Implications for the evolutionary function of music. *Evolutionary Psychology*, *10*(4), 688-702. doi: 10.1177/147470491201000403

Durojaye, C. (2017). African drumming: The history and continuity of African drumming traditions. *African Music*, *10*(3), 170–173.

Ekins, C., & Owens, D. P. (2018). Drums Alive®: A research-based, multi-disciplinary drumming fitness approach to brain and body health and wellness. *Palaestra*, *32*(4), 22–28.

- Endedijk, H. M., Ramenzoni, V. C. O., Cox, R. F. A., Cillessen, A. H. N., Bekkering, H., & Hunnius, S. (2015). Development of interpersonal coordination between peers during a drumming task. *Developmental Psychology, 51*(5), 714–721.
- Fancourt, D., Perkins, R., Ascenso, S., Carvalho, L. A., Steptoe, A., & Williamon, A. (2016). Effects of group drumming interventions on anxiety, depression, social resilience, and inflammatory immune response among mental health service users. *PloS one, 11*(3), e0151136. doi:10.1371/journal.pone.0151136
- Fancourt, D., Ockelford, A., & Belaia, A. (2014). The psychoneuroimmunological effects of music: A systematic review and a new model. *Brain, Behavior, and Immunity, 36*, 15-26. doi.org/10.1016/j.bbi.2013.10.014
- Faulkner, S., Ivery, P., Wood, L., & Donovan, R. (2010). Holyoake's drumbeat program: Music as a tool for social learning and improved educational outcomes. *Australian Journal of Indigenous Education, 39*, 98–109.
- Field, T., Hernandez-Reif, M., Diego, M., Schanberg, S., & Kuhn, C. (2005). Cortisol decreases and serotonin and dopamine increase following massage therapy. *International Journal of Neuroscience, 115*(10), 1397–1413. doi:10.1080/00207450590956459
- Field, T. M., Sunshine, W., Hernandez-Reif, M., Quintino, O., Schanberg, S., Kuhn, C., & Burman, I. (1997). Massage therapy effects on depression and somatic symptoms in chronic fatigue syndrome. *Journal of Chronic Fatigue Syndrome, 3*(3), 43–51.
- Fitch, W. T. (2006). The biology and evolution of music: A comparative perspective. *Cognition, 100*(1), 173-215. doi:10.1016/j.cognition.2005.11.009
- Forbes, R., M. (1953). The composition of the adult human body as determined by chemical analysis. *Journal of Biological Chemistry, 203*(1), 359-66.

Friedman, R. L. (2000). *The healing power of the drum: A psychotherapist explores the healing power of rhythm*. Gilsum, NH: White Cliffs Media.

Geller, S. (2018). Therapeutic presence and polyvagal theory: Principles and practices for cultivating effective therapeutic relationships. In Porges, S. W., & Dana, D (Eds.), *Clinical applications of the polyvagal theory: The emergence of polyvagal-informed therapies*. (pp. 106-126). New York, NY: Norton.

Gingras, B., Pohler, G., & Fitch, W. T. (2014). Exploring shamanic journeying: Repetitive drumming with shamanic instructions induces specific subjective experiences but no larger cortisol decrease than instrumental meditation music. *PLoS ONE*, *9*(7), 1–9.

Gray, A. (2018). Roots, rhythm, reciprocity: Polyvagal-informed dance movement therapy for survivors of trauma. In Porges, S. W., & Dana, D (Eds.), *Clinical applications of the polyvagal theory: The emergence of polyvagal-informed therapies*. (pp. 207-226). New York, NY: Norton.

Hernandez-Reif, M., Dieter, J., & Field, T. (1998). Migraine headaches are reduced by massage therapy. *International Journal of Neuroscience*, *96*(1/2), 1.

doi:10.3109/00207459808986453

Hernandez-Reif, M., Ironson, G., Field, T., Hurley, J., Katz, G., Diego, M., ... Burman, I. (2004). Breast cancer patients have improved immune and neuroendocrine functions following massage therapy. *Journal of Psychosomatic Research*, *57*(1), 45–52.

doi:10.1016/S0022-3999(03)00500-2

Hertzog, C., Kramer, A. F., Wilson, R. S., & Lindenberger, U. (2008). Enrichment effects on adult cognitive development: Can the functional capacity of older adults be preserved

and enhanced? *Psychological Science in the Public Interest*, 9(1), 1–65.

doi:10.1111/j.1539-6053.2009.01034.x

Hill, J. C., Hains, B., & Ricketts, K. (2017). Drumming: An innovative alternative for drug addicted individuals. *Journal of Alcohol & Drug Education*, 61(2), 7–24.

Hull, A. (1998). *Drum circle spirit: Facilitating human potential through rhythm*.

Gilsum, NH: White Cliffs Media.

Ivanov, A., Kvasovets, S., Ushakov, I., & Bubeev, Y. (2013). Rhythm-suggestive compensation and unconscious regulatory mechanisms. *Human Physiology*, 39(7),

716–722. doi:10.1134/S0362119713070086

Jacobson, H. (Producer). (2019). Stephen Porges on the link between feeling safe and making change: PYP 340 [Audio podcast].

<https://plantyourself.com/stephen-porges-pyp-340/>

James, S. (2018). Indigenous epistemology explored through yoruba orisha traditions in the african diaspora. *Women & Therapy*, 41(1/2), 114–130.

doi:10.1080/02703149.2017.1324192

Janata, P., & Grafton, S. T. (2003). Swinging in the brain: Shared neural substrates for behaviors related to sequencing and music. *Nature Neuroscience*, 6(7), 682.

doi:10.1038/nn1081

Jones, M. R. (1976). Time, our lost dimension: Toward a new theory of perception, attention, and memory. *Psychological Review*, 83(5), 323.

Jovanov, E., & Maxfield, M. C. (2011). Entraining the brain and body. In J. Berger & G. Turow (Eds.). *Music, science, and the rhythmic brain: Cultural and clinical implications* (pp. 31–48). New York, NY: Routledge.

- Kalani. (2004). *Together in rhythm: A facilitator's guide to drum circle music*. Los Angeles, CA: Alfred Pub. Co.
- Kirschbaum, C., & Hellhammer, D. H. (1989). Salivary cortisol in psychobiological research: An overview. *Neuropsychobiology*, 22(3), 150–169.
- Kirschner, S., & Tomasello, M. (2009). Joint drumming: Social context facilitates synchronization in preschool children. *Journal of Experimental Child Psychology*, 102(3), 299–314. doi:10.1016/j.jecp.2008.07.005
- Kokal, I., Engel, A., Kirschner, S., & Keysers, C. (2011). Synchronized drumming enhances activity in the caudate and facilitates prosocial commitment - If the rhythm comes easily. *PLoS ONE*, 6(11), 1–12. doi:10.1371/journal.pone.0027272
- Kunda, D. A. (1979). Slit logs and sacred cows: The history of the drum. *Music Educators Journal*, 66(1), 56–65. doi:10.2307/3395719
- Leeuwen, L., & Westwood, D. (2008). Adult play, psychology, and design. *Digital Creativity*, (19)153–161. doi:10.1080/14626260802312665
- Litchke, L. G., & Bracken, M. M. (2018). A qualitative study on the social-emotional benefits of Drumtastic Ability Beats® for children with autism spectrum disorder. *American Journal of Recreation Therapy*, 17(3), 37–47.
- Long, T., Linette, D., & Manosalvas, W. (2018). Introducing drumming as a therapeutic intervention in acute psychiatric services. *Beginnings*, 38(3), 16–17.
- Lotha, G., Lewis, R., Young, G., Gorlinski, V., & Ray, M. (2017). Drum: Musical instrument. In *Encyclopaedia Britannica*. Retrieved from www.britannica.com/art/drum-musical-instrument

- Marder, E., & Bucher, D. (2001). Central pattern generators and the control of rhythmic movements. *Current Biology*, *11*(23), R986-R996.
- Martin, K., Wood, I., Tasker, J., & Coletsis, C. (2014). *The Impact of Holyoake's DRUMBEAT Program on Prisoner Wellbeing in Western Australian Prisons*. The University of Western Australia, Crawley, Western Australia. Retrieved from https://cdnflightdec.userfirst.co.nz/uploads/sites/artsaccess/files/pdf_documents/drumbeat_report_20-12-2013.pdf
- Mason, B. S. (1974). *How to make drums, tomtoms & rattles*. New York, NY: Dover.
- Merker, B. H. (1999). Synchronous chorusing and the origins of music. *Musicae Scientiae Special Issue*, 1999-2000: 59-73.
- Merker, B. H., Madison, G. S., & Eckerdal, P. (2009). On the role and origin of isochrony in human rhythmic entrainment. *Cortex: A Journal Devoted to the Study of the Nervous System & Behavior*, *45*(1), 4–17. doi.10.1016/j.cortex.2008.06.011
- Mikenas, E. (1999). Drums, not drugs. *Percussive Notes*, *37*(2), 62–63. Retrieved from <http://publications.pas.org/Archive/complete/Apr99/99.04.pdf>
- Mikenas, E. (2003). Drumming on the edge of leadership hand drumming and leadership skills for the new millennium. *Percussion Notes*, *41*(1), 42-45.
- Moustakas, C. E. (1994). *Phenomenological research*. Thousand Oaks, CA: Sage Publications.
- Müllersdorf, M., & Ivarsson, A. B. (2012). Use of creative activities in occupational therapy practice in Sweden. *Occupational Therapy International*, *19*(3):127-34. doi:10.1002/oti.1327

Nachimuthu, P., Bhuvaneswari, B., & Mahendran, P. (2006). The relevance of rituals. *JOY: The Journal of Yoga*, 5(1), 1.

Namerow, N. S., Sclabassi, R. J., & Enns, N. F. (1974). Somatosensory responses to stimulus trains: Normative data. *Electroencephalography and Clinical Neurophysiology*, 37(1), 11-21. doi.org/10.1016/0013-4694(74)90241-7

National Institute of General Medical Sciences (NIGMS). (2017). Circadian rhythms. Retrieved from

https://www.nigms.nih.gov/education/pages/Factsheet_CircadianRhythms.aspx

Neher, A. (1962). A physiological explanation of unusual behavior in ceremonies involving drums, *Human Biology*, 34:2, 151-160. doi.org/10.1177/136346156400100204

Nett, B. (1956). *Music in Primitive Culture*. Cambridge, MA: Harvard University Press.

Newberg, A. B. (2014). The neuroscientific study of spiritual practices. *Frontiers in Psychology*, 5, 215. doi:10.3389/fpsyg.2014.00215

Norris, J. (2018). *Rhythm Entrainment: An Integrative Theory of Interconnectedness*. ProQuest Dissertations and Theses.

Núñez, S. (2016). Medicinal drumming: An ancient and modern day healing approach. *NeuroQuantology*, 14(2), 226–241. doi:10.14704/nq.2016.14.2.939

Ochoa, J. (2013). Drumming within the framework of occupational therapy for children, youth, and adults. Retrieved from

<http://tamborhythms.synthasite.com/resources/Drumming%20within%20the%20Framework%20of%20Occupational%20Therapy.pdf>

Ochoa, J. (n.d.). Music and occupational therapy. Retrieved from

<http://tamborhythms.synthasite.com/music-and-occupational-therapy.php>

- Patel, A. D. (2006). Musical rhythm, linguistic rhythm, and human evolution. *Music Perception, 24*(1), 99–103. doi:10.1525/mp.2006.24.1.99
- Patton, M. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage Publications.
- Percussion instrument. (n.d.). In Merriam-Webster's online dictionary. Retrieved from <https://www.merriam-webster.com/dictionary/percussion%20instrument>
- Petralia, R. S, & Wenthold, R. J. (2009). Neurotransmitters in the auditory system. In: Binder M.D., Hirokawa N., Windhorst U. (eds). *Encyclopedia of Neuroscience*. Berlin, Heidelberg: Springer.
- Phillips-Silver, J., & Keller, P. E. (2012). Searching for roots of entrainment and joint action in early musical interactions. *Frontiers in Human Neuroscience, 6*, 26. doi:10.3389/fnhum.2012.00026.
- Plastow, N. A., Joubert, L., Chotoo, Y., Nowers, A., Greeff, M., Strydom, T., Theron, M., & van Niekerk. E. (2018). The immediate effect of African drumming on the mental well-being of adults with mood disorders: An uncontrolled pretest–posttest pilot study. *American Journal of Occupational Therapy, 72*, 7205345010p1-7205345010p6. doi:10.5014/ajot.2018.021055
- Porges, S. W. (2011). *The polyvagal theory: Neurophysiological foundations of emotions, attachment, communication, and self-regulation*. New York, NY: Norton.
- Price, P.C., Jhangiani, R., Chiang, I-C. A., Leighton, D.C., & Cuttler, C. (2017). *Research Methods in Psychology (3rd American ed.)*. Rice University, Creative Commons v4.0. Retrieved from <https://open.umn.edu/opentextbooks/BookDetail.aspx?bookId=75>

- Ragg, D. M., Soulliere, J., & Turner, M. (2019). Drumming and mindfulness integrations into an evidence-based group intervention. *Social Work with Groups, 42*(1), 29–42. doi.org/10.1080/01609513.2017.1402401
- Redmond, L. (1997). *When the drummers were women: A spiritual history of rhythm*. New York, NY: Three Rivers Press.
- Rhythm. (n.d.). In Merriam-Webster's online dictionary. Retrieved from <https://www.merriam-webster.com/dictionary/rhythm>
- Rhythm History. (n.d.). In StringQuest. Retrieved from <http://www.stringquest.com/rhythm-history/>
- Rogers, L. J. (1981). Methods for finding single generators, with application to auditory driving of the human EEG by complex stimuli. *Journal of Neuroscience Methods, 4*(3), 257-65.
- Ross, J. M., & Balasubramaniam, R. (2014). Physical and neural entrainment to rhythm: Human sensorimotor coordination across tasks and effector systems. *Frontiers in human neuroscience, 8*, 576. doi:10.3389/fnhum.2014.00576
- Schaller, G. B. (1963). *The mountain gorilla*. Chicago, IL: University of Chicago Press.
- Shier, D., Butler, J., & Lewis, R. (2013). *Hole's human anatomy & physiology*. New York, NY: McGraw-Hill.
- Smith, C, Viljoen, J. T., & McGeachie, L. (2014). African drumming: A holistic approach to reducing stress and improving health. *Journal of Cardiovascular Medicine, 15*(5), 441-446. doi:10.2459/JCM.0000000000000046
- Sooksawat, A., Janwantanakul, P., Tencomnao, T., and Pensri, P. (2013). Are religious beliefs and practices of Buddhism associated with disability and salivary cortisol in office

workers with chronic low back pain? *BMC Musculoskelet. Disord.* 14:29. doi: 10.1186/1471-2474-14-29

Strong, J. (2015). *Different drummer: One man's music and its impact on ADD, anxiety, and autism*. Charleston, SC: Strong Institute.

Strong, J. (1995). Rhythmic entrainment intervention. *Rhythmic Report: The Quarterly Newsletter for Rhythmic entrainment Intervention Research Information*, 2(3), 1-6.

Sudsuang, R., Chentanez, V., and Veluvan, K. (1991). Effects of Buddhist meditation on serum cortisol and total protein levels, blood pressure, pulse rate, lung volume and reaction time. *Physiol. Behav.* 50, 543–548. doi: 10.1016/0031-9384(91)90543-W

Thaut, M. H., & Abiru, M. (2010). Rhythmic auditory stimulation in rehabilitation of movement disorders: A review of current research. *Music Perception*, 27(4), 263–269. doi.org/10.1525/mp.2010.27.4.263

Thaut, M. H., McIntosh, G. C., & Hoemberg, V. (2015). Neurobiological foundations of neurologic music therapy: Rhythmic entrainment and the motor system. *Frontiers in Psychology*, 5, 1185. doi:10.3389/fpsyg.2014.01185

The secret language of drumming. (2018). *New Scientist*, 238(3176), 19.

The structure of the drum: How sound is produced. (n.d.). In *Yamaha*. Retrieved from https://www.yamaha.com/en/musical_instrument_guide/drums/mechanism/mechanism003.html

Tierney, A., & Kraus, N. (2015). Neural entrainment to the rhythmic structure of music. *Journal of Cognitive Neuroscience*, 27(2), 400–408. doi:10.1162/jocn_a_00704

Uchino, B. N. (2009). Understanding the links between social support and physical health: A life-span perspective with emphasis on the separability of perceived and

received support. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*, 4(3), 236–255. doi:10.1111/j.1745-6924.2009.01122.x

van Rensburg, E. J., Hatting, R., van Rooyen, C., Chelin, M., van der Merwe, C., Putter, L., Herholdt, J., van Drusten, J., Taylor, M., & Buitendag, T. (2016). The short-term effect of a group drumming intervention on aggressive behaviour among adolescent girls diagnosed with conduct disorder. *South African Journal of Occupational Therapy*, 46(2), 16–22. doi.org/10.17159/2310-3833/2016/v46n2a4

Vinesett, A. L., Price, M., & Wilson, K. H. (2015). Therapeutic potential of a drum and dance ceremony based on the african ngoma tradition. *Journal of alternative and complementary medicine (New York, N.Y.)*, 21(8), 460–465. doi:10.1089/acm.2014.0247

Walter, W. G. (1953). *The living brain*. New York, NY: Norton.

Waring, D. (2007). *Making drums*. New York: Sterling.

Welgampola, M. S., Rosengren, S. M., Halmagyi, G. M., & Colebatch, J. G. (2003). Vestibular activation by bone conducted sound. *Journal of Neurology, Neurosurgery, and Psychiatry*, 74(6), 771–778.

Whelan P. J. (2009) Neurotransmitters and pattern generation. In: Binder, M. D., Hirokawa, N., Windhorst, U. (eds). *Encyclopedia of Neuroscience*. Berlin, Germany: Springer.

Whiton, J. (2018). Practice-based evidence for effective music-making interventions in mental health settings. *American Journal of Occupational Therapy*, 72(4_Supplement_1):7211520310p1. doi:10.5014/ajot.2018.72S1-PO4035.

Wilcock, A. A. (1998). *An occupational perspective of health*. Thorofare, NJ: Slack Incorporated.

Will, U., & Turow, G. (2011). Introduction to entrainment and cognitive ethnomusicology. In Berger, J., & Turow, G. (Eds.), *Music, science, and the rhythmic brain: Cultural and clinical implications* (pp. 3-30). New York, NY: Routledge.

Winkelman, M. (2003). Complementary therapy for addiction: “Drumming out drugs.” *American Journal of Public Health, 93*(4), 647–651.

Wood, L., Ivery, P., Donovan, R., & Lambin, E. (2013). “To the beat of a different drum”: Improving the social and mental wellbeing of at-risk young people through drumming...discovering relationships using music - beliefs, emotions, attitudes, & thoughts. *Journal of Public Mental Health, 12*(2), 70–79.

doi:10.1108/JPMH-09-2012-0002

Appendix A

Interview Guide Questions

Primary Research Question:

What are the perceived benefits of drumming for adults who participate in community drum circles?

Sub Questions:

1. How do participants get introduced to drumming?
2. What is the perceived meaning of drumming for the participant?
3. What are the social aspects of participating in a drum circle?
4. What are other important factors related to drumming for you that we have not already discussed?

Appendix B

Phenomenology

Phenomenology is a type of qualitative research. The philosophy of phenomenology was developed by Edmund Husserl, who was interested in the meaning, essence, and structure of phenomena (Moustakas, 1994). Unlike quantitative research which collects numerical data, qualitative research is less concerned with drawing general conclusions about a large population than with understanding the first-person reports of life experience (Moustakas, 1994; Price, et al., 2017). In addition, qualitative research involves more in-depth information about relatively few people that is more global and exploratory in nature while quantitative research involves a larger sample with less in-depth information that tends to be more specific and focused (Price et al., 2017). By gathering detailed descriptions of human behavior in the real-world contexts, qualitative researchers can convey a sense of the “lived experience” of the research participants (Price et al., 2017, chapter 31 para. 4). To ensure the data is based solely on the gathered evidence, the researcher must set aside any preexisting expectations or biases in order to preserve the subjective experience of the participants (Bhattacharjee, 2012). Moustakas (1994) described this concept as the “Epoche” (p. 85) which serves as a preparation for deriving new knowledge by being able to experience the collected data as if for the first time.

Methods of qualitative research can include “participant observation, in-depth interviews, focus groups, narratives of audio/video recordings, or secondary documents” (Bhattacharjee, 2012, p. 113; Moustakas, 1994; Price et al., 2017). Interviews last between 30 to 90 minutes with the

opportunity for follow up questions if needed. Interviews are transcribed verbatim and coded into themes. Moustakas (1994) describes the process of “horizontalizing” (p. 118) the data by considering every statement relevant to the topic of the phenomenon line by line to identify ideas and perceptions. From these statements meaning units or significant statements were listed (Moustakas, 1994). The meaning units will be clustered into themes and used to develop “textural descriptions of the experience” (Moustakas, 1994, p. 118). The essence of the phenomenon is retained through this process rather than being analyzed or interpreted (Moustakas, 1994).

Appendix C

Electroencephalogram (EEG) Brainwave Frequency Bands

Based on Richard Canton’s (1875) technique of measuring electrical activity on the scalp, Hans Berger developed electroencephalography in the 1920s (Will & Turow, 2011). The prominent electroencephalogram (EEG) brainwave frequency bands consist within the following ranges and are labeled as gamma (30-140 Hz), beta (13-30 Hz), alpha (8-13 Hz), theta (4-8 Hz), and delta (0.05-4 Hz) (Jovanov & Maxfield, 2011; Will & Turow, 2011). The EEGs are not an exact representation of all brain neuronal activity, but the different EEG rhythm patterns are associated with different perceptual, motor, and cognitive states (Burgess, & Gruzelier, 1997; Daniell, 2004; Will & Turow, 2011). Gamma frequencies are divided into two groups slow gamma (30-70 Hz) and fast gamma (70-140 Hz) waves and are associated with moments of insight and heightened awareness (Buzsaki, 2006). Beta frequency is associated with normal everyday activities that

include active alert attention and focus on the exterior world, but also include states of tension, anxiety, fear, and alarm involved in the fight, fright, flight response (Buzsaki, 2006; Jovanov & Maxfield, 2011; Will & Turow, 2011). Alpha frequency activity is associated with states of relaxation (Buzsaki, 2006; Jovanov & Maxfield, 2011). Alpha frequencies are characterized as calm, alert, and supportive of learning and are associated with an increased focus on the present moment (Buzsaki, 2006; Jovanov & Maxfield, 2011). Theta frequency activity is usually associated with periods just before waking or sleeping, including drowsy, near unconscious states, and during meditation (Buzsaki, 2006; Jovanov & Maxfield, 2011). Delta frequency activity is associated with deep sleep or unconsciousness (Jovanov & Maxfield, 2011).

Appendix D

Recruitment Flyer

Participants needed for a research study related to the perceived benefits of adult participation in drum circles

Are you interested in providing your unique perspective on participating in Drum Circles?

Who: Adults over the age of 18

Time: 45 to 75 minute interview

This study is being conducted by a graduate student
from the St. Catherine's Occupational Therapy Department.

If interested, please contact:

Sean at sacudd928@stkate.edu or (715)-338-5564

Appendix E

Image retrieved from
[www.stockunlimited.com/vector/silhouette
-of-djembe_1462766.html](http://www.stockunlimited.com/vector/silhouette-of-djembe_1462766.html)

Information and Consent Form

ST CATHERINE UNIVERSITY

Informed Consent for a Research Study

Study Title: The Perceived Benefits of Drumming

You are invited to participate in a research study. This study is called The Perceived Benefits of Drumming. The study is being done by Sean Cudd, a Masters' candidate student at St. Catherine University in St. Paul, MN. The faculty advisor for this study is Kristine Haertl, PhD, OTR/L, FAOTA, and the department of Occupational Therapy at St. Catherine University. Below, you will find answers to the most commonly asked questions about participating in a research study. Please read this entire document and ask questions you have before you agree to be in the study.

Why are the researchers doing this study?

The purpose of this study is to examine the perceived benefits of drumming of adults who participate in community drum circles. This study is important because it is hoped that this information will lead to academic and practical knowledge that expands our understanding of the occupation of drumming and the encouraged participation in health promoting occupations. Approximately five to seven people are expected to participate in this research.

Why have I been asked to be in this study?

Participation in community drum circles for 1 or more years.

If I decide to participate, what will I be asked to do?

If you meet the criteria and agree to be in this study, you will be asked to do these things:

- The researcher will contact you and ask for a convenient time and location to conduct the interview; if you desire, a copy of the consent form may be provided to you in advance.
- The interview will last approximately 45 to 75 minutes and will ask questions regarding your personal experience with drumming.

In total, this study will take approximately 45 to 75 minutes over one session.

What if I decide I don't want to be in this study?

Participation in this study is completely voluntary. If you decide you do not want to participate in this study, please feel free to say so, and do not sign this form. If you decide to participate in this study, but later change your mind and want to withdraw, simply notify me and you will be removed immediately. If you choose to discontinue participation in the study, you must do so within two months of the interview. After such time, data analysis will have been conducted, and it will not be possible to extricate your data from the project. Your decision of whether or not to participate will have no negative or positive impact on your relationship with St. Catherine University, nor with the student or faculty involved in the research.

What are the risks (dangers or harms) to me if I am in this study?

This study has minimal risks. Some of the questions may be perceived as sensitive in nature as they request information regarding personal thoughts, beliefs, and past experiences. You may choose not to answer any question or questions that you wish without affecting your participation in the study. Confidentiality will be maintained throughout the study; no participant's name will appear in the final written research report. At any time during the study, you may request that information be withheld from use. You may also request that the recording be stopped or paused for any reason during the course of the interview.

What are the benefits (good things) that may happen if I am in this study?

The benefit to you for participation is an opportunity to share your unique opinions and perspectives on the benefits of drumming. It is hoped that information from this study will lead to academic and practical knowledge that expands our understanding of the occupation of drumming and the encouraged participation in health promoting occupations.

Will I receive any compensation for participating in this study?

You will not be compensated for participating in this study.

What will you do with the information you get from me and how will you protect my privacy?

The information that you provide in this study will be recorded and later transcribed and coded. Themes related to the perceived benefits of drumming will be used to guide this exploration of drumming. Your result will be kept confidential. In any written reports or publications, no one will be identified, or identifiable and only group data will be presented. The researcher will keep the research results in a locked safe and only the researcher and their advisor will have access to the records while they work on this project. The researcher will finish analyzing the data by December 2020 and will then destroy all original reports and identifying information that can be linked back to you. Only Dr. Haertl and I will have access to the audio recordings. All audio recordings will be erased by December of 2020.

Any information that you provide will be kept confidential, which means that you will not be identified or identifiable in any written reports or publications. If it becomes useful to disclose any of your information, the researcher will seek your permission and tell you the persons or agencies to whom the information will be furnished, the nature of the information to be furnished, and the purpose of the disclosure; you will have the right to grant or deny permission for this to happen. If you do not grant permission, the information will remain confidential and will not be released.

Could my information be used for future research?

No, your data will not be used or distributed for future research even if de-identified without gaining further consent from you.

Are there possible changes to the study once it gets started?

If during the course of this research study the researcher team learns about new findings that might influence your willingness to continue participating in the study, they will inform you of these findings

things to continue participation in meaningful activities, and by promoting health by the engagement in beneficial activities. For my master's thesis, I am exploring drumming from the perspective of the individuals who participate in drum circles. I'm interested in drumming as a meaningful activity that is beneficial for our mental and physical health, and I would like to learn more about the individual perspectives of drum circle participants. I will be conducting 45 to 75-minute interviews to gather information on this topic. I plan to conduct approximately 5 to 7 interviews. Please contact me if you are interested in discussing the topic of drumming or have any additional questions that I did not answer. I will leave my contact information on this flyer. If you are interested in participating in this study, please contact me, and we can set up a convenient location to meet. Thank you for your time."